DIPARTIMENTO
DI INGEGNERIA
DELL'INFORMAZIONE

Control Systems Engineering

Preparation of the study plan

INSTRUCTIONS
2023/24

Study Plan

Selection of courses and activities to be completed for graduation.

Total formative credit units: 120 – 126

Common mandatory activities (69 cfu)

SYSTEMS THEORY 9 cfu (Year 1, Semester 1)

MACHINE LEARNING 9 cfu (Year 1, Semester 1)

DIGITAL CONTROL 6 cfu (Year 1, Semester 1)

ESTIMATION AND FILTERING 6 cfu (Year 1, Semester 2)

CONTROL LABORATORY 9 cfu (Year 1, Semester 2)

FINAL THESIS + INTERNSHIP/RESEARCH TRAINING 21+9=30 cfu

The remaining activities of the study plan (51-57 cfu) can be chosen by:

- ✓ selecting one of the 4 **suggested paths** (*Machine Learning, Robotics, Industrial Automation and Complex systems*), with automatic approval;

- ✓ preparing a **customized plan** according to the student's interests. It must be approved by the teaching committee.

All study plans must be submitted via UNIWEB.

Machine Learning Path

30 path cfu + 6 control cfu
+15 elective cfu

Path Courses

Convex Optimization

Learning Dynamical Systems

Reinforcement Learning

Computer Vision

"Computation and measurements"

Big Data Computing

Measurements architectures for cyber-physical systems

"Advanced Control"

Nonlinear Systems & Control

Robotics and Control 1

Adaptive and Model Predictive Control

"Methods and Models"

Game Theory

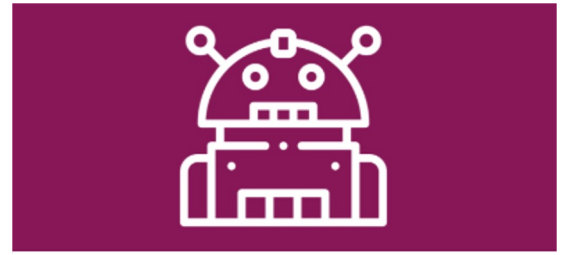
Neural Networks and DL

Learning from Networks

Network Dyn. Systems

Robotics Path

30 path cfu + 6 control cfu +15 elective cfu



Path Courses

Robotics and Control 1

Robotics and Control 2

Convex Optimization

Computer Vision

"Learning"

Learning Dynamical Systems

Reinforcement Learning

"Advanced Control"

Nonlinear Systems & Control

Network Dynamical Systems

"Applied"

Industrial Robotics

Intelligent Robotics

Robotics Laboratory

"Industrial"

Electric Drives for Automation

Embedded Real-Time Control

Measurement Architectures for CPS

Industrial Automation Path

30 path cfu + 6 control cfu +15 elective cfu

Core Courses

Convex Optimization

Embedded Real-Time Control

Industrial Automation

Electric Drives for Automation

"Methodological"

Learning Dynamical Systems

Robotics and Control 1

"Applied"

Industrial Robotics

Computer Vision*

Measurement Architectures for CPS

"Disruptive"

Reinforcement Learning

Information Security

Computer Vision**

Adaptive & MPControl

Complex Systems Path

30 path cfu + 6 control cfu
+15 elective cfu

Core Courses

Learning Dynamical Systems

Convex Optimization

Mathematical Physics

Nonlinear Systems & Control

"System Biology"

System Biology

Control of Biological Systems

Math. Cell Biology

"NL Dynamics"

Robotics and Control 1

Robotics and Control 2

Reinforcement Learning

"Networks"

Network Dyn. Systems

Learning from Networks

Game Theory

"Information"

Automata, Languages and Computation

Quantum Information & Computing

Game Theory

Customized Path and Full Course List

Rules for customized paths: Choose 51-57 CFU among the following courses.
Of those, AT LEAST 15 CORE CFU and AT LEAST 15 INTEGRATIVE CFU.
Moreover, you must choose 15 ELECTIVE CFU from any Master program of UNIPD (including the following list).

Industrial Automation (9cfu CORE)
Learning Dynamical Systems (9cfu, CORE)
Robotics and Control 1 (9cfu, CORE)
Robotics and Control 2 (9cfu, CORE)
Adaptive and Model Predictive (6cfu, CORE)
Reinforcement Learning (6cfu, CORE)
Nonlinear Systems and Control (6cfu, CORE)
Embedded Real-Time Control (6cfu, CORE)
Network Systems and Dynamics (6cfu, CORE)
Network Systems (6cfu, CORE)
Systems Biology (6cfu, CORE)
Robotics laboratory (6cfu, CORE)
Industrial Robotics (9cfu, CORE)

Convex Optimization (6cfu, INTEG.)
Mathematical Physics (9cfu, INTEG.)
Digital Signal Processing (6cfu, INTEG.)
Quantum Information and Computing (6cfu, INTEG.)
Neural Networks and Deep Learning (6cfu, INTEG.)
Measurement Architectures for Cyber-physical Systems (9cfu, INTEG.)
Computer Vision (9cfu, INTEG.)
Computer Vision (6cfu, INTEG.)
Intelligent Robotics (9cfu, INTEG.)
Big Data Computing (6cfu, INTEG.)
Learning from Networks (6cfu, INTEG.)
Game Theory (6cfu, INTEG.)
Information Security (6cfu, INTEG.)
Automata, Languages and Computation (9cfu, INTEG.)
Control of Biological Systems (6cfu, INTEG.)
Smart Grids (6cfu, INTEG.)
Automotive and Domotics (9cfu, INTEG.)
Stochastic Processes (6cfu, INTEG.)
Modeling and Control of Electric Drives (9cfu INTEG.)
Mathematical Cell Biology (6cfu INTEG.)

Questions?

More info at:

https://lauree.dei.unipd.it/lauree-magistrali/control-systems-engineering/

Ask for help or suggestions by writing to:

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