

# Syllabus

## *Course Description*

Course Title	Fundamentals of Systems and Control
Course Code	42411
Course Title Additional	
Scientific-Disciplinary Sector	IINF-04/A
Language	English
Degree Course	Bachelor in Electronics and Cyber-Physical Systems Engineering
Other Degree Courses (Loaned)	
Lecturers	Prof. Karl Dietrich von Ellenrieder, Karl.vonEllenrieder@unibz.it <a href="https://www.unibz.it/en/faculties/engineering/academic-staff/person/37038">https://www.unibz.it/en/faculties/engineering/academic-staff/person/37038</a>
Teaching Assistant	
Semester	First semester
Course Year/s	2
CP	6
Teaching Hours	36
Lab Hours	0
Individual Study Hours	114
Planned Office Hours	12
Contents Summary	<p>The course covers the following topics:</p> <ol style="list-style-type: none"> <li>1. Introduction <ol style="list-style-type: none"> <li>a. Time response of 1st/2nd order systems</li> <li>b. Block diagrams</li> <li>c. Linear stability</li> <li>d. Effects of feedback</li> </ol> </li> <li>2. Classical Control <ol style="list-style-type: none"> <li>a. root locus – fundamental ideas</li> <li>b. frequency methods – fundamental ideas and design approach</li> </ol> </li> <li>3. Basics of Digital Control (time-permitting)</li> </ol>

<b>Course Topics</b>	The basic principles of dynamics systems modelling, stability and automatic control for linear time-invariant systems are presented.
<b>Keywords</b>	Dynamic modelling, linear time-invariant systems, automatic control
<b>Recommended Prerequisites</b>	Mathematical Analysis I and II; Physics I and II; Basics of Electronics; Fundamentals of Programming (Module 1)
<b>Propaedeutic Courses</b>	
<b>Teaching Format</b>	Classroom lectures and in-class exercises
<b>Mandatory Attendance</b>	Attendance at lectures is strongly recommended. Attendance at exercise sessions is required
<b>Specific Educational Objectives and Learning Outcomes</b>	The course belongs to the type "caratterizzanti - ingegneria elettronica". The course introduces the fundamentals of linear control theory. Topics covered include: The dynamic response of 1st and 2nd order systems; linear stability; root locus stability analysis; control design and stability analysis in the frequency domain; and time-permitting, basics of digital control systems. The course is aimed at 1st/2nd year undergraduate level students and focuses on building understanding and intuition. Examples and exercises that use Matlab and Simulink will be given.
<b>Specific Educational Objectives and Learning Outcomes (additional info.)</b>	
<b>Assessment</b>	Formative assessment Form: Exercises Length /duration: 24 hours total Summative assessment Form : Exercises (30%) and Final Exam (70%) Length/duration: 4 hours
<b>Evaluation Criteria</b>	In-Class Exercises: Completeness and correctness of answers; level of understanding Written Final Exam: Completeness and correctness of answers. Students are required to receive an overall grade of greater than 60/100 points (final mark of 18/30) to pass the course.

<b>Required Readings</b>	Lecture notes and exercises will be available on Teams.
<b>Supplementary Readings</b>	Additional books and articles may be recommended by the instructor during the course
<b>Further Information</b>	Subject Librarian: David Gebhardi, David.Gebhardi@unibz.it and Ilaria Miceli, Ilaria.Miceli@unibz.it Software used : Matlab and Simulink.
<b>Sustainable Development Goals (SDGs)</b>	Quality education