



# UNIVERSITÀ DI PAVIA

Anno Accademico 2019/2020

## PROCESS CONTROL

<b>Anno immatricolazione</b>	2019/2020
<b>Anno offerta</b>	2019/2020
<b>Normativa</b>	DM270
<b>SSD</b>	ING-INF/04 (AUTOMATICA)
<b>Dipartimento</b>	DIPARTIMENTO DI INGEGNERIA INDUSTRIALE E DELL'INFORMAZIONE
<b>Corso di studio</b>	INGEGNERIA ELETTRICA
<b>Curriculum</b>	Energetica
<b>Anno di corso</b>	1°
<b>Periodo didattico</b>	Primo Semestre (30/09/2019 - 20/01/2020)
<b>Crediti</b>	6
<b>Ore</b>	45 ore di attività frontale
<b>Lingua insegnamento</b>	English
<b>Tipo esame</b>	SCRITTO
<b>Docente</b>	FERRARA ANTONELLA (titolare) - 6 CFU
<b>Prerequisiti</b>	Knowledge acquired in previous courses in Automatic Control and Mathematical Methods in Engineering.
<b>Obiettivi formativi</b>	The course describes and analyzes control schemes which are frequently used at industrial level. It also provides the basics for the design of digital control systems.
<b>Programma e contenuti</b>	<p>Industrial control schemes: Cascade control, open loop control, filtering of the reference signal, compensation of measurable disturbances, two degrees of freedom control schemes, Smith Predictor, decentralized control, relative gain array, decoupling schemes.</p> <p>PID controllers Features and properties. Rules for the empirical calibration. Wind-up</p>

and anti wind-up schemes.

Digital control:

Discrete-time systems. The concept of equilibrium for discrete-time systems. Stability. Stability of linear time-invariant discrete-time systems. Jury test. Digital control schemes. Sampling problem. Choice of the sampling time. Discretization of continuous-time controllers. Euler and Tustin methods.

**Metodi didattici**

Lectures (hours/year in lecture theatre): 45

Practical class (hours/year in lecture theatre): 0

Practicals / Workshops (hours/year in lecture theatre): 0

**Testi di riferimento**

Lecture notes

Paolo Bolzern, Riccardo Scattolini, Nicola Schiavoni. Fondamenti di controlli automatici. McGraw-Hill, Milano. (In Italian).

Carlos A. Smith, Armando B. Corripio. Principles and Practices of Automatic Process Control. John Wiley and Sons.

**Modalità verifica apprendimento**

Closed-book, closed-notes, 2 hour written exam consisting of 1-2 sections assessing knowledge and understanding of the course topics and ability to apply them in a problem solving context. Each section will be independently graded. Threshold to pass is 18/30 an maximum mark is 30/30 cum laude. The final mark is obtained as the weighted mean of marks given to each section of the written exam. Example of a written exam:

[http://sisdin.unipv.it/labsisdin/teaching/courses/procon/files/Process\\_Control\\_Exam\\_Example.pdf](http://sisdin.unipv.it/labsisdin/teaching/courses/procon/files/Process_Control_Exam_Example.pdf)

**Altre informazioni**

**Obiettivi Agenda 2030 per lo sviluppo sostenibile**

[\\$lbl legenda sviluppo sostenibile](#)