POLIMI EDUCATION

# OPENDAY

**BUILD THE FUTURE** Lauree - Lauree Magistrali - Dottorato di Ricerca

09 APRIL 2025

### ELECTRONICS engineering Open Day 2025

Francesco Zanetto, Ph.D.





Politecnico di Milano: Schools and Masters

• Electronics and Engineering: what and why?



Master Degree in Electronics Engineering



#### Data and Stats



Other info: <u>daniele.ielmini@polimi.it</u> (Chair of the Electronics Engineering degrees)



#### **Politecnico di Milano: Schools and Masters**



### Electronics and Engineering: what and why?



#### • Master Degree in Electronics Engineering



#### Data and Stats



#### POLITECNICO MILANO 1863



*"La Scuola di Atene", by Raffaello Sanzio, Musei Vaticani, Rome* 

and original drawings by Raffaello, Pinacoteca Ambrosiana, Milano



## Politecnico di Milano

- 1.300 academics e
- 1.200 technicians and clerks

#### 45.000 students

#### 4 Scuole:

- ICAT Architecture, Urban Planning & Construction Engineering
- DES Design;
- AUIC Civil, Environmental & Land Management Engineering;
- 3i Industrial and Information Engineering
- **12** Departments:
- ... DEIB ...
- 5 Campuses:
- ... "MI Leonardo" ...

POLIMI ranks as the top university in Italy for Engineering and Technology, and among the best all over the world



#### **Ranking:**

#**1** Italy, #**6** Europe, #**21** World

(in *«Engineering & Technology»* QS World University Ranking 2025)

### **POLIMI campuses**



MI Leonardo MI Bovisa Cremona Lecco Piacenza





### **Campus «MI Leonardo»**





### **Campus «MI Leonardo»**





## 12 departments (research tasks)

Dep. ARCHITECTURE & URBAN STUDIES Dep. ARCHITECTURE, BUILDINGS & CONSTRUCTIONS Dep. CHEMISTRY, MATERIALS & CHEMICAL ENG "GIULIO NATTA" Dep. DESIGN Dep. ELECTRONICS, ICT AND BIOENGINEERING Dep. ENERGY Dep. PHYSICS Dep. CIVIL AND ENVIRONMENTAL ENG. Dep. MANAGEMENT ENG. Dep. MATHEMATICS Dep. MECHANICS Dep. AEROSPACE SCIENCE AND TECHNOLOGY

(DASTU) (DABC) (DCMC) (DESIGN) (DEIB) (DENG) (DFIS) (DICA) (DIG) (DMAT) (DMEC) (DAER)





## Schools (faculties for education)

4 Schools (Deans) e 74 CdS (Coordinators)

	Bachelor	Master
School of ARCHITECTURE URBAN PLANNING CONSTRUCTION ENG	3	10+1
School of DESIGN	4	7
School of CIVIL, ENVIRONMENTAL AND LAND MANAGEMENT ENG	4	4
School of INDUSTRIAL AND INFORMATION ENGINEERING	17	24
OVERALL	28	46
28 Bachelor of Science (B.Sc.)		
46 Master of Science (M.Sc. or graduate)		
18 Philosophy Doctor (Ph.D.)		







## **School 3i: Industrial and Information Engineering**

- Largest school of POLIMI
- > 5100 Bachelor degrees / year
- 8 Departments involved
- 917 academics and personnel

# with 60% of all students > 3500 Master degrees / year



# ≈ 21% international students



MI Bovisa 45%



## Info on Polimi and «3i» school

#### www.polimi.it



#### SPOTLIGHT . . . . . . . . . . . . . . . .

Nostra 2020's winning project



ISEE AND 2ND FEES INSTALMENT

Extension of the deadline:







POLIPRINT AND POLITECNICO OFFICIAL MERCHANDISE REOPEN

EUROPEAN PRIZE TO RESTORATION OF BASILICA OF SANTA MARIA DI COLLEMAGGIO SUMMER SCHOOL IDEA LEAGUE

The 2020 Call is available



#### www.ingindinf.polimi.it





## Master of Science in «3i»



#### **Campus "MI Leonardo"** AUTOMATION and CONTROL eng.

COMPUTER SCIENCE and eng.

**BIOMEDICAL** eng.

CHEMICAL eng.

ELECTRICAL eng.

PHYSICS eng.

**ELECTRONICS** eng.

MATHEMATICAL eng.

**TELECOMMUNICATION** eng.

**GEOINFORMATICS** eng.



**Campus "MI Bovisa" AERONAUTICAL** eng. DESIGN & eng. ELECTRICAL eng. ENERGY eng. MANAGEMENT eng. MANAG. of BUILT ENVIRONMENT MECHANICAL eng. MOBILITY eng. NUCLEAR eng. MATERIALS eng. and NANOTECHNOLOGY SPACE eng.

#### **New Masters**

**BIOINFORMATICS for COMPUTATIONAL GENOMICS** CYBER RISK STRATEGY AND GOVERNANCE FOOD engineering MUSIC and ACOUSTING engineering







### Info on Masters of the «3i» School

#### www.polimi.it/corsi/corsi-di-laurea-magistrale

POLITECNICO MILANO 1863

ELECTRONICS ENG

2º (Corso di Laurea Magistrale - Equ

CAMPUS: Milano Leonarda

Educational rules Definitive TRACKS AVAILABLE PSS - ELECTRONICS ENGINEERING

International partners for abroa
 Full programme description

nobility, tutorina, deare

Professors

/ Pogrammes	POLITECNICO MILANO 1863 E MENU	tools Q search
POLITECNICO DI MILANO PROGRAMMES	Home / Programmes / Laurea Magistrale (equivalent to Master of Science)	
litecnico di Nilano offres study programme at all ieveli (pachelor, master of sionos, specializing masters) ja postgradute programmos, PPJ Jin Architecture, Delora na Engineering "You can allo finch high- el training courses (high-heel and specialization schools, honours programmes), a vider ange of MOCOs, line courses free and open to everybody, availabile at the Polimi Open (howledgai vebsite) for current dents, "Passion in Action" catallogue (open participation teaching activities) and language courses.	LAUREA MAGISTRALE (EQUIVA SCIENCE)	LENT TO MASTE
	Next year's educational offer for international prospective students	is available at <u>this page</u> .
LAUREA (EQUIVALENT TO BACHELOR OF SCIENCE)	SCHOOL SCHOOL OF X CAMPUS    2019/202  INDUSTRIAL AND INFORMATION ENGINEERING	20 2018/2019 2017/2018
	Results:24	
	> Aeronautical Engineering	(Milano Bovisa)
LAUREA MAGISTRALE (EQUIVALENT TO MASTER OF SCIENCE)	> Automation and Control Engineering	(Milano Leonardo)
	> Biomedical Engineering	(Milano Leonardo)
	> Chemical Engineering	(Milano Leonardo)
	> Computer Science and Engineering	(Milano Leonardo)
	> Design & Engineering	(Milano Bovisa)
PROGRAMMES IN COLLABORATION WITH OTHER UNIVERSITIES	> Electrical Engineering	(Milano Leonardo, Milano Boy
A Strain a literation of a	Electronics Engineering	(Milano Leonardo)
	> Energy Engineering	(Milano Bovisa, Piacenza)
	> Engineering Physics	(Milano Leonardo)
	> Food Engineering	(Milano Leonardo)
SPECIALIZING MASTERS AND POSTGRADUATE PROGRAMMES	Geoinformatics Engineering	(Milano Leonardo)
	> Management Engineering	(Milano Bovisa)
	Management of Built Environment	(Milano Leonardo)
	> Materials Engineering and Nanotechnology	(Milano Leonardo)
	> Mathematical Engineering	(Milano Leonardo)
RESEARCH DOCTORATE (PH.D.)	> Mechanical Engineering	(Milano Bovisa, Piacenza)
	> Mechanical Engineering	(Lecco)
	> Mobility Engineering	(Milano Bovisa)
	Music and Acoustic Engineering	(Cremona)
	Nuclear Engineering	(Milano Bovisa)
	Safety and Prevention Engineering in the Process Industry	(Milano Leonardo)
	> Space Engineering	(Milano Bovisa)
	> Telecommunication Engineering	(Milano Leonardo)

POLITEC manifest	NICO MILANO 18	63										
Degree r	programme	Show/Se	earch Pro	gramme								
Progr	amme Structure	Academ	ic									-
> Show	/Search Programme	Year	inc.	2019/202 ~	Sede	All car	npuses					~
Save	Document	School		School of Indus	trial and Informa	tion Engir	eering (22	5)				~
Degree I	Programme	Program	nme	Electronics Eng	ineering (476)							~
Facul	ty	Program	nme		Track	PSS - E	LECTRONIC	S ENGINEE	RING			
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schedule	has been disabled	1st Y	ear									
Enabl	le	Code	SSD	Cour	se Title	Num Sec	Language	e Course location	Туре	Sem	CFU	CFU Grou
Search			ING-							1.1	10.0	
Searc	th a Professor	052427	INF/01	ANALOG CIRCU	IT DESIGN			MI	м	1	[1.0 @]	10.0
Searc	ch a Course (system	054654	ING-	ELECTRONIC SY	STEMS			MI	M	1	10.0	10.0
Searc	D.M. n. 509) th Lessons taught in	005155	ING-	ELECTRON DEV	ICES		-	MT	м		10.0	
Englis	sh	095155	INF/01	LAGOTINON DEV.	and and		•	1714			10.0	10.0
Glores		095162	ING- INF/01	MEMS AND MIC	ROSENSORS		-	MI	М	1	10.0	
Se	emester (Sem)		ING-						100			
1	First Semester	095251	INF/01	SIGNAL RECOVE	ERY			MI	м	2	10.0	10.0
2	Second Semester	095264	ING-	DIGITAL INTEG	RATED CIRCUIT D	DESIGN		MI	M	2	10.0	
A	A Annual course		ING.									10.0
Course type (Type)		095274	INF/01	RF CIRCUIT DES	SIGN			MI	м	2	10.0	
I	I Integrated Course Mono-Disciplinary		ING-	MICROELECTRO	NIC TECHNOLOG	IES		MI	м	2	5.0	
V	M Course		ING-		NONIC SYSTEMS	DESIGN		MI	м	2	5.0	5.0
	Language	001000	INF/01	PISATING BERSTI	territe erterrerite.	RESEARCH .	•		1.00	-	[3.0 di)]	_
0	Course completely offered in italian			Courses to be cl	hosen from Group	p TAB1						5.0
	Course completely offered in english	2nd 1	/ear									
0/@	Course offered in italian and english	Code	SSD	Cour	se Title	Num	Languag	e Course location	Туре	Sem	CFU	CFU Grou
	Not available	095380	ING-	MIXED-SIGNAL				MI	м	1	10.0	
Inn	ovative teaching		INF/01				-					10.0
	The credits shown next to this symbol	090918	ING- INF/01	POWER ELECTR	ONICS			MI	М	1	10.0	
	the course CFUs	0.000	1.000	Courses to be cl	hosen from Group	D TAB1						10.0
	provided with Innovative teaching.	054085	ING-	BIOCHIP				MI	м	2	5.0	
	Subject	095394	ING-	SEMICONDUCTO	OR RADIATION			MI	м	2	5.0	10.0
	taught jointly with		INF/01	DETECTORS	DESIGN FOR DIG	HEDICAL	-					
đi	companies or	090935	INF/01	INSTRUMENTAT	ION	ACDICAL		MI	М	2	10.0	
	Blended			Courses to be cl	hosen from Group	D TAB2						
	Flipped			Courses to be cl	hosen from Group	D TAB1						10.0
	Massive	090921		THESIS AND FIL	NAL EXAM				v	1	20.0	
	Open Online Courses	090921		THESIS AND FIL	NAL EXAM				V	2	20.0	20.0
	(MOOC) • Soft Skills	100000000000000000000000000000000000000										
		Cours	ses of the	Group TAB1								
		Code	SSD	c	Course Title		Num Sec L	anguage	Course	Туре	e Sem	CFU
		052471	ING-	ADVANCED D	IGITAL SIGNAL P	ROCESSIN	4G		MI	м	1	10.0
		097589	FIS/03	ADVANCED O	PTICS AND LASE	RS			MI	м	1	10.0
		099282	BIO/10	BIOINFORMAT	TICS AND FUNCT	IONAL GE	NOMICS	0	MI	м	1	5.0
		093043	ING-	CELLUIAD BY	DENGINEEDING			0	MT			10.0
		083042	IND/34	CELLULAR BIG	OLINGINEERING			U.	PUL	PI	1	10.0



#### **Study program regulations**

#### www.polimi.it/corsi/corsi-di-laurea-magistrale

School of Industrial and Information Engineering Electronics Engineering (Milano Leonardo) - 2019/2020

#### 2. General presentation of the study programme

The Study Programme in Electronics Engineering prepares the student to conceive, design, innovate, validate and disseminate devices, circuits, apparatuses and complex electronic systems and to integrate them into highly multidisciplinary areas, in the most diversified applications and countless high-tech and consumer world markets.

The Study Programme in Electronics Engineering (ELN) is divided into a first-level three-year Bachelor of Science (Laurea, L) degree and a second-level two-year Master of Science (Laurea Magistrale, LM) degree, with progressively increasing contents and skills. The Laurea Magistrale in Electronics Engineering (LM ELN) is equivalent to the Master of Science in Electronics Engineering (M.S.E.E.).

The aim of the LM ELN is to train and complete professional Electronics Engineers with a broad and robust scientific, technological and engineering know-how, so that they acquire the capability of combining the physical-chemical-mathematical aspects of the most advanced sciences with the technological needs of advanced engineering implementations. The LM ELN provides the skills to create enabling technologies, demonstrate innovative applications, design cutting-edge electronic products and systems, integrate them in the most diverse areas, often expanding toward new markets and scenarios, by inventing new fields, and by improving the quality of everyday life.

Electronics is everywhere around us and it is the irreplaceable and enabling basis of all current and future technologies of the Information, Communication, Control, Automation, Energy and Electricity era. Scientific researches and market developments in electronic technologies are continuous, incessant, and increasingly stimulated by the most diverse and demanding applications. For example, ever-faster microprocessors, with low power consumption, but higher and higher computing power, and increasingly dense memories, without defects and of long endurance and short access time, are the essential electronic constituents of any computer and processing system; without such electronic circuits, artificial intelligence would remain only science-fiction. The ultrasensitive and miniaturized semiconductor sensors, which continually dialogue with each other and towards the outside world, in the most refined robotic systems and in distributed and ubiquitous networks, are fundamental to acquire the real world's signals, understand them, manage them, control them, and implement actions; without such electronic devices, reality would remain only virtual. Electronic devices, from the simplest consumer products of entertainment and gaming to advanced electronic systems for automation and control, communications, information systems, biomedical instrumentation, equipment for energy generation, storage and distribution, avionics, mechatronics and satellite systems, and so on, have become so fundamental that their existence and performance are taken for granted; without such electronic systems there would be no modern world

Thanks to the success of the LM ELN and the excellence of Electronics Engineers, the design and innovation of electronic devices, electronic circuits, electronic equipment and systems will provide the fundamental building blocks for all areas of modern life, with all its "Smart-" (smart cyberphysical-systems, smart industries, smart manufacturing, smart living, smart mobility, smart lighting, smart cities, smart communities, smart aging, etc.) and "autonomous-" (vehicles, driving, fleet, manufacturing, etc.) features, so invasive in everyday life.

The Master of Science's Electronics Engineer is the inventor of these systems, she/he designs them, develops them, validates them experimentally and eventually installs them into the end-user application. The first task of an Electronics Engineer is to derive models of the physical reality with which his/her electronic systems will interact, to understand, describe, foresee, and verify the interactions with the other mechanical, electrical, energetic, informative, biological, clinical, physical, chemical, nuclear, etc. equipment. It is a refined and multifaceted professional figure, not closed in his world, but oriented to a continuous interaction with the users of these systems. The Electronics Engineer has a propulsive push towards innovation aimed at improving the performance not only of what is electronic-based (e.g., the component, board, instrument, mainframe, pag. 2/20

Data: 23/Mar/2019

#### School of Industrial and Information Engineering Electronics Engineering (Milano Leonardo) - 2019/2020

· PROJECTs to train students to put skills into practice: · CONTESTs between students and with companies.

As shown in the guidelines for the second-level Laurea Magistrale in Electronics Engineering, seven courses offer a total of 12 credits of D.I. Action 1; these are indicated in the following tables with the symbol "d.i." and the number of corresponding credits out of the total number of credits assigned to the course (e.g. the "2.0 d.i." of the "Biochip" subject at the second year, out of the 5 credits total).

Furthermore, in the next academic years other forms of D.I., both in the form of Action 1 and Action 2 activities, will be activated, to allow students to acquire other "soft skills", in addition to technological and scientific knowledge, aimed at improving both public speaking and interactive presentation of achieved results (e.g. the progress of on-going studies or projects), organizational skills, team building and effective teamwork interactions.

Code	Act type	SSD	Course Title	Langu age	Туре	Sem	CFU	CFU Group
052427	в	ING-INF/01	ANALOG CIRCUIT DESIGN	EN	М	1	10.0 [1.0 @]	10.0
054654	В	ING-INF/01	ELECTRONIC SYSTEMS	EN	М	1	10.0	10.0
095155	В	ING-INF/01	ELECTRON DEVICES	EN	М	1	10.0	
095162	В	ING-INF/01	MEMS AND MICROSENSORS	EN	М	1	10.0	10.0
095251	В	ING-INF/01	SIGNAL RECOVERY	EN	М	2	10.0	10.0
095264	В	ING-INF/01	DIGITAL INTEGRATED CIRCUIT DESIGN	EN	М	2	10.0	
095274	В	ING-INF/01	RF CIRCUIT DESIGN	EN	М	2	10.0	10.0
054081	в	ING-INF/01	MICROELECTRONIC TECHNOLOGIES	EN	М	2	5.0 [1.0 @]	
054083	в	ING-INF/01	DIGITAL ELECTRONIC SYSTEMS DESIGN	EN	М	2	5.0 [3.0 ®]	5.0
			Courses to be chosen from Group TAB1					5.0

Legend for the "Training Activities" column: "B" are core-course on characterizing Electronics subjects; "C" are side-courses, i.e. not strictly related to Electronics topics. The be more specific, core-courses are those belonging to the specific Scientific Disciplinary Sectors (SSD) "ING-INF / 01 - ELECTRONICS" and also "ING-INF / 02 - Electromagnetic Fields" and "ING-INF / 07 -Electrical Measurements and Electronics".

The 10 credits "ANALOG CIRCUIT DESIGN" core-course provides also 1 credit of Innovative Education (D.I. indicated with "1.0 d.i." in the tables) consisting of lessons delivered with active teaching methods in which the students are asked to answer interactively to questions posed in classroom and at the end of the lessons and by contents addressed in flipped-class mode. The 5 credits "DIGITAL ELECTRONIC SYSTEM DESIGN" core-course provides 3 credits of D.I. consisting of flipped-class activities with hands-on practice on developmental electronic boards employing configurable electronic FPGA (field-programmable gate-array) devices and on CAD software tools for the synthesis and simulation of programmable digital electronic systems.

The 5 credit "MICROELECTRONIC TECHNOLOGIES" core-course provides 1 credit of D.I. consisting of a multimedia MOOC (Massive Open Online Course) on some microelectronic manufacturing processing for integrated circuits and of guided tours in laboratories and production rooms of a microelectronic industry.

#### 2 Year courses - Track: PSS - ELECTRONICS ENGINEERING

	Code	Act type	SSD	Course Title	Langu age	Туре	Sem	CFU	CFU Group
	095380	В	ING-INF/01	MIXED-SIGNAL CIRCUIT DESIGN	EN	М	1	10.0	10.0
Dat	ta: 23/M	ar/201	9					-	pag. 15/20

#### School of Industrial and Information Engineering Electronics Engineering (Milano Leonardo) - 2019/2020

090918	В	ING-INF/01	POWER ELECTRONICS	EN	М	1	10.0	
			Courses to be chosen from Group TAB1					10.0
054085	в	ING-INF/01	BIOCHIP	EN	М	2	5.0 [2.0 @]	
095394	В	ING-INF/01	SEMICONDUCTOR RADIATION DETECTORS	EN	М	2	5.0	10.0
090935	в	ING-INF/01	ELECTRONICS DESIGN FOR BIOMEDICAL INSTRUMENTATION	EN	М	2	10.0	
			Courses to be chosen from Group TAB2					
			Courses to be chosen from Group TAB1					10.0
090921			THESIS AND FINAL EXAM		V	1	20.0	
090921			THESIS AND FINAL EXAM		V	2	20.0	20.0

The 5 credit "BIOCHIP" course provides 2 credits of D.I., consisting of a multimedia MOOC (Massive Open Online Course) on microelectronic methodologies for manufacturing electronic devices and biochips, and of some activities where students must design a biochip at the POLI-FAB clean-rooms and laboratories.

#### **Courses of the Group TAB1**

Code	Act type	SSD	Course Title	Langu age	Type	Sem	CFU
052471	с	ING-INF/03	ADVANCED DIGITAL SIGNAL PROCESSING	EN	М	1	10.0 [1.0 •
094790	С	ING-INF/03	RADAR IMAGING	EN	Μ	1	5.0
096129	С	ING-INF/04	ADVANCED AND MULTIVARIABLE CONTROL	EN	Μ	2	10.0
083047	с	ING- IND/34	BIOMATERIALS [C.I.]	IT	I	2	10.0
083042	с	ING- IND/34	CELLULAR BIOENGINEERING	IT	М	1	10.0
097589	С	FIS/03	ADVANCED OPTICS AND LASERS	EN	Μ	1	10.0
095942	С	ING-INF/05	DIGITAL SYSTEMS DESIGN METHODOLOGIES	EN	I	2	10.0
073011	С	ING-INF/06	BIOENGINEERING OF THE MOTOR SYSTEM	IT	М	1	5.0
099282	С	BIO/10	BIOINFORMATICS AND FUNCTIONAL GENOMICS	IT	М	1	5.0
096617	С	FIS/03	PHYSICS OF PHOTOVOLTAIC PROCESSES	EN	М	1	5.0
052351	С	ING-INF/04	MODEL IDENTIFICATION AND DATA ANALYSIS	EN	I	1	10.0
096081	С	FIS/03	QUANTUM OPTICS AND INFORMATION	EN	М	2	5.0
093062	С	ING-INF/04	AUTOMATION AND CONTROL IN VEHICLES	EN	М	2	5.0
054312	с	ING-INF/03	DIGITAL COMMUNICATION	EN	I	1	10.0 [2.0 @]
088949	С	ING-INF/05	ADVANCED COMPUTER ARCHITECTURES	EN	М	2	5.0
090914	С	ING-INF/04	CONTROL OF INDUSTRIAL ROBOTS	EN	М	1	5.0
095907	С	ING-INF/05	EMBEDDED SYSTEMS	EN	Ι	1	10.0
096660	С	MAT/08	NUMERICAL METHODS IN MICROELECTRONICS	EN	М	2	5.0
052470	С	ING-INF/03	QUANTUM COMMUNICATIONS	EN	Μ	2	5.0
089480	С	FIS/03	SOLID STATE PHYSICS A	EN	М	2	5.0
096532	с	ING- IND/31	ADVANCED CIRCUIT THEORY	EN	М	2	5.0

#### In TAB1 there are 5 and 10 credit electives taught in Italian that students can select.

#### Courses of the Group TAB2

	Code	Act type	SSD	Course Title	Langu age	Type	Sem	CFU
	090918	В	ING-INF/01	POWER ELECTRONICS	EN	М	1	10.0
Dat	a: 23/M	ar/201	9				1	oag. 16/2



**Libraries:** 4 a MI + 1 materials library + 5 in other Campus



**POLIHUB** www.polihub.it to support your ideas and to foster startups











#### **Buddy project**:

first 3 months with a "buddy" student to help your start at POLIMI!

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<b>9</b>	•	1	1	BB 🔤	5	G 🖪 PoliMI	🚱 Login	3i	🕥 ELN	RM L ELN	S LM ELN	e PowerBl	🛃 Forms	🔶 Streams	😗 Webex	😑 Gforms		» 📰 Elenco di	lettura
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<u>me</u> / <u>s</u>	ervice	sano	d oppo	rtunities /	<u>Other</u>	services and op	<u>portunities</u> /	Buddy	y project										
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		>	Wh	at does a	a budd	y do?													
		>	Wh	/ becom	e a bu	ddy?													
		>	Nev	/! Open	Badge	for Buddy													
		>	Wh	o can ap	ply?														
		>	Hov	v to appl	y?														
		>	Dur	ation															
		>	Trai	ning															
		>	Hov	/ studen	ts are	matched													
		>	Cor	tacts															

Starting from the academic year 2015-2016, Politecnico di Milano has implemented a **buddy system**: this foresees a match between new international students and students who are already enrolled, who will assist new students in the phase prior to their arrival and over a three months' period after their arrival.

The **first three months** are the most challenging for someone who comes from a far-away country and needs to adapt not only to a new academic environment but also to a culture and traditions often distant from his/her own.



#### **Career Service**:

Helps you to find an intership during the M.S.

Organizes meetings with companies

Helps you finding a job after graduation





#### Sport:

"Giuriati" sport ground



## **CENTRO SPORTIVO GIURIATI**









#### Politecnico di Milano: Schools and Masters



#### • Electronics and Engineering: what and why?



### • Master Degree in Electronics Engineering



#### **Data and Stats**



## **Electronics: a definition**





## What is **ELECTRONICS**?

embedded systems, smart machines, communication, networks... smart, autonomous, wearable, "...of things" ... systems for *real* and *virtual* worlds, and for *augmented-reality* for humans and robots !

Electronics it the enabling technology to capture real-world information, to process signals, to make actions and motion, to interact with machines, to augment the reality around us !



### Where is ELECTRONICS?



components and circuits

science, physics, space





consumer electronics

clinical and scientific instrumentation



#### Internet Of Things & wearable



Electronics is wherever hardware, products, system, innovation, intelligence... are !



### Where is ELECTRONICS?



avionics and transportation



# automotive and mobility

#### Industrial automation

#### robot and drones







#### Electronics is wherever hardware, products, system, innovation, intelligence... are !



### From the smallest devices ...



Electronic Engineers start from electrons and holes, to conceive nanometric devices, integrate them in a micrometric and millimetric circuit, so to define the macro system.



## ... to big systems ...





### ... and great applications!









## Who is the Electronics Engineer?

grasps the **needs** and conceives the **solutions**:

creates, simulates, designs, makes, validates, installs...

devices, components, circuits, apparatus, systems...



#### Electronic Engineers operate in all "smart" and autonomous sectors of modern life !



### Electronics makes your dreams come true



Giovanni is *quality manager* in Ferrari, in Maranello





Stefano is *principal engineer* on quantum computers at Intel Labs

Roberto works on an international *scientific experiment* at CERN



Elena is **program manager** at Apple

Irene is 3D sensor **systems engineer** at Amazon



Graduates in M.S.E.E. at POLIMI go everywhere and realize dreams – their own and others



### Where the electronic engineer works



Electronic Engineers operate all along the production and supply chain of moder life systems.



## **Acquired expertise**

- **spot** what to solve and how
- define specs, requirements, constraints, costs, pros/cons
- select design methodologies and technologies
- design electron devices
- develop integrated circuits, electronic boards, mixed systems
- exploit sensors, actuators, µP, FPGA, DSP, ... at best
- integrate electronics into applications (atm, bio, ene, mec, inf, tlc ...)
- validate through instrumentation
- manage "ilities" in plants and systems (reliability, manufacturability, testability ...)

Electronic Engineers operate in all sectors from ideas to development, production and deployment!



## Job outlooks

- microelectronics
- high-tech industries
- companies
- industrial automation
- infrastructures
- R&D
- start-up & spin-off companies
- consultancy and entrepreneurship
- public/private scientific/technological organizations
- ... Ph.D.

#### Electronic Engineers operate in all high-tech and R&D companies!



#### for semiconductors / integrated circuits

(mechatronics, avionics, energy, automotive, space...)

for smart electronics (infotainment, telecomm, computers...)

#### and **robotics** for manufacturing

for communications / networks / cloud / grid genetics / pharmacology / medicine



#### Politecnico di Milano: Schools and Masters



#### Electronics and Engineering: what and why?



#### **Master Degree in Electronics Engineering**



#### **Data and Stats**







### **Electronics...**

production, transmission, distribution of electric energy



Electronic products, consumers, industrial, ...





Microelectronics and integrated circuits

Medical and nuclear instrumentation





#### Robots and drones





Low-Voltage, low-power

embedded, smart, wearable, implantable

systems



### **Goals of the master**





## MSc: 1st year



	tipologia	Nome Insegnamento	Sem	CFU	di cui di D.I.	CFU Gruppo	
	caratterizzante	ANALOG CIRCUIT DESIGN	1	10	1	10	
	caratterizzante	ELECTRONIC SYSTEMS	1	10		10	
Z	caratterizzante	ELECTRON DEVICES	1	10		10	
	caratterizzante	MEMS AND MICROSENSORS	1	10		10	
	caratterizzante	SIGNAL RECOVERY	2	10		10	
	caratterizzante	DIGITAL INTEGRATED CIRCUIT DESIGN	2	10		10	
an	caratterizzante	RF CIRCUIT DESIGN	2	10		10	
-	caratterizzante	DIGITAL ELECTRONIC SYSTEMS DESIGN	2	5	3	F	
	caratterizzante	MICROELECTRONIC TECHNOLOGIES	2	5	1	С	
	affine	Insegnamenti a scelta dal Gruppo TAB1				5	

100 CFU in 2 years: 60 CFU at the 1st year, corresponding to 7 classes, taught in English. One course of 10 CFU corresponds to 60h of lessons and 40h of exercises.



## MSc: 2nd year

	tipologia	Nome Insegnamento	Sem	CFU	di cui di D.I.	CFU Gruppo
	caratterizzante	MIXED-SIGNAL CIRCUIT DESIGN	1	10		10
L Z	caratterizzante	POWER ELECTRONICS	1	10		10
vear 2	affine	Insegnamenti a scelta dal Gruppo TAB1				10
	caratterizzante	BIOCHIP	2	5	2	
LM year g	caratterizzante	SEMICONDUCTOR RADIATION DETECTORS	2	5		10
	caratterizzante	ELECTRONICS DESIGN FOR BIOMEDICAL INSTRUM.	2	10		
Ň	affine	Insegnamenti a scelta dal Gruppo (AB1 o TAB2				10
		THESIS AND FINAL EXAM		20		20

At the 2<sup>nd</sup> year only 40 CFU (**20 CFU are eligible courses**). All in **English**. Finally 20 CFU (6-9 months) of **experimental thesis in the labs** of POLIMI or in a company.



### Several elective courses and choices

1 1

	SSD	Denominazione Insegnamento	Sem	CFU	di cui di D.I.				
	FIS/03	PHYSICS OF PHOTOVOLTAIC PROCESSES	1	5					
	FIS/03	ADVANCED OPTICS AND LASERS	1	10					
	FIS/03	QUANTUM OPTICS AND INFORMATION	2	5					
T	FIS/03	SOLID STATE PHYSICS A	2	5					
<b>∆</b> B	ING-IND/31	ADVANCED CIRCUIT THEORY	2	5					
Ì	ING-INF/03	DIGITAL COMMUNICATION	1	10	1				
00	ING-INF/03	ADVANCED DIGITAL SIGNAL PROCESSING	1	10	1				
Grupp	ING-INF/03	RADAR IMAGING	1	5					
	ING-INF/03	QUANTUM COMMUNICATIONS	2	5					
	ING-INF/04	CONTROL OF INDUSTRIAL ROBOTS	1	5					
de	ING-INF/04	MODEL IDENTIFICATION AND DATA ANALYSIS	1	10					
ti	ING-INF/04	AUTOMATION AND CONTROL IN VEHICLES	2	5					
en	ING-INF/04	ADVANCED AND MULTIVARIABLE CONTROL	2	10					
Ĕ	ING-INF/05	EMBEDDED SYSTEMS	1	10					
na	ING-INF/05	DIGITAL SYSTEMS DESIGN METHODOLOGIES	2	10					
<b>0</b> 0	ING-INF/05	ADVANCED COMPUTER ARCHITECTURES	2	5					
JSC	ING-IND/34	BIOMATERIALI [C.I.]	2	10					
	ING-IND/34	BIOINGEGNERIA CELLULARE	1	10					
	ING-INF/06	BIOINGEGNERIA DEL SISTEMA MOTORIO	1	5					
	BIO/10	BIOINFORMATICA E GENOMICA FUNZIONALE							
	MAT/08	NUMERICAL METHODS IN MICROELECTRONICS	2	5					

	SSD	Denominazione Insegnamento	Sem	CFU	di cui di D.I.
	caratterizzante	вюснір	2	5	2
	caratterizzante	DIGITAL ELECTRONIC SYSTEMS DESIGN	2	5	
	caratterizzante	DIGITAL INTEGRATED CIRCUIT DESIGN	2	10	
2	caratterizzante	ELECTRON DEVICES	1	10	
AB	caratterizzante	ELECTRONICS AND ELECTROACOUSTIC FOR SOUND ENG.	2	10	
T O	caratterizzante	ELECTRONICS DESIGN FOR BIOMEDICAL INSTRUM.	2	10	
dc	caratterizzante	MEMS AND MICROSENSORS	1	10	
rup	caratterizzante	MICROELECTRONIC TECHNOLOGIES	2	5	1
ש	caratterizzante	MIXED-SIGNAL CIRCUIT DESIGN	1	10	
de	caratterizzante	POWER ELECTRONICS	1	10	
Iti	caratterizzante	RF CIRCUIT DESIGN	2	10	
Jer	caratterizzante	SEMICONDUCTOR RADIATION DETECTORS	2	5	
an	caratterizzante	SENSOR SYSTEMS	1	5	3
ng	caratterizzante	ANTENNAS	2	5	
ISe	caratterizzante	ELECTROMAGNETIC COMPATIBILITY	1	5	
-	caratterizzante	MICROWAVE ENGINEERING	2	5	
	caratterizzante	PHOTONIC DEVICES	2	10	
	caratterizzante	RF SYSTEMS	1	10	
	caratterizzante	OPTICAL MEASUREMENTS	1	5	



### **Hands-on labs and THESIS**









## **Useful contacts**

Student email:name.surname@mail.polimi.itTeacher email:name.surname@polimi.itPhone number:(02-2399) xxxx

#### **Enrollment to the Master:**

(for international students) prof. giacomo.borghi@polimi.it

(for Italian students) prof. <u>massimo.ghioni@polimi.it</u>

**Study Plans:** 

prof.ssa <u>giulia.acconcia@polimi.it</u> and prof.ssa <u>federica.villa@polimi.it</u>

**Coordinator:** 

prof. <u>daniele.ielmini@polimi.it</u>



### Timeline



#### **5 exam sessions** for each course every year.



### **Example of academic year**

	SESSIONE	E D'ESAME		1° SEMESTRE			77.2	D'ESAME		2° SEMEST	RE	S	ESSIO	NE D'ESAME
	agosto	settembre	ottobre	novembre	dicembre			febbraio	marzo	aprile	maggio	giugno		luglio
	1 gio	1 dom	1 mar	1 ven	1 dom			1 sab	1 dom	1 mer	1 ven	1 lun		1 mer
	2 ven	2 lun	2 mer	2 sab	2 lun	• 4		2 dom	2 lun	2 gio	2 sab	2 mar		2 gio
	3 sab	3 mar	3 gio ≭	3 dom	3 mar	•		3 lun	3 mar	3 ven	3 dom	3 mer		3 ven
	4 dom	4 mer	4 ven \star	4 lun	4 mer	•		4 mar	4 mer \star	4 sab	4 lun	4 gio		4 sab
	5 lun	5 gio	5 sab	5 mar	5 gio			5 mer	5 gio ≭	5 dom	5 mar	5 ven		5 dom
	6 mar	6 ven	6 dom	6 mer	6 ven	6 lun		6 gio	6 ven	6 lun	6 mer	6 sab		6 lun
	7 mer	7 sab	7 lun	7 gio	7 sab	7 mar		7 ven	7 sab	7 mar	7 gio	7 dom		7 mar
	8 gio	8 dom	8 mar	8 ven	8 dom	8 mer		8 sab	8 dom	8 mer	8 ven	8 lun		8 mer
$\geq$	9 ven	9 lun	9 mer	9 sab	9 lun	9 gio	ING	9 dom	9 lun	9 gio	9 sab	9 mar		9 gio
	→9 sab	10 mar 🎽	10 gio	10 dom	10 @	10 ven	ING	10 lun	10 mar	10 ven	10 dom	10 mer		10 ven
	11 dom	11 m 🤉 💺	11 ven	11 lun		11 sab		11 mar \star	11 mer	11 sab	11 lu	11 gio	ING	11 sab
	12 lun	129 *	12 sab	12 mar 🖉	12 310	12 dom		12 mer \star	12 gio	12 dom	emer	12 ven	ING	12 dom
	13 mar	A PD	13 dom	13 mer	13 ven	13 lun		13 gio \star	13 ven	13 lun	1010	13 sab		13 lun
	14 mer	sab	14 lun	14	14 sab	14 mar		14 ven	14 sab	14 mar	4 gio	14 dom		14 mar
<i>′</i>	15 gio	15 dom	15 mar	Vel	15 dom	15 mer		15 sab	15 dom	15 mer	15 ven	15 lun		15 mer
	16 ven	16 lun	16 merr	16 sab	16 lun	16 gio		16 dom	16 lun	16 gió	16 sab	16 mar		16 gio
	17 sab	17 mar	17 2	17 dom	17 mar ≭	17 ven		17	17 mar	<b>7</b> 4	17 dom	17 mer		17 ven
	18 dom	18 mer	18	18 lun	18 mer ≭	18 sab		1. par	18 mer	10-sab	18 lun	18 gio		18 sab
	19 lun	19 gio	19 sak	19 mar	19 gio	19 dom		mer	19 gir	19 dom	19 mar	19 ven		19 dom
	20 mar	20 ven	20 dom	20 mer	20 ven	20 lun .		20 gio	2001	20 Iun	20 mer	20 sab		20 lun
	21 mer	21 sab	21 lun	21 gio	21 sab	21 m		21 ven	21 sab	21 mar	21 gio	21 dom		21 1 7 3
	22 gio	22 dom 📃 📏	22 mar	22 ven	22 dom	22 m		22 sab	22 <b>J</b> om	22 mer	22 ven	22 lun		7. te *
	23 ven	23 lun	23 mer	23 sab	23 lun	23 gio		23 dom	∠3 lun	23 gio	23 sab	23 mar		🥶 gio \star \star
	24 sab	24 mar	24 gio	24 dom	24 mar	24 ven		24 lun	24 mar	24 ven	24 dom	24 mer		24 ven ≭
	25 dom	25 mer	25 ven	25 lun	25 mer	25 sab		25 mar	25 mer	25 sab	25 lun	25 gio	9	25 sab
	26 lun	26 gio ≭	26 sab	26 mar	26 gio	26 dom		26 mer	26 gio	26 dom	26 mar	26 ven		26 dom
	27 mar	27 ven \star	27 dom	27 mer	27 ven	27 lun		27 gio	27 ven	27 Iun	27 mer	27 sab		27 lun
	28 mer	28 sab	-4 CO	urses	28 sab	28 mar		28 ven	28 52	COURS		28 dom		28 mar
	29 gio	29 dom	29 mar	29 ven	29 dom	29 mer		29 sab	29 dom	25 mer 🛪	25 ven	29 lun		29 mer
	30 ven	30 lun	30 mer	30 sab	30 lun	30 gio			30 lun	30 gio	30 sab	30 mar		30 gio
	31 sab		31 gio		31 mar	31 ven			31 mar		31 dom			31 ven

LEGENDA



F

esami di profitto lezioni festività vacanze periodo senza esami, revisioni e recuperi facoltativi per laboratori (design)

prove in itinere (lezioni sospese)

### **Example of weekly schedule**

Data		Dove	09:00	10:00	1	11:00	12:00	13	:00	14:00		15:00	1	6:00	17:00		18:00	_	19:00	20:0	)	
		<u>D.1.2</u>							[lezi (dal	ione] ANALOG C 17/09/2018 al 1	IRCUIT DE 7/12/2018)	SIGN										
Lunedì		<u>E.G.6</u>	[lezione] CONTROL OF ROBOTS (dal 17/09/2018 al 17/1	INDUSTRIAL 2/2018)																		
		DOA			[lezione] ELE	ECTRONIC SY	STEMS						+ +									
	_	0.0.4			(dal 09/10/20	018 al 18/12/20	118)				flamin a 2 h 41							_				
		<u>S.1.3</u>									MICROSEN (dal 18/09/2	EMS AND NSORS 2018 al 18/1	12/2018)									
Martedi	i	<u>E.G.8</u>									[esercitazio MICROSEN (dal 09/10/2	ne] MEMS NSORS 2018 al 11/1	AND 2/2018)									
		<u>D.0.4</u>	[lezione] MEMS AND MICROSENSORS (dal 09/10/2018 al 18/1	2/2018)																		
					[lezione] AN/	ALOG CIRCUI	T DESIGN											-				
		<u>D.1.2</u>			(dal 19/09/20	018 al 19/12/20	18)															
Mercoleo	dì	<u>N.1.2</u>									[lezione] MI MICROSEN (dal 19/09/2	EMS AND NSORS 2018 al 19/1	12/2018)									
		<u>D.1.2</u>	[lezione] CONTROL OF ROBOTS (dal 19/09/2018 al 19/1	INDUSTRIAL 2/2018)																		
		<u>E.G.2</u>	[esercitazione] ANALO DESIGN (dal 20/09/2018 al 20/1	G CIRCUIT 2/2018)																		
Giovedi	1	<u>E.G.4</u>			[lezione] ELE	ECTRONIC SY	STEMS															
	-	<u>E.G.1</u>									[lezione] Mi MICROSEN (dal 20/09/2	EMS AND NSORS 2018 al 20/1	12/2018)									
											[lezione] AN		CUIT DESI	GN								
Venerdi	1	L.26.14									(dal 21/09/2	2018 al 21/1	12/2018)									
		<u>D.1.1</u>	[lezione] ANALOG CIR (dal 21/09/2018 al 21/1	CUIT DESIGN 2/2018)	[lezione] ELE (dal 21/09/20	ECTRONIC SY 018 al 21/12/20	STEMS 118)															
Sabato					<u> </u>																	
Jabato																						
Insegname	enti selezi	ionati																				
Visualizza	Legenda		Denomi	nazione Insegn	amento						Docent	e			Cfu	Anno cor	so Seme	stre	Data inizio	Data fine	Ri	muovi
Ing. Ind-Inf	(Mag.)(d	ord. 270) - MI (476)	) Electronics Engineeri	ng - Ingegne	ria Elettron	ica																
•		052427 - ANALOG C	IRCUIT DESIGN					Laca	aita Andre	ea Leonardo					10.00		1		17/09/201	8 21/12/201	8	( <del>L</del>
		088724 - ELECTRON	IC SYSTEMS					Zap	pa Franco	D					10.00		1		20/09/201	8 21/12/201	8	<b>(</b>
		095162 - MEMS AND	MICROSENSORS					Lang	gfelder G	iacomo					10.00		1		18/09/201	8 20/12/201	8	( <del>)</del>
		090914 - CONTROL	OF INDUSTRIAL ROBOTS					Roco	co Paolo						5.00		1		17/09/201	B 19/12/201	8	( <del>]</del>
Aggiorna																						

Every week about 24 hours of LESSONS and EXERCISES in class and few hours of LABORATORIES





#### Politecnico di Milano: Schools and Masters



#### • Electronics and Engineering: what and why?



#### Master Degree in Electronics Engineering



#### **Data and Stats**



### **MSc students**







## Grades at exams (xx/30) and graduations (xxx/110)





### Who are the MSc students?

#### Who enrolls



#### Time before getting a job





### **Employment data**





### Internationalization





### **Brochure on MSc in Electronics Engineering**



#### Manifesto degli studi

Legenda:

B – insegnamento "caratterizzante" l'Elettronica.
C – insegnamento "affine" o attività "integrativa".

D.I. – Didattica Innovativa (flipped-classroom, blended learning, cotutela con aziende, soft skills o Massive Open Online Courses).

SSD – Settore Scientifico Disciplinare (ad esempio "INF-INF/01" è "Elettronica").

CFU - Crediti Formativi Universitari (1 CFU è pari a circa 10 ore in aula e circa 15 ore di studio a casa).

#### Insegnamenti del 1° Anno di corso

Piano di Studio preventivamente approvato PSS - ELECTRONICS ENGINEERING

Codice	Attività formative	SSD	Denominazione Insegnamento	Lingua	Sem	CFU	CFU Gruppo
052427	В	ING-INF/01	ANALOG CIRCUIT DESIGN	-	1	10 [1 di D.I.]	10
054654	В	ING-INF/01	ELECTRONIC SYSTEMS	-	1	10	10
095155	В	ING-INF/01	ELECTRON DEVICES	-	1	10	
095162	В	ING-INF/01	MEMS AND MICROSENSORS	-	1	10	10
095251	В	ING-INF/01	SIGNAL RECOVERY		2	10	10
095264	В	ING-INF/01	DIGITAL INTEGRATED CIRCUIT DESIGN		2	10	
095274	В	ING-INF/01	RF CIRCUIT DESIGN		2	10	10
054085	В	ING-INF/01	BIOCHIP	-	2	5 [2 di D.I.]	
054083	В	ING-INF/01	DIGITAL ELECTRONIC SYSTEMS DESIGN	-	2	5 [3 di D.I.]	5
		-	Insegnamenti a scelta dal Gruppo TAB1				5

#### Insegnamenti del 2° Anno di corso

Piano di Studio preventivamente approvato PSS - ELECTRONICS ENGINEERING

Codice	Attività formative	SSD	Denominazione Insegnamento	Lingua	Sem	CFU	CFU Gruppo
095380	В	ING-INF/01	MIXED-SIGNAL CIRCUIT DESIGN	-	1	10	
090918	В	ING-INF/01	POWER ELECTRONICS	-	1	10	10
-			Insegnamenti a scelta dal Gruppo TAB1	)			10
054081	В	ING-INF/01	MICROELECTRONIC TECHNOLOGIES	-	2	5 [1 di D.I.]	
055519	В	ING-INF/01	RADIATION DETECTION SYSTEMS	-	2	5	10
090935	в	ING-INF/01	ELECTRONICS DESIGN FOR BIOMEDICAL INSTRUMENTATION	-	2	10	10
-			Insegnamenti a scelta dal Gruppo TAB2				10
		-	Insegnamenti a scelta dal Gruppo TAB1				10
090921			THESIS AND FINAL EXAM		1	20	20
090921			THESIS AND FINAL EXAM		2	20	20

#### Manifesto degli studi

	-	
	r	

Insegnamenti	del	Gruppo	TAB
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Codice	Attività formative	SSD	Denominazione Insegnamento	Lingua	Sem	CFU
052471	с	ING-INF/03	ADVANCED DIGITAL SIGNAL PROCESSING		1	10 [1 di D.I.]
097589	С	FIS/03	ADVANCED OPTICS AND LASERS		1	10
099282	С	BIO/10	BIOINFORMATICA E GENOMICA FUNZIONALE	Ő	1	5
083042	С	ING-IND/34	BIOINGEGNERIA CELLULARE	Õ	1	10
073011	С	ING-INF/06	BIOINGEGNERIA DEL SISTEMA MOTORIO	Ŏ	1	5
090914	С	ING-INF/04	CONTROL OF INDUSTRIAL ROBOTS		1	5
055520	B, C	ING-INF/04 ING-INF/07	OPTICAL MEASUREMENTS		1	5
096617	С	FIS/03	PHYSICS OF PHOTOVOLTAIC PROCESSES		1	5
055552	С	ING-INF/03	RADAR IMAGING		1	5 [1 di D.I.]
052577	с	ING-IND/32	SISTEMI PER L'AUTOMAZIONE E LA COMUNICAZIONE INDUSTRIALE	0	1	5
054312	С	ING-INF/03	DIGITAL COMMUNICATION		1	10 [2 di D.I.]
095907	С	ING-INF/05	EMBEDDED SYSTEMS		1	10
052351	С	ING-INF/04	MODEL IDENTIFICATION AND DATA ANALYSIS		1	10
096532	С	ING-IND/31	ADVANCED CIRCUIT THEORY		2	5
088949	С	ING-INF/05	ADVANCED COMPUTER ARCHITECTURES		2	5
093062	С	ING-INF/04	AUTOMATION AND CONTROL IN VEHICLES		2	5
095947	C	ING-INF/05	CRYPTOGRAPHY AND ARCHITECTURES FOR COMPUTER SECURITY		2	5
055521	С	ING-IND/31	ELECTROMAGNETIC COMPATIBILITY C		2	5 [2 di D.1.]
096660	C	MAT/08	NUMERICAL METHODS IN MICROELECTRONICS		2	5
052470	С	ING-INF/03	QUANTUM COMMUNICATIONS		2	5
096081	С	FIS/03	QUANTUM OPTICS AND INFORMATION		2	5
089480	C	FIS/03	SOLID STATE PHYSICS A		2	5
083047	С	ING-IND/34	BIOMATERIALI [C.I.]	0	2	10
095942	C	ING-INE/05	DIGITAL SYSTEMS DESIGN METHODOLOGIES		2	10

#### Insegnamenti del Gruppo TAB2

Codice	Attività formative	SSD	Denominazione Insegnamento	Lingua	Sem	CFU
095155	В	ING-INF/01	ELECTRON DEVICES		1	10
095162	В	ING-INF/01	MEMS AND MICROSENSORS		1	10
095380	В	ING-INF/01	MIXED-SIGNAL CIRCUIT DESIGN		1	10
090918	В	ING-INF/01	POWER ELECTRONICS		1	10
054184	B, C	ING-INF/07	RELIABILITY DESIGN		1	5
052484	B, C	ING-INF/02	RF SYSTEMS		1	10 [1 di D.I.]
054092	В	ING-INF/01	SENSOR SYSTEMS		1	5 [3 di D.I.]
054321	B, C	ING-INF/02	ANTENNAS		2	5 [1 di D.I.]
054085	В	ING-INF/01	BIOCHIP		2	5 [2 di D.I.]
054083	В	ING-INF/01	DIGITAL ELECTRONIC SYSTEMS DESIGN		2	5 [3 di D.I.]
095264	В	ING-INF/01	DIGITAL INTEGRATED CIRCUIT DESIGN		2	10
090935	В	ING-INF/01	ELECTRONICS DESIGN FOR BIOMEDICAL INSTRUMENTATION		2	10
054081	В	ING-INF/01	MICROELECTRONIC TECHNOLOGIES		2	5 [1 di D.I.]
094791	B, C	ING-INF/02	MICROWAVE ENGINEERING		2	5
096115	B, C	ING-INF/02	PHOTONIC DEVICES		2	10
055519	В	ING-INF/01	RADIATION DETECTION SYSTEMS		2	5
095274	В	ING-INF/01	RF CIRCUIT DESIGN		2	10
052834	В	ING-INF/01	ELECTRONICS AND ELECTROACOUSTICS FOR SOUND ENGINEERING	-	2	10

www.poliorientami.polimi.it/fileadmin/user\_upload/open\_day\_virtuale\_2020/ingegneria\_elettronica/Ingegneria\_Elettronica\_OpenDay\_Brochure.pdf



#### www.elettronica.polimi.it

PROSPECTIVE STUDENTS - ENROLLED STUDENTS - JOBS - CONTACTS - PROFESSORS RESEARCH



HOME PROGRAM



The Study Programme (Corso di Studi, CdS) in Electronics Engineering trains the student to design, use, and innovate electron devices, circuits and systems, to guide the evolution of this technological field with competence and professionalism, and to promote its deployment in countless sectors and in most diversified applications, where Electronics plays a key role. The objective of the Study Programme in Electronics Engineering is to train professionals with a rich and robust scientific and technological background, which combine physical-chemical-mathematical understanding of the most advanced technologies with cutting-edge engineering skills, necessary to conceive, design, and develop applications, products, and systems to be deployed in the most diversified fields, often enabling new markets and inventing new application scenarios.

""Electronics Engineering is at the basis of all technologies in today's Information age, fostering all aspects of life, work, and society."

Research in electronics technologies is continuous, incessant, and increasingly stimulated by the most diverse and demanding applications. For example, ever-faster microprocessors and increasingly dense memories are the essential electronic constituents of any computer and processing system. Ultra-sensitive and miniaturized semiconductor sensors, which continually dialogue with each other and with the outside world, are fundamental to acquire real world's signals. Embedded systes can understand, manage, and control objects around us and can implement actions through drones and robots. Not to speak of the ubiquitousness of electronic systems in telecommunications, where the development of ever faster and more complex electronic circuits enabled the explosion of cellular, fiber optic, and satellite communications.

#### HOME PROGRAM - PROSPECTIVE STUDENTS

ENROLLED STUDENTS - JOBS - CONTACTS - PROFESSORS RESEARCH

#### Information events

The School of "Industrial and Information Engineering" organizes several information and guidance events each year, in order to explain to interested students what Engineering is and what the various Study Programmes are.

In particular, both the Bachelor of Science (i.e., the three-years "Laurea") and the Master of Science (i.e., the two-years "Laurea Magistrale") Degrees in Electronic Engineering have been actively presented at the following events:

- "DOPEN DAYS 2020" (held online on April 27, 2020), addressed to Italian high-school students interested in the Bachelor's first level degree in "Electronic Engineering"; video about the study programme and students interview.
- "D POLIMI e Scuola di INCEGNERIA INDUSTRIALE e dell'INFORMAZIONE" and also "D Ingegneria ELETTRONICA" (held on December 2, 2019, in Italian), addressed to students of the Scientific and Technical High School of Salesiani in Sesto San Giovanni;
- DELECTRONICS ENG.: Study Programme's Quality Assurance" (hend on October 31, 2019) to students at the second year of the M.S.E.E., on AQ (Quality Assurance), AVA procedure (Self-evaluation, periodic Evaluation, Accreditation), proactive role of students, Students' Representatives within the Study Programme's Council and within the Joint Professors-Students Committee.
- "D QUALITY ASSURANCE" (held on October 9, 2019) to students at the M.S.E.E. providing an overview on "Bologna process", AQ (Quality Assurance), AVA (Autovalutazione, Valutazione periodica e Accreditamento, i.e. self-evaluation, periodic evaluation, and Accreditation) procedure, role of MIUR (Italian Ministry of Education, University and Research), role of ANVUR (Agenzia Nazionale di Valutazione del sistema Universitario e della Ricerca, Italian evaluation agency for university and research), and periodic visit of CEV (Commissione di Esperti della Valutazione, evaluation experts committee).
- "> LESSON ZERO" (held on October 3, 2019) to students at the M.S.E.E., providing an overview on POLIMI, Schools, Departments, Organization, Students' role, Services and Opportunities and Contact persons, M.S.E.E. programme, courses and credits, thesis tipologies and evaluations, internal and external thesis, final grade, thesis topics on the research developed at POLIMI on Electronics.
- \* A LEZIONE ZERO" (held on September 27, 2019) to freshmen at the first year of the Laurea (B.S.E.E.), providing an overview on POLIMI, Schools, Departments, Organization, Students' role, Services and Opportunities and Contact persons, B.S.E.E. programme, courses and credits, intership;
- "D WELCOME DAY 2019" (held on September 11, 2019), addressed to international students enrolling to the Master of Science in "Electronics Engineering" (M.S.E.E., i.e. the "Laurea Magistrale");
- "D SUMMER SCHOOL 2019" (held on June 11, 2019), addressed to the best students of the second-to-last year of secondary high schools in Italy, illustrating the Study Programmes of both Laurea (B.S.E.E.) and Laurea Magistrale (M.S.E.E.) in Electronic Engineering at POLIMI;
- "AMSTERS' Degrees at POLIMI 2019" (held on May 14, 2019), addressed to first-level B.S. students interested to apply to the second-level Master's Degree (LM) in "Electronics Engineering";
- "B ELECTRONICS", a brief review of some applications of electronics in everyday's life;



#### More on www.elettronica.polimi.it

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The ratio between students and teachers is between 10 and 13 and the values of the indicators of the teachers quality, according to the parameters of the MIUR, are between 1.1 and 1.2, compared to an average of 1.0 of other universities in the same geographical area. The overall percentage of satisfied undergraduates in the B.S.E.E's degree programme is between 84% and 88%.

The percentage of female students (15%) is in line with other Study Programmes (10% Mechanical Eng., 14% Computer Science, 15% Aerospace Eng.), but it is low and with no motivation, leaving ample room for better gender balance.

"As confirmed by many companies, the employment rate of ELectronics Engineers within four months after graduation is 97% for the Laurea Magistrale M.S.E.E.'s Degree, of which more than 70% within one month."



It is also interesting to note that the first average salary (1,807 €) is higher than the average of other Master's degree at POLIMI (1,600 €).



MILANO 1863

#### HOME CORSO - STUDENTI FUTURI - STUDENTI ISCRITTI - LAVO

- LAVORO - CONTATTI - DOCENTI RICERCA

#### Alumni

Here are some of our former graduated students, who reached outstanding positions in different fields and environments, both in Italy and abroad. As you can see, Electronics engineers boost excellence everywhere!

Alberto Sangiovanni-Vincentelli. I was born in Milano in 1947. I received an MS in Electronic Engineering cum laude from Politecnico di Milano in 1971. After graduation, Lioined the Department of Electronic Engineering as a researcher first and then as a Professore Incaricato. In 1975, I joined Electrical Engineering and Computer Sciences at the University of California, Berkeley, where I hold the Edgar L. and Harold H. Buttner Chair. Among various visiting positions, I was at IBM T.J. Watson Research Center in 1980 and at MIT in 1987. In 2001, I received the Kaufman Award for my pioneering contributions to EDA from the Electronic Design Automation Consortium. In 2011, I was awarded the IEEE/RSE Maxwell Medal "for groundbreaking contributions that have had an exceptional impact on the development of electronics and electrical engineering or related fields". I co-founded Cadence and Synopsys, listed in NASDAQ with market cap of over 40 Billion USD. I presently serve on the Board of Directors of Cadence Design Systems, KPIT (India), Cogisen, ISEO, Expert System (Italy), and UltraSoC (UK) (Chairman of the Board). I consulted for, among others, Intel, HP, TI, ST Microelectronics, Mercedes, BMW, Magneti Marelli, Telecom Italia, United Technologies, Camozzi Group, Pirelli, General Motors, UniCredit and UnipolSAI. I had been the President of Comitato Nazionale dei Garanti per la Ricerca and President of the Strategy Committee of the Fondo Strategico Italiano. I am also serving as member of the Advisory Board of the Politecnico di Milano, and as Chairman of the International Advisory Council of MIND (Milano Innovation District). I am a member of the United States National Academy of Engineering, an IEEE and ACM Fellow I received an honorary Doctorate from Aalborg University (Denmark) and one from KTH (Sweden). I published more than 950 papers and 19 books.



Alberto Sangiovanni Vincentelli

Mario Caironi

Mario Calironi was born in Bergamo (titaki) in 1978. He studied at "Politecnico di Milano" (Milan, Itaki) where he obtained his Laurea degree in Electrical Engineering in 2003 and a Ph.D. In Information Technology with honours in 2007, with a thesis on organic photodetectors and memory devices. In March 2007 I joined the group of Prof. Henning Sirringhaus at the Cavendish Laboratory (Cambridge, UK) as a postdoctoral research associate. I worked in Cambridge for 3 years on high resolution inkjet printing of downscaled organic transistors and logic gates, and on charge injection and transport in high mobility polymers. In April 2010 twas appointed as a Team Leader at the Center for Nano Science and Technology@Polifoid for the sitture totaliano di Tecnologia (Milan, Italy). In 2014 i entered the tenure track at the same institution, securing a tenured Senior Researcher position in 2019. I am currently responsible of the "Printed and Molecular Electronics" research line and my group is currently composed of 7 postdocs. 8 Pho Students and I feliow researcher. I am author and co-author of more than 120 scientific papers in international journals and books. I have an h-index of 35 (Scholar - July 2019). I am currently interested in solution based high resolution printing techniques for micro-electronic. opto-electronic and termeelectric devices Sabricitanic, in the device semiconductors based field-effect

transistors and their integration in high-frequency printed circuits, and in biomedical and/or implantable sensors and electronics for the healthcare. I am an 2014 ERC grantee.

My double-E master degree at POLIMI was key to the rest of my career. When I joined the Cavendish Labs, I immediately teamed with chemists and physicists who were developing the fastest polymer transistor at that time. They did not know how to measure it. I went back to my university notes, and found very soon the solution. A few months later we published a paper that is still, after 10 years, a milestone in polymer electronics. I believe that as research fields become more and more inter- and multi-disciplinary, with impact on healthcare and personalized medicine, it is even more important to hold solid basis in one sector to be able to make a difference: and Electronics is everywhere! As such, a double-E degree will give you the keys to many future technologies.



#### **Questions?**

