



### ROBOT CONTROL

<b>Anno immatricolazione</b>	2019/2020
<b>Anno offerta</b>	2020/2021
<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>	Sistemi elettrici
<b>Anno di corso</b>	2°
<b>Periodo didattico</b>	Secondo Semestre (08/03/2021 - 14/06/2021)
<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 provides the basic methodological tools to model and control industrial robots.
<b>Programma e contenuti</b>	<p>Modelling of robotic systems: Structure of robotic manipulators. Classification. The joint space and the operational space. Direct kinematics. Inverse kinematics. Differential kinematics. Euler angles. Relationship between geometrical and analytical Jacobian. Dynamic modeling.</p> <p>Robot control: Planning. Motion control in the joint space (decentralized and centralized) and in the operational space (inverse dynamics). Interaction</p>

control: force control, hybrid force/position control.

**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

Robotics: Modelling, Planning and Control (Advanced Textbooks in Control and Signal Processing). Bruno Siciliano, Lorenzo Sciavicco, Luigi Villani, Giuseppe Oriolo. Springer.

**Modalità verifica apprendimento**

Closed-book, closed-notes, 2 hour written exam consisting of 3 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 and 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/robcon/files/Robot\\_Control\\_Exam\\_Example.pdf](http://sisdin.unipv.it/labsisdin/teaching/courses/robcon/files/Robot_Control_Exam_Example.pdf)

**Altre informazioni**

**Obiettivi Agenda 2030 per lo sviluppo sostenibile**

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