



DYNAMIC SYSTEMS & CONTROL (SURNAMES L-Z)

Enrollment year	2016/2017
Academic year	2017/2018
Regulations	DM270
Academic discipline	ING-INF/04 (AUTOMATICS)
Department	DEPARTMENT OF ELECTRICAL, COMPUTER AND BIOMEDICAL ENGINEERING
Course	INDUSTRIAL ENGINEERING
Curriculum	PERCORSO COMUNE
Year of study	2°
Period	(05/03/2018 - 15/06/2018)
ECTS	9
Lesson hours	104 lesson hours
Language	Italian
Activity type	WRITTEN AND ORAL TEST
Teacher	MAGNI LALO - 6 ECTS TOFFANIN CHIARA - 3 ECTS
Prerequisites	Linear algebra, complex numbers, basics of circuit theory and physics.
Learning outcomes	The goal of this course is to teach methods for analysing fundamental properties of dynamical systems and design basic control schemes on the basis of given requirements. Lectures will focus on methodological tools, while in lab students will learn computer-based control design using MATLAB and Simulink, which are standard platforms in the industrial context.
Course contents	- System theory Introduction to control problems. Mathematical modelling of physical systems. Definition of dynamical systems. State-space models. Trajectories and equilibria. Stability. Stability of linear time-invariant systems. Routh-Hurwitz stability criterion. Transfer functions. Block

	<p>diagrams. Step response. Frequency response. Bode and Nyquist diagrams.</p> <p>- Analysis and design of control systems Feedback control schemes. Control specifications. Nyquist and Bode stability criteria. Static, dynamic and robust performance. Sensitivity functions. Control design in the frequency domain. Loop shaping. PID controllers. Root locus.</p>
Teaching methods	<p>Lectures (hours/year in lecture theatre): 34 Practical class (hours/year in lecture theatre): 42 Practicals / Workshops (hours/year in lecture theatre): 24</p>
Reccomended or required readings	<p>Gene F. Franklin, J. David Powell, Abbas Emami-Naeini. Feedback Control of Dynamic Systems. Prentice Hall.</p>
Assessment methods	<p>Closed-book, closed-note written exam. Both knowledge of theory and skills in solving simple exercises will be tested.</p>
Further information	<p>Closed-book, closed-note written exam. Both knowledge of theory and skills in solving simple exercises will be tested.</p>
Sustainable development goals - Agenda 2030	<p>\$lbl legenda sviluppo sostenibile</p>