



POLITECNICO
MILANO 1863

SCHOOL OF INDUSTRIAL
AND INFORMATION ENGINEERING

Laurea Magistrale
(equivalent to Master of Science)

Automation and Control Engineering

The World of Automation and Control Engineering

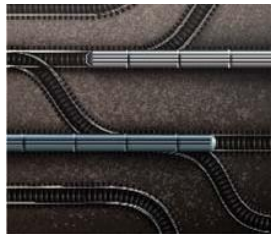
robotics



mechatronics



public utility and transport



production plants



Why enrolling in our MSc Programme?

The Master of Science (MSc) Programme in Automation and Control Engineering aims at training **experts in the design, implementation, and management of automation systems characterized by a strong technological content, in inherently multidisciplinary contexts.**

During the MSc studies, students acquire

- **skills to deal with integration problems arising from the use of components and technologies that are very different from each other**, ranging from the technologies of traditional engineering areas (mechanics, electrical engineering, energy, aerospace) to the most advanced information technologies (control and automation, electronics, computer science, telecommunications)
- **competences to increase functionality and value** of equipment and machinery, to **improve the efficiency** of production processes, and to **devise autonomous systems** that can interactively learn from humans, overcome their performance, and perform strenuous and repetitive tasks, possibly in hostile environments, or even missions impossible for a human

The increasing automation in various domains, including industry, transport, energy, and society at large, makes the Automation Engineer a **highly in-demand professional figure.**

What are the prospects after graduation?

An Automation Engineer can find **job opportunities** in all those companies that produce, or incorporate in their products, tools and systems for the automation, in those companies characterized by flexible production processes at high levels of automation, and in consulting and engineering firms designing complex, technologically advanced automation systems.

The automation market covers increasingly **all sectors of industrial production and services:**

- process industries (chemical, petrochemical, energy, etc.)
- companies and institutions working in the field of transport (land, sea and air)
- the manufacturing industry of consumer goods (food, appliances, games, etc.)
- industries and companies producing and operating plants and systems for renewable energy generation and distribution
- the public utility networks (water, gas, energy, transport, etc.)
- manufacturers of automatic machines, robots, and mechatronic systems, deriving from the integrated design of the mechanics and of the measuring and control electronics
- bodies that oversee or participate in the management of resources (material, natural and human ones) of relevant economic and social interest

The MSc qualification also grants access to the **Research Doctorate**, and to second level Specialization Courses and University Masters.

What subjects are studied?

A single curriculum is available, taught in English, with a few complementary and optional courses taught in Italian.

Courses can be classified in the following categories:

- **methodological**, on transversal subjects such as learning from data, identification, modeling, simulation, optimization and control, including traditional and data-driven methods
- **technological**, on process instrumentation including advanced actuation and measurement systems for control applications
- **application-oriented**, to gain more focused knowledge on the application of control and automation to key areas such as industry, energy, and transport
- **experimental and professionalizing**, comprising an educational lab on automation and control and a project work in collaboration with a company, to improve soft skills through innovative training activities

A final thesis completes the training. During the thesis work, new methods and techniques for automation and control are developed with application in high-tech areas, often in collaboration with industries.

Some highlights

Innovative and international-level courses

- **Project work**, characterized by a strong innovative teaching and held in direct collaboration with a company, that proposes an innovation topic
- **Automation and Control Laboratory**, held in a lab and oriented towards an experimental activity where knowledge acquired in various courses is integrated
- **Advanced topics in automation and control engineering**, held by an internationally recognized Visiting Professor affiliated with a foreign institution

Special opportunities

- students with a creative and entrepreneurial attitude are stimulated to **develop innovative high-tech automation solutions**, and possibly **build a start-up company** with the support of PoliHub
- high level training programme **PoliMI Ambassador in Smart Infrastructures**
- **international curricula** are offered through agreements (Erasmus, extra-Eu bilateral, double degree) with numerous foreign institutions

MSc thesis awards to give a recognition to our best students for their thesis work

AUTONOMY

INNOVATION

TECHNOLOGY

INTELLIGENCE

website www.ccsatm.polimi.it

Study Programme Structure



1° YEAR

Course	Semester	Credits
COMPUTER AIDED MANUFACTURING	1	10
DYNAMICS OF MECHANICAL SYSTEMS	1	10
MODEL IDENTIFICATION AND DATA ANALYSIS	1	10
ADVANCED AND MULTIVARIABLE CONTROL	2	10
DYNAMICS OF ELECTRICAL MACHINES AND DRIVES	2	10
Complementary courses	2	10

2° YEAR

Course	Semester	Credits
AUTOMATION AND CONTROL LABORATORY	2	5
SOFTWARE ENGINEERING (FOR AUTOMATION)	2	5
Complementary courses	1-2	30
THESIS AND FINAL EXAM	1-2	20

Some complementary courses

ADVANCED MEASUREMENT SYSTEMS FOR CONTROL APPLICATIONS
ADVANCED PROCESS CONTROL
ADVANCED TOPICS IN AUTOMATION AND CONTROL ENGINEERING
AUTOMATION AND CONTROL IN AUTONOMOUS VEHICLES
AUTOMATION AND CONTROL IN ELECTRIC AND HYBRID VEHICLES
AUTOMATION OF ENERGY SYSTEMS
CONTROL OF INDUSTRIAL ROBOTS
CONTROL OF MOBILE ROBOTS
DATA DRIVEN CONTROL SYSTEM DESIGN
HIGH-TECH ENTREPRENEURSHIP
ICT FOR CONTROL SYSTEMS ENGINEERING
NETWORKED CONTROL
NONLINEAR CONTROL
NUMERICAL OPTIMIZATION FOR CONTROL
POWER ELECTRONICS AND SUPPLIES
PRODUCTION SYSTEMS CONTROL
PROJECT WORK
ROBUST CONTROL
SAFETY IN AUTOMATION SYSTEMS
SIMULATION TECHNIQUES AND TOOLS
SYSTEMS THEORY
VIBRATION CONTROL AND DIAGNOSTICS OF MECHANICAL SYSTEMS



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