



 POLITECNICO DI MILANO



Automation and Control Engineering Programme

Welcome meeting, 27 September 2016

Paolo Rocco (Chair of the Programme)

Politecnico di Milano - Dipartimento di Elettronica, Informazione e Bioingegneria



Chair and vice-chair of the programme

Chair

[Prof. Paolo Rocco](#)

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Vice-chair

[Prof. Maria Prandini](#)

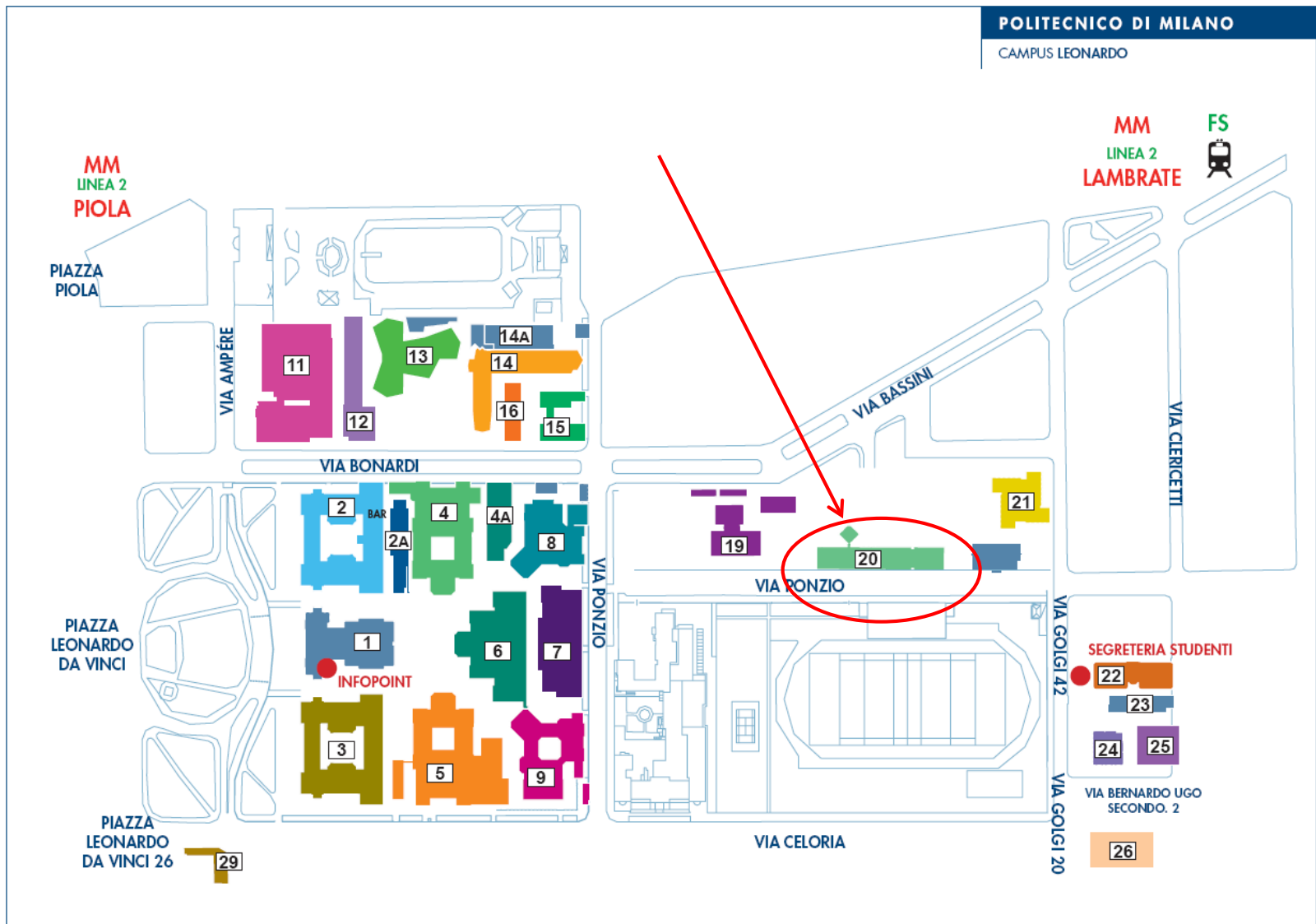
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Where is building 20?





What are the rules to obtain your MSc degree?

- you have to earn **120 credits**
- 45 credits must be taken on qualifying subjects (systems and control, identification, converters and drives, applied mechanics)
- 15 credits or more on subsidiary subjects (computer science, electronics, measurements, industrial production technologies, ...)
- a **final thesis** corresponding to **20 credits** is mandatory

How is the programme organized?

- the programme is organized in two years, four semesters
- each student has a **study plan**
- study plans can be pre-approved or autonomous (see below)



Code	Att form	SSD	Course title	Sem	Credits (CFU)
091223	B	ING-IND/13	FUNDAMENTALS OF MECHANICS	2	5.0
091247	B	ING-IND/32	FUNDAMENTALS OF ELECTRICAL MACHINES	1	5.0

- these courses cover introductory material in two fundamental subjects (electrical machines and mechanics)
- they can be assigned by the admission committee to students enrolling in the MSc course
- they cannot be freely selected by students



Suggested study plan – First year

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If no alignment courses are assigned:

Code	Att. form.	SSD	Corse title	Sem	Credits (CFU)	CFU Group
090912	C	ING-IND/16	COMPUTER AIDED MANUFACTURING	1	10.0	10.0
088775	B	ING-IND/13	DYNAMICS OF MECHANICAL SYSTEMS	1	10.0	10.0
096297	B	ING-INF/04	MODEL IDENTIFICATION AND DATA ANALYSIS	1	10.0	10.0
096129	B	ING-INF/04	ADVANCED AND MULTIVARIABLE CONTROL	2	10.0	10.0
088860	B	ING-IND/32	DYNAMICS OF ELECTRICAL MACHINES AND DRIVES	2	10.0	10.0
--	--	--	Courses to be chosen in Group TAB2	--	--	10.0
--	--	--	Courses to be chosen in Group TAB4	--	--	



Suggested study plan – First year

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If you have been assigned **Fundamentals of Electrical Machines:**

Code	Att. form.	SSD	Corse title	Sem	Credits (CFU)	CFU Group
090912	C	ING-IND/16	COMPUTER AIDED MANUFACTURING	1	10.0	10.0
088775	B	ING-IND/13	DYNAMICS OF MECHANICAL SYSTEMS	1	10.0	10.0
096297	B	ING-INF/04	MODEL IDENTIFICATION AND DATA ANALYSIS	1	10.0	10.0
091247	B	ING-IND/32	FUNDAMENTALS OF ELECTRICAL MACHINES	1	5.0	5.0
096129	B	ING-INF/04	ADVANCED AND MULTIVARIABLE CONTROL	2	10.0	10.0
088860	B	ING-IND/32	DYNAMICS OF ELECTRICAL MACHINES AND DRIVES	2	10.0	10.0
--	--	--	Courses to be chosen in Group TAB2	--	--	10.0
--	--	--	Courses to be chosen in Group TAB4	--	--	

Just add it to the courses in the first semester



Suggested study plan – First year

If you have been assigned **Fundamentals of Mechanics**:

Code	Att. form.	SSD	Corse title	Sem	Credits (CFU)	CFU Group
090912	C	ING-IND/16	COMPUTER AIDED MANUFACTURING	1	10.0	10.0
088775	B	ING-IND/13	DYNAMICS OF MECHANICAL SYSTEMS	1	10.0	10.0
096297	B	ING-INF/04	MODEL IDENTIFICATION AND DATA ANALYSIS	1	10.0	10.0
--	--	--	--	1	--	10.0
096129	B	ING-INF/04	ADVANCED AND MULTIVARIABLE CONTROL	2	10.0	10.0
088860	B	ING-IND/32	DYNAMICS OF ELECTRICAL MACHINES AND DRIVES	2	10.0	10.0
091223	B	ING-IND/13	FUNDAMENTALS OF MECHANICS	2	5.0	5.0
--	--	--	Courses to be chosen in Group TAB2	--	--	5.0
--	--	--	Courses to be chosen in Group TAB4	--	--	

You cannot attend this course now. You will attend it in the 1st semester 2016/17

Add courses for 10 credits in the first semester, for example from TAB. 1 (see below) or present a study plan with a reduced number of credits

Attend this course in the second semester



Suggested study plan – First year

If you have been assigned **Fundamentals of Electrical Machines** and **Fundamental of Mechanics**:

Code	Att. form.	SSD	Corse title	Sem	Credits (CFU)	CFU Group
090912	C	ING-IND/16	COMPUTER AIDED MANUFACTURING	1	10.0	10.0
088775	B	ING-IND/13	DYNAMICS OF MECHANICAL SYSTEMS	1	10.0	10.0
096297	B	ING-INF/04	MODEL IDENTIFICATION AND DATA ANALYSIS	1	10.0	10.0
091247	B	ING-IND/32	FUNDAMENTALS OF ELECTRICAL MACHINES	1	5.0	5.0
--	--	--	--	1	--	5.0
096129	B	ING-INF/04	ADVANCED AND MULTIVARIABLE CONTROL	2	10.0	10.0
088860	B	ING-IND/32	DYNAMICS OF ELECTRICAL MACHINES AND DRIVES	2	10.0	10.0
091223	B	ING-IND/13	FUNDAMENTALS OF MECHANICS	2	5.0	5.0
--	--	--	Courses to be chosen in Group TAB2	--	--	5.0
--	--	--	Courses to be chosen in Group TAB4	--	--	

You cannot attend this course now. You will attend it in the 1st semester 2016/17

Add it to the courses in the first semester

Add a course for 5 credits in the first semester, for example from TAB. 1 (see below) or present a study plan with a reduced number of credits

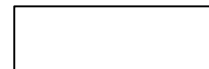
Attend this course in the second semester



Schedule of courses – First semester

	Monday	Tuesday	Wednesday	Thursday	Friday
08.15-9.15	DMS – BL.27.05	DMS – BL.28.21		CAM – CT.57	MIDA – T.2.2
09.15-10.15	DMS – BL.27.05	DMS – BL.28.21	FEM – D.3.3	CAM – CT.57	MIDA – T.2.2
10.15-11.15	CAM – BL.27.05	CAM – BL.28.21	FEM – D.3.3	DMS – CT.57	
11.15-12.15	CAM – BL.27.05	CAM – BL.28.21		DMS – CT.57	
12.15-13.15					
13.15-14.15				DMS – BL.27.07	
14.15-15.15				DMS – BL.27.07	FEM – D.2.3
15.15-16.15	MIDA – T.2.3	MIDA – T.2.1		CAM – BL.27.07	FEM – D.2.3
16.15-17.15	MIDA – T.2.3	MIDA – T.2.1		CAM – BL.27.07	
17.15-18.15	MIDA – T.2.3	MIDA – T.2.1		CAM – BL.27.07	

- CAM: Computer Aided Manufacturing
- DMS: Dynamic of Mechanical Systems
- MIDA: Model Identification and Data Analysis
- FEM: Fundamentals of Electrical Machines



Leonardo Campus



Bovisa Campus



Suggested study plan – Second year

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(subject to changes)

Code	Att. form.	SSD	Course title	Sem	Credits (CFU)	CFU Group
094124	C	ING-INF/05	SOFTWARE ENGINEERING (FOR AUTOMATION)	2	5.0	5.0
--	--	--	Courses to be chosen from Group TAB1	--	--	30.0
--	--	--	Courses to be chosen from Group TAB2	--	--	
--	--	--	Courses to be chosen from Group TAB3	--	--	
--	--	--	Courses to be chosen from Group TAB4	--	--	
097467	B	ING-IND/13 ING-IND/32 ING-INF/04	PROJECT WORK	--	5.0	
090913	B	ING-IND/13 ING-IND/32 ING-INF/04	AUTOMATION AND CONTROL LABORATORY	2	5.0	5.0
090921	--	--	THESIS AND FINAL EXAM	1	20.0	20.0
090921	--	--	THESIS AND FINAL EXAM	2	20.0	



Suggested study plan – TAB 1

Code	Att. form.	SSD	Course title	Sem	Credits (CFU)
093061	B	ING-INF/04	ADAPTIVE SYSTEMS AND LEARNING	1	5.0
090914	B	ING-INF/04	CONTROL OF INDUSTRIAL ROBOTS	1	5.0
097468	B	ING-IND/13	NOISE AND VIBRATION ENGINEERING	1	5.0
097469	B	ING-INF/04	NONLINEAR CONTROL	1	5.0
088724	C	ING-INF/01	ELECTRONIC SYSTEMS	1	10.0
089180	C	MAT/08	NUMERICAL ANALYSIS	1	5.0
093060	B	ING-INF/04	SAFETY IN AUTOMATION SYSTEMS	1	5.0
094172	B	ING-INF/04	SYSTEMS THEORY (NONLINEAR DYNAMICS)	1	5.0



Suggested study plan – TAB 2

Code	Att. form.	SSD	Corse title	Sem	Credits (CFU)
093062	B	ING-INF/04	AUTOMATION AND CONTROL IN VEHICLES	2	5.0
090916	B	ING-INF/04	AUTOMATION OF ENERGY SYSTEMS	2	5.0
097470	B	ING-IND/32	POWER ELECTRONICS AND SUPPLIES	2	5.0
090917	C	ING-IND/35	HIGH-TECH ENTREPRENEURSHIP	2	5.0
097471	B	ING-INF/04	ADVANCED PROCESS CONTROL	2	5.0
090915	B	ING-INF/04	PRODUCTION SYSTEMS CONTROL	2	5.0
097483	C	ING-IND/12 ING-INF/07	ADVANCED MEASUREMENT SYSTEMS FOR CONTROL APPLICATIONS	2	5.0
097484	B	ING-INF/04	SIMULATION TECHNIQUES AND TOOLS	2	5.0



Suggested study plan – TAB 3



Code	Att. form.	SSD	Corse title	Sem	Credits (CFU)
097413	C	ING-IND/16	ADDITIVE MANUFACTURING	1	5.0
095143	C	ING-INF/01	ANALOG CIRCUIT DESIGN	1	10.0
089169	C	ING-INF/05	AUTONOMOUS AGENTS AND MULTIAGENT SYSTEMS	1	5.0
089194	B	ING-INF/04	COMPLESSITÀ NEI SISTEMI E NELLE RETI	1	5.0
096221	--	ING-IND/26	DYNAMICS AND CONTROL OF CHEMICAL PROCESSES	1	5.0
095901	B	ING-INF/04	ICT FOR CONTROL SYSTEMS ENGINEERING	1	5.0
089166	C	ING-INF/05	IMAGE ANALYSIS	1	5.0
090931	C	ING-INF/05	MIDDLEWARE TECHNOLOGIES FOR DISTRIBUTED SYSTEMS	1	5.0
097312	C	ING-IND/17	MANUFACTURING SYSTEMS PLANNING	1	10.0
094179	C	ING-INF/07	OPTICAL MEASUREMENTS	1	5.0
090918	C	ING-INF/01	POWER ELECTRONICS	1	10.0
089184	C	ING-INF/05	SOFTWARE ENGINEERING 2	1	5.0



Suggested study plan – TAB 4

Code	Att. form.	SSD	Corse title	Sem	Credits (CFU)
089076	C	MAT/09	COMPLEMENTI DI RICERCA OPERATIVA	2	5.0
088882	C	ING-INF/05	FORMAL METHODS FOR CONCURRENT AND REAL-TIME SYSTEMS (UIC 545)	2	5.0
097485	--	ING-IND/14	MACHINE DESIGN	2	5.0
095896	B	ING-INF/04	NATURAL RESOURCES MANAGEMENT	2	10.0
089187	C	MAT/09	OTTIMIZZAZIONE DISCRETA	2	5.0





Suggested study plan – Second year

- **elective courses available** in the second year
- at least 20 credits to be taken from TAB1 or TAB2 (a larger number of credits is suggested)
- schedules of courses in TAB1 and TAB2 will not overlap, the same is not guaranteed for courses in TAB3 and TAB4

WARNING: compatibility of schedule is **not guaranteed** between courses in the first year and courses in the second year (TAB1 ... TAB4)



- If you have been assigned an **alignment course** a study plan that satisfies all your preferences, without any overlapping of schedules, **cannot be guaranteed**



Autonomous study plans

- Each student is expected to present his/her study plan
- If the study plan is compliant with the suggested study plans, it is automatically approved (“pre-approved”)
- Otherwise the study plan will be considered “**autonomous**” and then subjected to approval by a committee
- Students can also include a maximum of 10 credits of **freely chosen** courses. The committee will assess the adequacy of such courses with the learning objectives of the programme
- Within these 10 credits, students in the second year may include a special course named “**Project Work**”: it is a course held in cooperation with companies, on design activities in the field of automation and control. Only a limited number of seats are available (an application will be required)



Responsible for study-plans evaluations

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Prof. Marcello Farina

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e-mail: marcello.farina@polimi.it



It is advisable to contact Prof. Garatti or Prof. Farina before submitting an autonomous study plan



	Thesis with reviewer “Tesi”	Thesis without reviewer “Tesina”
Expected outcome	<i>an innovative project in the field of automation and control</i>	<i>a (maybe less) innovative project in the field of automation and control</i>
Reviewer required	yes	no
Maximum increment for the final grade	7/110	4/110

You can ask to any of your professors for a topic for your thesis.


Further sources of information

Polinternational

<http://www.polinternational.polimi.it/>

Web-site of the programme

<http://ccs-automazione.elet.polimi.it/>



POLITECNICO MILANO 1863


Prospective international students

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Overview




POLITECNICO MILANO 1863

Ingegneria dell'Automazione



L'ingegneria dell'automazione ha come scopo il progetto, la realizzazione e la gestione di dispositivi e sistemi atti a far funzionare macchine, impianti, reti e apparati di servizio in modo corretto, economicamente efficiente, tecnicamente sicuro e, per quanto possibile, autonomo.

Sistemi di automazione di crescente complessità sono oggi presenti in quasi ogni settore dall'industria al terziario, dai trasporti all'agricoltura, dall'edilizia alla gestione e difesa delle risorse naturali. Essi contribuiscono a rendere i processi produttivi più efficienti, a migliorare le prestazioni dei prodotti e a generare e migliorare le condizioni di lavoro e di vita.

Il corso di studio in Ingegneria dell'Automazione fornisce una approfondita preparazione interdisciplinare, che integra le tecnologie classiche dell'ingegneria, quali la meccanica o l'elettrica, con le più avanzate tecnologie dell'informatica, l'automatica, l'elettronica, l'informatica, le telecomunicazioni.

I laureati, per la loro versatilità e per l'ampiezza della loro preparazione, trovano impiego in tutti i comparti della produzione industriale e dei servizi in cui l'automazione ha un'importanza crescente.

- nell'industria manifatturiera;
- nelle industrie produttrici di macchine automatiche, di robot e di sistemi meccatronici;
- nell'industria di processo, chimica, petrolchimica, tessile, della plastica, dell'energia;
- nel settore dei trasporti, con riferimento sia ai singoli mezzi di trasporto, auto, treni, aerei, veicoli, navi, sia ai sistemi di gestione delle reti ferroviarie, autostradali, metropolitane;
- nell'industria produttiva di beni di largo consumo, elettrodomestici, giochi;
- nei servizi di gestione delle reti di pubblica utilità, acqua, gas, energia elettrica.

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