POLITECNICO
MILANO 1863

"*Lesson ZERO*"

Master of Science in Electronics Engineering

prof. **Franco ZAPPA**
Coordinator of Electronics B.S.E.E. and M.S.E.E. Study Programmes

October 2nd, 2019

Summary

1. Politecnico di Milano
2. *Students do matter*
3. Services, Tools, Opportunities
4. Contacts in ELECTRONICS
5. Master of Science (LM) in ELECTRONICS ENGINEERING

1. **Politecnico di Milano**

2. Students do matter

3. Services, Tools, Opportu

4. Contacts in ELECTRONICS

5. Master of Science (LM) in ELECTRONICS ENGINEERING

POLIMI

1,300 professors and researchers

1,200 technicians and administration

42,000 students

4 Schools:

- Architecture, Urban Planning and Construction Eng.;
- Design;
- Civil, Environmental and Territory Eng.;
- **Industrial and Information Eng.**

12 Departments:

- **... DEIB ...**

7 Campuses:

- **... "MI Leonardo" ...**

Ranking:
#1 Italy, **#6** Europe, **#16** world
(in «*Engineering & Technology*», QS World University Ranking 2019)

*Logo: from the "The School of Athen" painting by **Raffaello**, at Pinacoteca Ambrosiana, Milano*

POLIMI Teaching (Schools) and Research (Departments)

Teaching

(61 Study Programmes In 4 Schools)

	B.S.	M.S.		TOTAL
Architecture, Urban Planning, Construction Eng.	3	9	1	13
Design	4	6		10
Civil, Environmental and Territory Eng.	3	4		7
Industrial and Information Eng.	**14**	**17**		**31**
TOTAL	**24**	**36**		**61**

Research

(12 Departments)

Dept. AEROSPACE SCIENCE AND TECHNOLOGY	DAER
Dept. ARCHITECTURE AND URBAN STUDIES	DASTU
Dept. ARCHITECTURE, BUILT ENVIRONMENT AND CONSTRUCTION ENG.	DABC
Dept. CHEMISTRY, MATERIALS AND CHEMICAL ENG. "GIULIO NATTA"	DCMC
Dept. CIVIL AND ENVIRONMENTAL ENG.	DICA
Dept. DESIGN	DESIGN
Dept. ELECTRONICS, INFORMATION AND BIOENGINEERING	**DEIB**
Dept. ENERGY	DENG
Dept. MANAGEMENT, ECONOMICS AND INDUSTRIAL ENG.	DIG
Dept. MATHEMATICS FRANCESCO BRIOSCHI	DMAT
Dept. MECHANICAL ENG.	DMEC
Dept. PHYSICS	DFIS

Campuses

POLITECNICO MILANO 1863

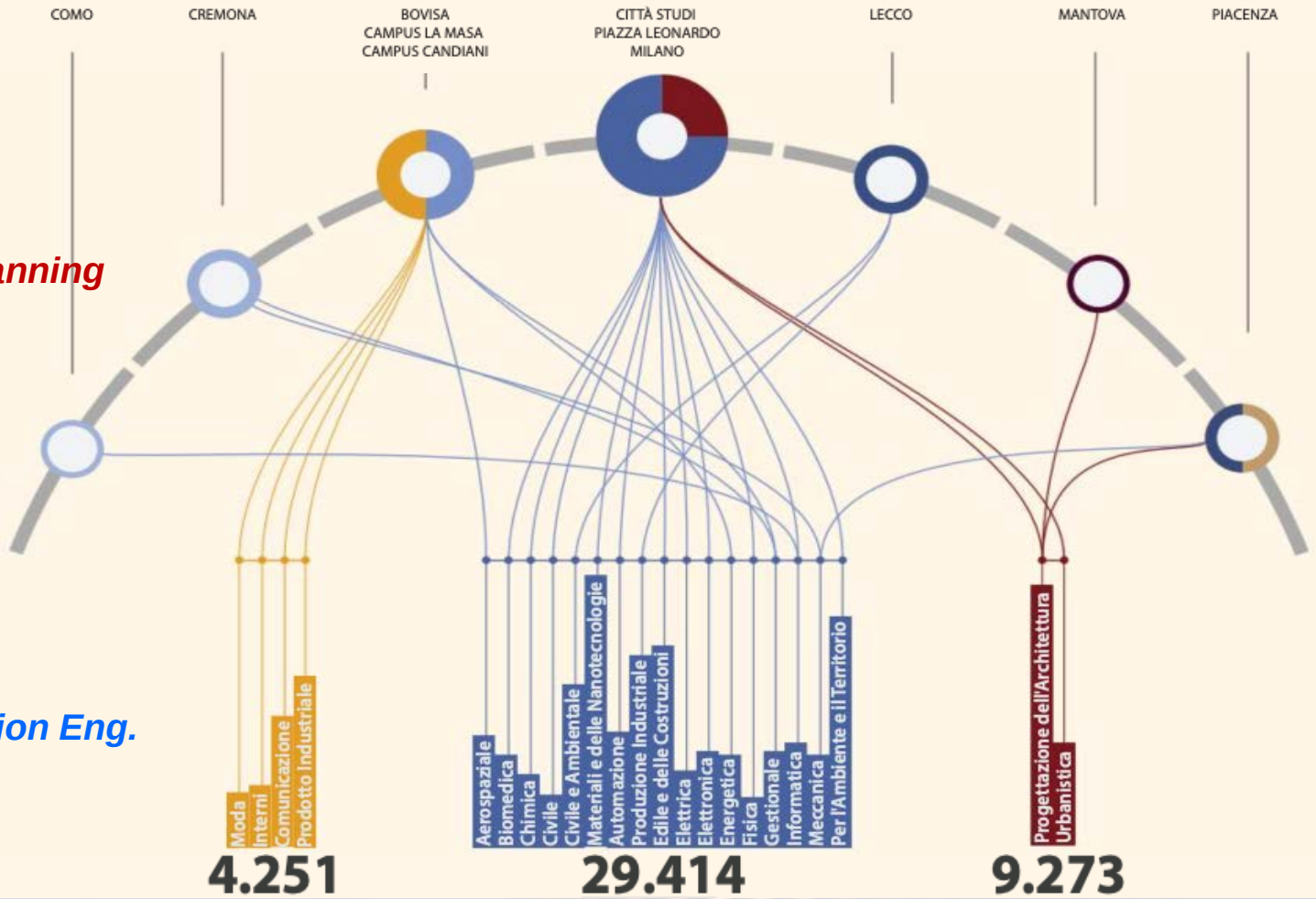
Schools:

Architecture, Urban Planning and Construction Eng.

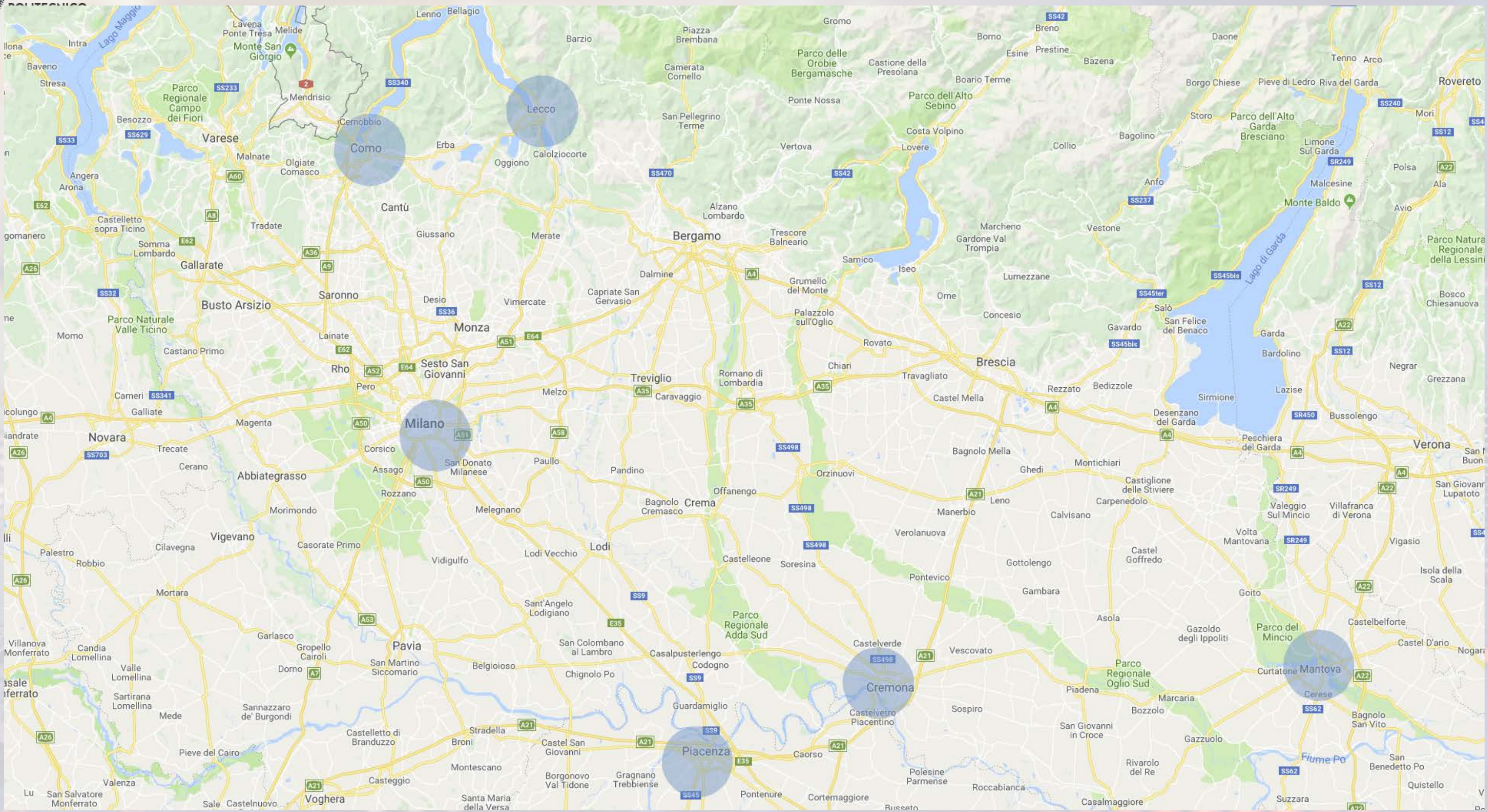
Design

Civil, Environmental and Territory Eng.

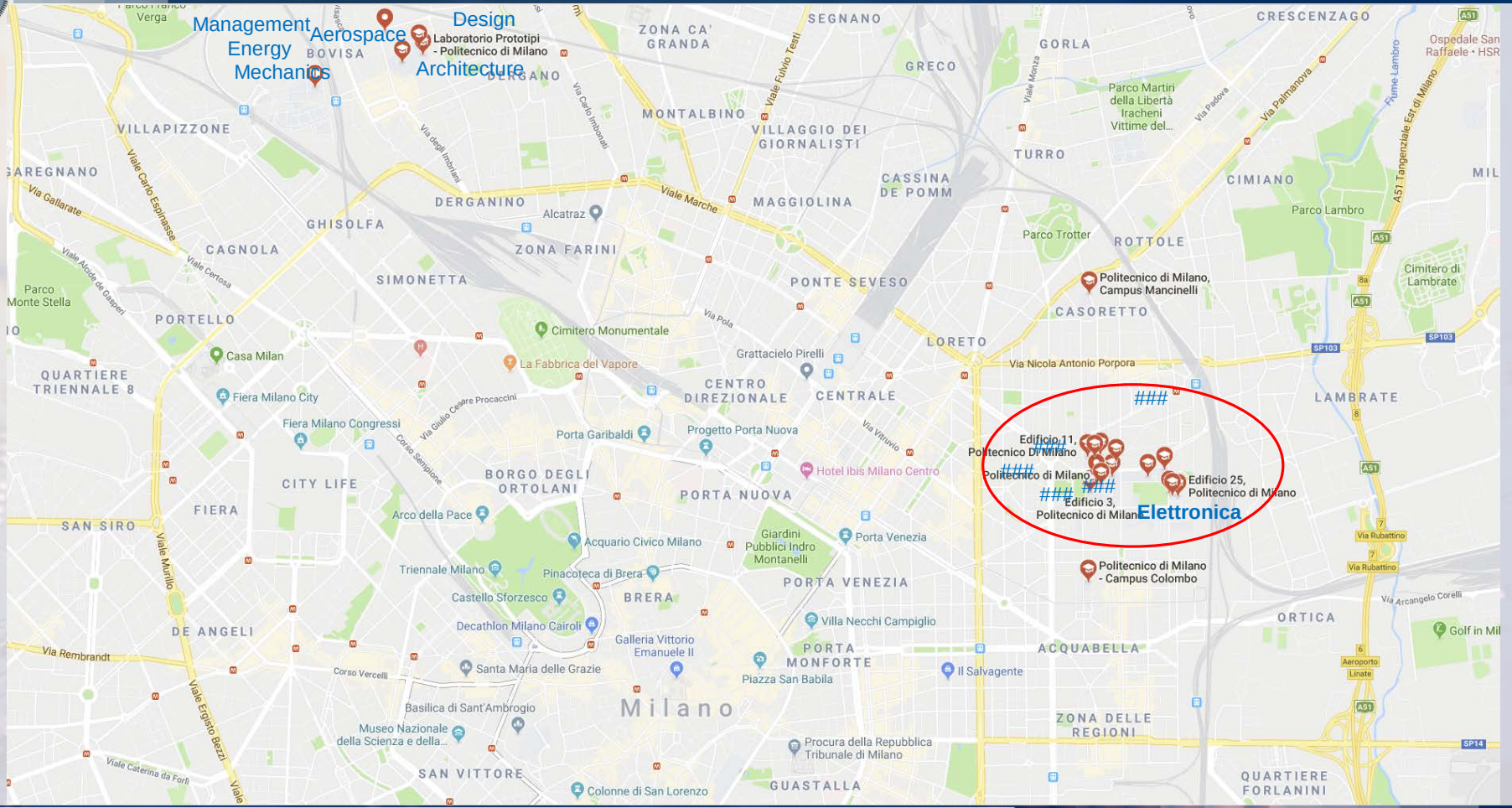
Industrial and Information Eng.



Campuses

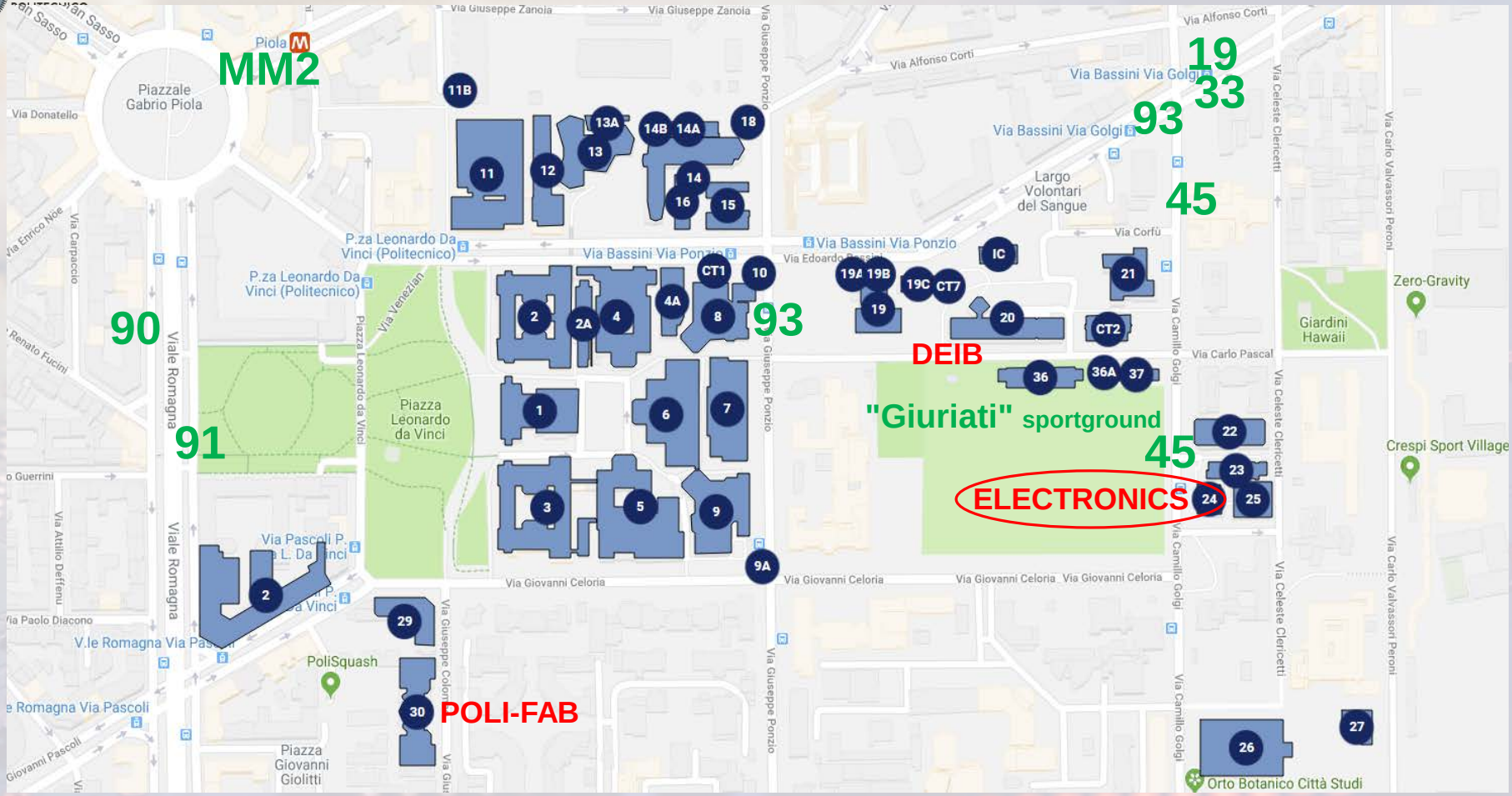


Campuses in Milano ("Leonardo" and "Bovisa")



"Leonardo" campus

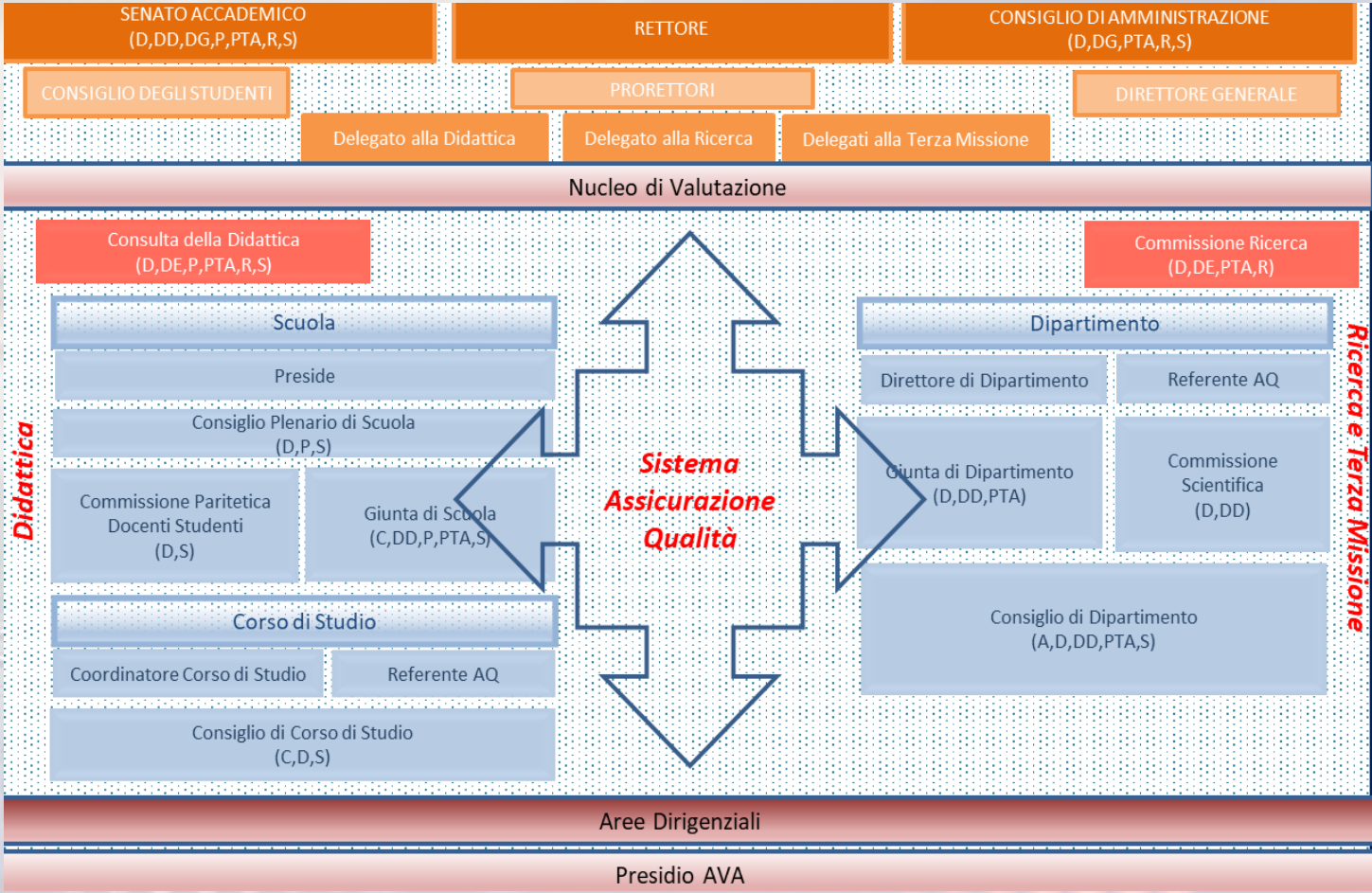
MM2 S9



POLIMI organization chart

LEGENDA:

A: PhD / postDoc
C: Study Programme Coordinator
D: Professor
DD: Dept. Director
DE: Rector deputy
DG: General Director
P: School Dean
PTA Technical/Administrative staff
R: Rector
S: Student



"Academic Senate" and "Board of Governors"

ACADEMIC SENATE

23 MEMBERS

- RECTOR;
- 12 DEPARTMENT REPRESENTATIVES;
- 4 PROFESSOR REPRESENTATIVES;
- 2 TECHNICAL-ADMINISTRATIVE STAFF REPRESENTATIVES;
- **4 STUDENT REPRESENTATIVES**

ROLE:

THE SENATE ADDRESSES AND PLANS THE DEVELOPMENT OF THE UNIVERSITY, WITH PARTICULAR ATTENTION TO EDUCATION AND RESEARCH, AND MONITORS THE WHOLE OPERATION OF THE INSTITUTION

THE ACADEMIC SENATE MEETS ONCE A MONTH

BOARD OF GOVERNORS

11 MEMBERS

- RECTOR;
- 4 PROFESSOR REPRESENTATIVES;
- 1 TECHNICAL AMINISTRATIVE STAFF REPRESENTATIVE;
- 3 EXTERNAL MEMBERS;
- **2 STUDENT REPRESENTATIVES**

ROLE:

THE BOARD OF GOVERNORS DEFINES THE LONG-TERM ECONOMIC PROGRAMME ON THE BASIS OF THE PROPOSALS AND OPINIONS OF THE ACADEMIC SENATE

THE CDA MEETS ONCE A MONTH

"Prof-Stud Joint Committee"

Deans (**Presidi**) lead Schools through Panel (**Giunta**) and Counsil (**Consiglio**) and coordinate Study Programmes and courses

JOINT COMMITEE

10 MEMBERS

- 5 PROFESSORS APPOINTED BY THE DEAN OF THE SCHOOL;
- **5 STUDENT REPRESENTATIVES:**

ROLE:

MONITORS THE PROVISION OF TRAINING, THE QUALITY OF TEACHING AND SERVICES OFFERED TO STUDENTS;

monitors the on-going School activities and proposes improvements

"Study Programme Board" (CCS)

Each CdS is headed by a Coordinator (**Coordinatore**), whom students should refer to

Study Programmes of the School in "Industrial and Information Eng.":

Aerospace Eng.	lorenzo.dozio@polimi.it
Autom. and Control Eng.	maria.prandini@polimi.it
Biomedical Eng.	luca.mainardi@polimi.it
Chemical Eng.	isabella.nova@polimi.it
Electrical Eng.	sergio.pignari@polimi.it
Electronics Eng.	**franco.zappa@polimi.it**
Energy Eng.	luigi.colombo@polimi.it
Eng. Physics	mauro.nisoli@polimi.it
Management Eng.	stefano.ronchi@polimi.it
Computer Science and Eng.	gianpaolo.cugola@polimi.it
Mathematical Eng.	anna.paganoni@polimi.it
Materials Eng. and Nanotech.	stefano.turri@polimi.it
Mechanical Engineering	gaetano.cascini@polimi.it
Music and Acoustics Eng.	augusto.sarti@polimi.it
Nuclear Eng.	matteo.passoni@polimi.it
Industrial Production Eng.	giancarlo.giudici@polimi.it
Telecommunication Eng.	matteo.cesana@polimi.it

STUDY PROGRAMME BOARD – CCS

MEMBERS

- PRESIDENT OF THE CSS;
- N. OF PROFESSORS OF THE CCS;
- **N. OF STUDENT REPRESENTATIVES**

ROLE:

IT DEFINES THE SUBJECTS OF THE STUDY PROGRAMME, THE TEACHING METHODS AND ITS USE, THE ANALYSIS OF THE EFFECTIVENESS OF THE COURSES CARRIED OUT, THE ORGANIZATION OF THE STUDY PLAN, THE ECTS DISTRIBUTION.

Defines Study Programme (Corso di Studi) goals, supervises courses, exam modalities, other educational activities, Study Plans organization, credits vs. contents

Contacts for B.S. and M.S. in ELECTRONICS Eng.

Dean of the School

prof. **Antonio CAPONE**
antonio.capone@polimi.it

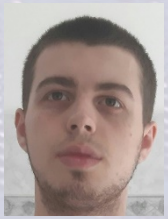
Coordinator of Electronics

prof. **Franco ZAPPA**
franco.zappa@polimi.it

Student representatives in Electronics:

Alberto BADILINI
alberto.badilini@mail.polimi.it
@albertobadilini

Alessandro DI GIOVINE
alessandromichele.digiovine@mail.polimi.it



Francesco FAILLACE
francesco.faillace@mail.polimi.it
@francescofaillace

Giacomo TOMBOLAN
giacomo.tombolan@mail.polimi.it
@giacotombolan

"Prof-Stud Joint Committee"

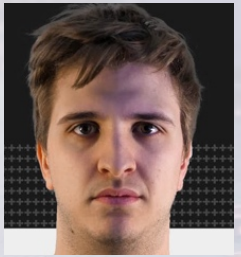
"Commissione Paritetica Docenti-Studenti"

Composed by 5 professors and 5 student representatives of all School's CdSs

Beatrice **Bartolozzi**

Giacomo **Buratti**

Antonella **Polimeno Camastra**



Laurens **Lanzillo**

Pietro **Rossetti**

In charge to:

- monitor the study programme offers, teaching quality and student services quality;
- identify metrics to evaluate monitoring results;
- submit proposals to Dean (Preside) and Evaluation Board (Nucleo di Valutazione) to improve CdSs.

"Student ombudsman" - "Difensore degli studenti"

Students can contact him to highlight misconducts

He enters into play after a (not anonymous) complain report, and supports the student to solve issues

He protect and support the student agains any possible retaliation.

He is prof. **Gerardus JANSZEN** difensoredeglistudenti@polimi.it 02-2399.8366

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Roles of Students and their Representatives

Students have the right to participate to life and governance of POLIMI through their Representatives. Students are asked to express their opinion on POLIMI management bodies.

Student Representatives are elected directly by you. You can candidate yourself!

Elections, held every 2 years, are important opportunities to make students voices be heard

Student Representatives are the simplest and most effective way of conveying students' **proposals and requests** on basic subjects, such as teaching and services for students.

Example of results:

- reorganization of educational activities;
- benefits of the «Right to Education» (DSU), including scholarships for low income students
- Exemptions to tuition fees for top students

Students' opinion on teaching: why

The survey of student's opinions is one of the main tools for monitoring the **quality of teaching**:

filling in an ANONYMOUS online questionnaire for each course is MANDATORY for enrollment in exams

By completing the questionnaire, students actively participate to **quality assessment & improvement**

Questions concern:

- teaching
- teacher
- assistant activities
- infrastructures

Since your opinions are highly considered, you are invited to:

- **Pay particular attention to questionnaire compilation**
- **Give informed and consistent answers to questions**
- **Provide proactive and constructive comments**

Students' opinion on teaching: questions

D1		Are you interested in the topics of this teaching?
D2	TEACHING	Was the preliminary knowledge sufficient to understand the topics?
D3	TEACHING	Was the teaching carried out in a manner consistent with what was stated on the Study Program?
D4	TEACHING	Was this teaching free from unnecessary repetitions of topics covered in other courses?
D5	TEACHING	Was the study load proportionate to the assigned credits?
D6	TEACHING	Was the teaching material adequate?
D7	TEACHER	Does the teacher stimulate the interest towards the discipline?
D8	TEACHER	Does the teacher explain the topics clearly?
D9	TEACHER	Are lessons important for learning the contents of this teaching?
D10	TEACHER	Are examination procedures clearly defined?
D11	TEACHER	Was teaching material provided in advance by the teacher?
D12	TEACHER	Are hours of the teaching activity respected?
D13	TEACHER	Is teaching staff actually available for clarifications and explanations?
D14	OTHER ACTIVITIES	Are integrative educational activities (exercises, labs, seminars, etc.) coordinated with lessons?
D15	OTHER ACTIVITIES	Are integrative educational activities other than lessons (exercises, labs, seminars, etc.) useful for learning?
D16	OTHER ACTIVITIES	Are tutors / assistants clear?
D17	INFRASTRUCTURES	Are classrooms suitable to follow lessons well (can you see and hear)?
D18	INFRASTRUCTURES	Are classrooms large enough?
D19	INFRASTRUCTURES	Are premises and equipment for integrative educational activities (exercises, labs, seminars, etc.) adequate?
D20	SATISFACTION	Are are overall satisfied with how this teaching was carried out?

Students' opinion on teaching: process flow

Build your future thanks to your answers!

Fill in online questionnaire

Data gathering

Data validation

Data processing per course/teacher

Results published on polimi web pages per course/teacher

STUDY PROGRAMME BOARD: Data analysis

PROF-STUD JOINT COMMITTEE: Data analysis

UNIVERSITY BODIES: Data analysis

Students' opinion on whole Study Programme and Services

In the last year of the Study Program, students' opinions are collected on:

→ **The whole training path** (mandatory for enrolling to the Final Degree Exam) on:

organization of teaching, specific contents, infrastructures, library, internships, international mobility, final exam.

→ **Student support services** (mandatory for registration to the 1st exam of the year) on:

enrollment, Study Plans, exam registration, taxes, student offices, ICT services, libraries, PoliPrint, catering, communication, environment.

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Who to contact for...

… questions related to courses:

1. Course teacher(s)
2. Study Program Coordinator
3. Student Representatives
4. Joint Professor-Student Committee
5. Dean of the School
6. Ombudsman

… administrative matters:

- Student Office (desks, online chat, chatbot, www.polimi.it/en/current-students/contacts/)

… organizational questions and Study Plans:

- Study Plan Reference person (chiara.guazzoni@polimi.it)
- Dean's offices (desks, chat, email)
- Department student office

Reference Rules

Educational rules (Regolamenti Didattici)

www.polimi.it/en/programmes

Charter of the Rights and Duties of students

www.normativa.polimi.it/?id_sottoc=66

School Rules (Regolamenti di Scuola)

www.ingindinf.polimi.it/en/school/school-rules

Academic calendar and deadlines

www.polimi.it/en/current-students/calendar-and-deadlines/deadlines

B.S.E.E. and M.S.E.E. www.elettronica.polimi.it

B.S.E.E. and M.S.E.E. website: www.elettronica.polimi.it

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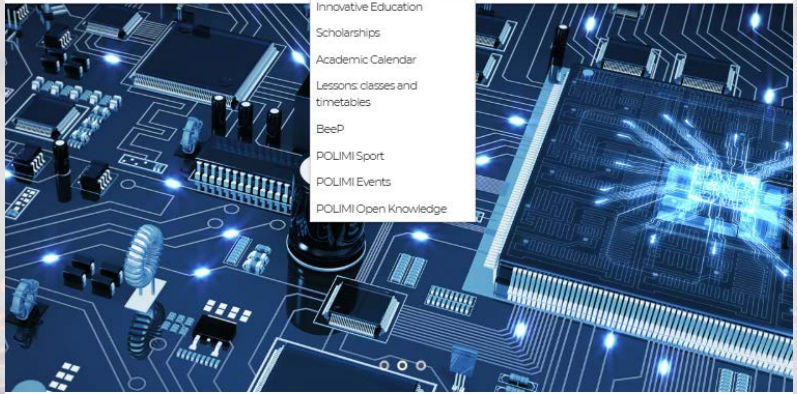
USEFUL LINKS PRIVACY

SCUOLA DI INGEGNERIA INDUSTRIALE E DELL'INFORMAZIONE

Corso di Ingegneria Elettronica

HOME | PROGRAM | PROSPECTIVE STUDENTS | ENROLLED STUDENTS | JOBS | CONTACTS | PROFESSORS | RESEARCH

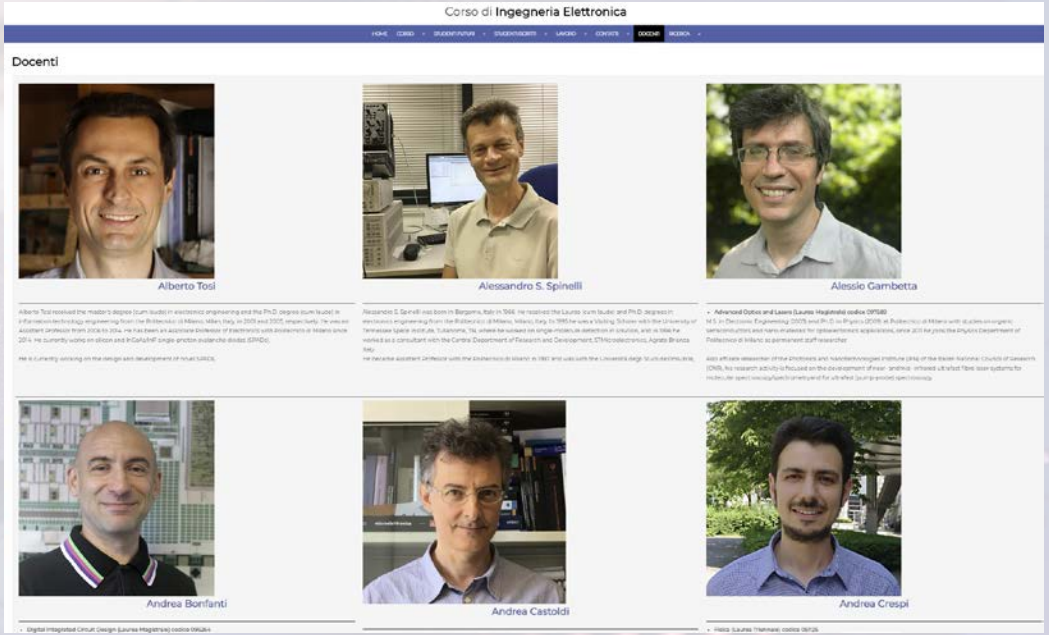
- Innovative Education
- Scholarships
- Academic Calendar
- Lessons: classes and timetables
- BeeP
- POLIMI Sport
- POLIMI Events
- POLIMI Open Knowledge



The Study Programme in Electronics Engineering prepares students to design, use, innovate, and deploy electron devices, circuits and systems and to guide the evolution of technology and innovation, with competence and professionalism.

The **Laurea** degree in "Ingegneria Elettronica" (**B.S.E.E.**) aims at training professionals with solid scientific and technologic know-how, combining physical-chemical-mathematical fundamentals of the most advanced technologies with the engineering capacity to conceive and develop products and electronic systems, exploitable in the most diversified areas of society, often opening up new markets and scenarios.

The **Laurea Magistrale** degree in Electronics Engineering (**M.S.E.E.**) aims at fostering the skills acquired during the Laurea courses, and to further expand engineering knowledge and excellence in electronics. Examples are integrated electronic and analog design capabilities, complex products design and system integration (sensor and transducer systems, analog/digital conversion, processing and programming, power management), and expertise on CAD design



Information pages and tools (1/2)

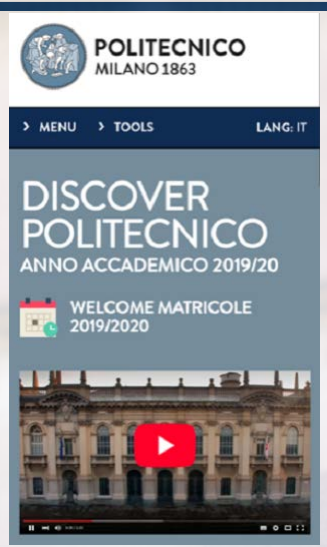
POLIMI web pages www.polimi.it and www.polimi.it/en/current-students for all information on POLIMI

School web pages www.ingindinf.polimi.it for more specific information on your School, Study Programme, teaching activities, graduation, special initiatives, etc.

Online POLIMI services www.polimi.it/servizionline is your portal to all administrative online tools

Information pages and tools (2/2)

APP DISCOVER POLIMI: mobile app for freshmen makes you discover all students POLIMI services



APP POLIMI: mobile app for students devoted to access lecture timetables, manage study plan, request support to student office, etc.

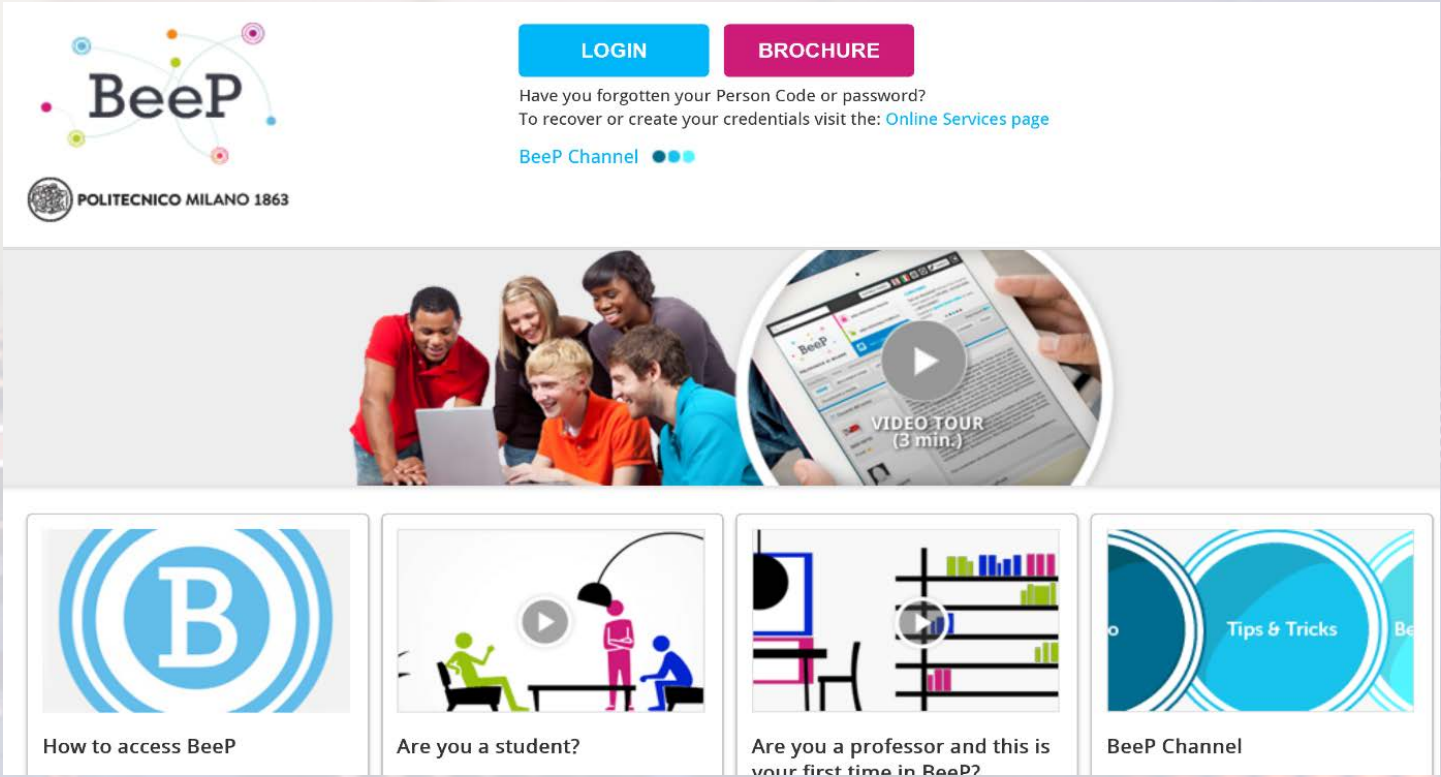
biweekly newsletter **Politamtam**
www.politamtam.polimi.it for info on events, activities of student organizations, opportunities, and more

Social channels:
www.facebook.com/polimi
www.youtube.com/polimi
www.instagram.com/polimi
www.twitter.com/polimi
www.linkedin.com/school/polimi
www.polimi.it/itunes

BEEP channel for teachings

application tool for teaching support, slides, notes, student-teacher communications :

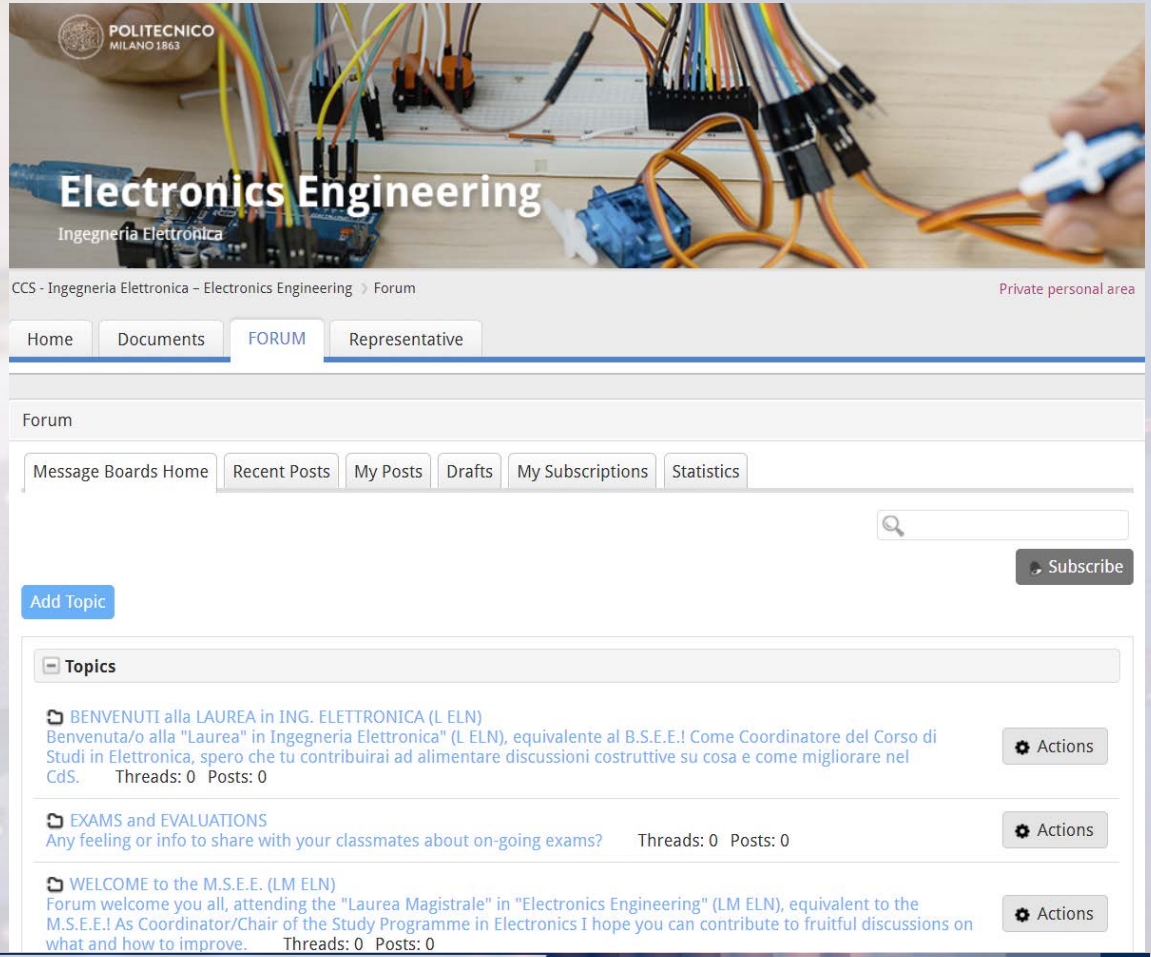
https://beep.metid.polimi.it/



BEEP channel for M.S.E.E. and B.S.E.E. forums

NEW tool and forum to let students communicate among themself, with Representatives and Coordinator about proposals and issues to solve:

https://beep.metid.polimi.it/



Services and Opportunities www.polimi.it/en/services-and-opportunities

Libraries: 4 in Milan campuses plus 5 in the other campuses

Career Service www.careerservice.polimi.it for connecting students to the job market and for supporting students in searching for first job

CareerService
www.careerservice.polimi.it

POLIHUB www.polihub.it startup District & Incubator that gives you opportunities for turning your ideas into a startup company

POLIHUB
INNOVATION DISTRICT & STARTUP ACCELERATOR
BY FONDAZIONE POLITECNICO DI MILANO

POLIMI Open Knowledge www.pok.polimi.it for free online courses (MOOCS)

POK MI Open Knowledge

International mobility www.polimi.it/en/services-and-opportunities/experience-abroad/
exchange projects, short mobility, double degrees

Tutoring

School tutoring services supports student during their studies, with student-tutors and reference-teachers, who have the task of:

- be a reference point for problems related to teaching activities
- helping students with issues on specific courses with **clarifications on unclear concepts and excercises**

www.ingindinf.polimi.it/en/students/tutoring

Tutoring for B.S. students (*Laurea*)

Peer-to-peer tutoring: experienced students-tutors help, individuals or small groups of 3-4 people, on basic courses of the first two years of B.S. programmes. You can request tutoring both during the proper semester and at other times, by email tutorato-ingegneria@polimi.it

Basic tutoring: lectures held by Ph.D. students or by expert teachers on basic courses of B.S. programmes. These tutoring activities are not related to specific classes: students can access them according to the most favorable schedule. Calendar will be published on the School's tutoring page web site.

Specific tutoring: tutorials held by Ph.D. students and expert teachers on some courses selected from the different B.S. programmes (information provided by the course lecturer)

Tutoring for M.S. students (Laurea Magistrale)

Equalization tutoring peer-to-peer: dedicated mainly to international students. Experienced student-tutors help, individuals or small groups of 3-4 people, on basic courses of the M.S. programmes. You may request tutoring both during the delivery semester and at other times of the year by email tutorato-ingegneria@polimi.it

Specific tutoring: held by Ph.D. students and expert teachers on some courses selected from the different programmes (information provided by the course lecturer)

International exchange programmes

POLIMI offers many opportunities for experiences abroad:

- **study mobility** (get credits attending courses and activities in partner universities)
- **Double Degrees** (get two degrees, one in POLIMI and one in the partner university)

www.polimi.it/en/services-and-opportunities/experience-abroad

The **Reference Persons** for student exchange of your Study Program in ELECTRONICS are:

- prof. **marco.sampietro@polimi.it** (outgoing)
- prof. **christian.monzio@polimi.it** (incoming)

On the "**Educational Rules**" of M.S.E.E. you may find the list of partner universities with which POLIMI have exchange programs available for you

Every year POLIMI issues a **call for international student mobility** to which you have to apply for accessing mobility opportunities

Experiences abroad: www.polimi.it/en/services-and-opportunities/experience-abroad

prof. **Federica Foiadelli** (Erasmus across the World, apart from China)

prof. **Flavia Grassi** (Double Degree programmes and exchanges with China)

Michela Longo (Double Degree programmes World, apart from China)

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Useful numbers

Students email: name.surname@**mail.polimi.it**

Staff email: name.surname@**polimi.it**

Phone extensions: (**02-2399**) xxxx

Admission to M.S.E.E:

(Italian stud.) **massimo.ghioni@polimi.it** **salvatore.levantino@polimi.it**

(international stud.) **christian.monzio@polimi.it**

Study Plans:

(M.S.E.E.) **chiara.guazzoni@polimi.it**

(B.S.E.E.) **dario.natali@polimi.it**

Transfer across degrees **daniele.ielmini@polimi.it**

Tutoring: **franco.zappa@polimi.it**

Contacts in ELECTRONICS B.S. and M.S. Study Programmes

task	activities	name	phone
Coordinator of the B.S. and the M.E. in ELECTRONICS ENG.		Franco ZAPPA	6149
Study Programme secretary	records and reports on CCS meetings	Salvatore LEVANTINO	3731
Quality Assurance	assesses Quality of teachings and Study Programme	Marco SAMPIETRO	6188
School tutoring	manages and proposes tutoring activities	Franco ZAPPA	6149
Interships	selects and accepts companies proposals	Franco ZAPPA	6149
Admission to M.S.E.E.	for Italian students	Massimo GHIONI	4003
	for Italian students	Salvatore LEVANTINO	3731
	for international students	Christian MONZIO COMPAGNONI	4038
Transfers among other B.S.	from / to other B.S.	Daniele IELMINI	6120
International exchanges outgoing	POLIMI students going abroad	Marco SAMPIETRO	6188
incoming	international students coming to POLIMI	Christian MONZIO COMPAGNONI	4038
Lessons timetables B.S.E.E.	2nd and 3rd years (prof. Epifani for 1st year)	Giorgio FERRARI	4008
M.S.E.E.	1st and 2nd years	Carlo SAMORI	4035
Study Plans B.S.E.E.	per la L ELN di primo livello	Dario NATALI	3766
M.S.E.E.	per la LM ELN di secondo livello	Chiara GUAZZONI	6147
Graduation Committee secretary		Alessandro SOTTOCORNOLA SPINELLI	4001
Open Day	organizes events and meetings	Giacomo LANGFELDER	3425
	"Meet me Tonight" and other info events	Marco CARMINATI	6102
ELECTRONICS web site		Ivan RECH	3700
Advisory Board	organizes meetings and discussions with Job market	Franco ZAPPA	6149
	monitors match between offered courses and	Giacomo LANGFELDER	3425
	Company requests	Dario NATALI	3766
Innovative Teaching	evaluats new way to provide teaching and skills	Marco CARMINATI	6102
	proposes novel educational approaches	Federica VILLA	3490
Honours Program	manage excellence paths	Dario NATALI	3766
Prof-Stud Joint Committee	evaluates all Study Programmes of the School	nobody	

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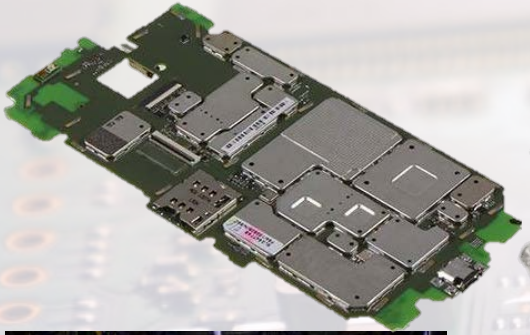
What is ELECTRONICS: $H_{ardware} + F_{irmware} + S_{oftware}$

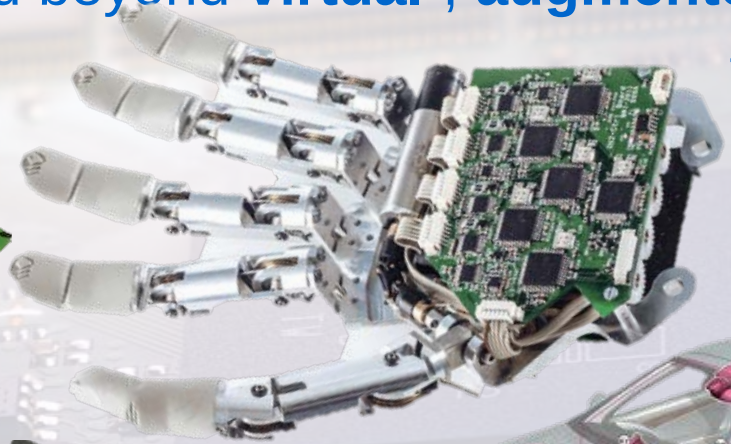
embedded systems, intelligent machines, communication networks …

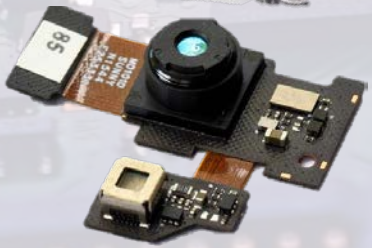
smart-, autonomous-, **wearable-** **products and systems**

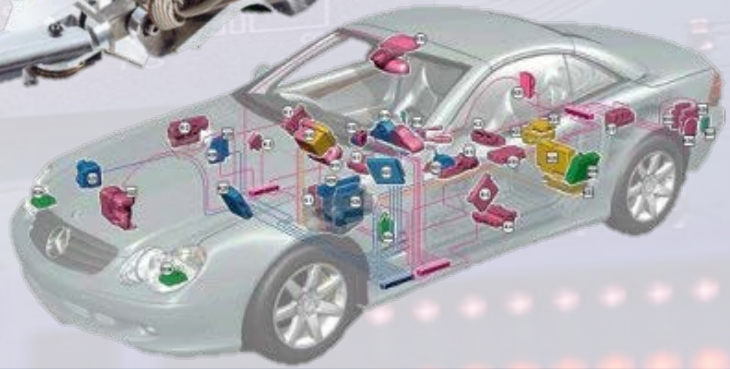
for **real world** and beyond **virtual-**, **augmented-, mixed- reality**

for **humans** and **robots**



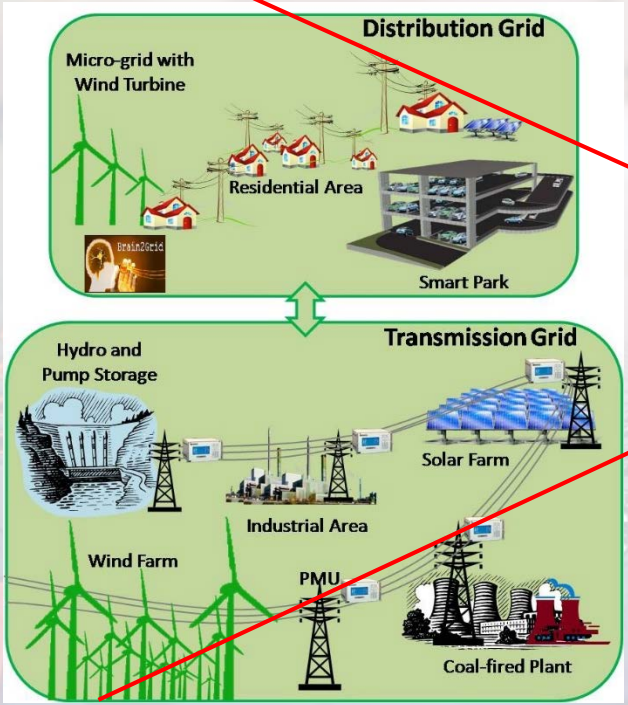






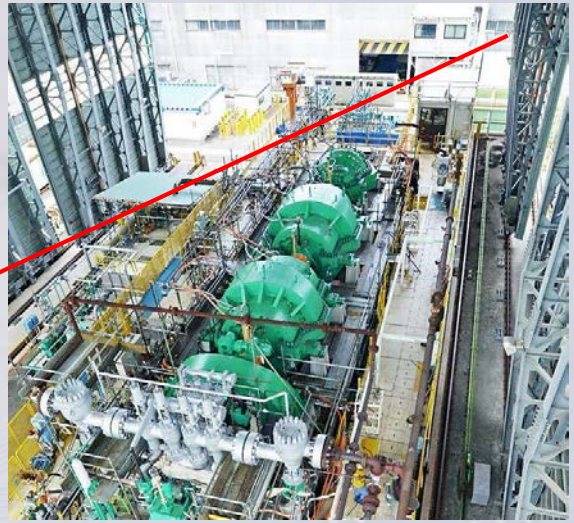
ELECTRONICS is not ELECTRICAL engineering

production, transmission, distribution of electric energy

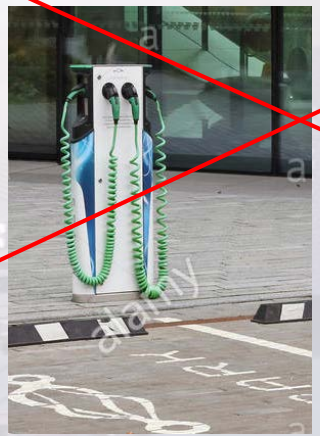


wide-area power-grid

heavy industry



electrical machines



e-vehicles

electric traction

Study Programme in ELECTRONICS ENG.

Ph.D.
Philosophie Doctorate

from International Master Degree's graduate

M.S.E.E.
Master of Science in Electronics Engineering

from International Bachelor Degree's undergraduate

B.S.E.E.
Bachelor of Science In Electronics Engineering

Expected students at the M.S. degrees "Scuola 3i"

130 new students at **LM ELN**

MAGISTRALE	SEDI	IMMATRICOLABILI UE	Extra UE	Marco Polo	TOTALE
Biomedical Engineering - Ingegneria Biomedica	Milano-Leo	460	40	3	500
Management Engineering - Ingegneria Gestionale	Milano-Bov	600	150	4	750
Engineering Physics - Ingegneria Fisica	Milano-Leo	100	10	2	110
Mathematical Engineering - Ingegneria Matematica	Milano-Leo	190	10	0	200
Chemical Engineering - Ingegneria Chimica	Milano-Leo	130	20	4	150
Ingegneria della Prevenzione e della Sicurezza nell'Industria di Processo	Milano-Leo	60	10	3	70
Electrical Engineering - Ingegneria Elettrica	Milano-Leo	75	75	4	150
Nuclear Engineering - Ingegneria Nucleare	Milano-Bov	60	20	3	80
Materials Engineering and Nanotechnology - Ingegneria dei Materiali e delle Nanotecnologie	Milano-Leo	200	50	4	250
Aeronautical Engineering - Ingegneria Aeronautica	Milano-Bov	200	25	3	225
Space Engineering - Ingegneria Spaziale	Milano-Bov	100	15	3	115
Energy Engineering - Ingegneria Energetica	Milano-Bov	240	40	3	280
	Piacenza	20	20	1	40
Mechanical Engineering - Ingegneria Meccanica	Milano-Bov	330	60	3	390
	Lecco	50	30	3	80
Telecommunication Engineering - Ingegneria delle Telecomunicazioni	Milano-Leo	70	50	3	120
Electronics Engineering - Ingegneria Elettronica	Milano-Leo	100	30	2	130
Computer Science and Engineering - Ingegneria Informatica	Milano-Leo	370	30	0	400
	Como	0	0	0	0
Music and Acoustic Engineering	Milano-Leo	50	10	0	60
	Cremona	30	10	0	40
Food Engineering	Milano-Leo	60	10	0	70
Mobility Engineering	Milano-Leo	60	10	0	70
Automation and Control Engineering - Ingegneria dell'Automazione	Milano-Leo	170	30	0	200
	TOTALE LM	**3725**	**755**	**48**	**4480**

Educational Programme

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

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 ultra-sensitive 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 cyber-physical-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,

- 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	Language	Type	Sem	CFU	CFU Group
052427	B	ING-INF/01	ANALOG CIRCUIT DESIGN	EN	M	1	10.0 [1.0 ☕]	10.0
054654	B	ING-INF/01	ELECTRONIC SYSTEMS	EN	M	1	10.0	10.0
095155	B	ING-INF/01	ELECTRON DEVICES	EN	M	1	10.0	10.0
095162	B	ING-INF/01	MEMS AND MICROSENSORS	EN	M	1	10.0	
095251	B	ING-INF/01	SIGNAL RECOVERY	EN	M	2	10.0	10.0
095264	B	ING-INF/01	DIGITAL INTEGRATED CIRCUIT DESIGN	EN	M	2	10.0	10.0
095274	B	ING-INF/01	RF CIRCUIT DESIGN	EN	M	2	10.0	
054081	B	ING-INF/01	MICROELECTRONIC TECHNOLOGIES	EN	M	2	5.0 [1.0 ☕]	5.0
054083	B	ING-INF/01	DIGITAL ELECTRONIC SYSTEMS DESIGN	EN	M	2	5.0 [1.0 ☕]	
--	--	--	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	Language	Type	Sem	CFU	CFU Group
095380	B	ING-INF/01	MIXED-SIGNAL CIRCUIT DESIGN	EN	M	1	10.0	10.0

090918	B	ING-INF/01	POWER ELECTRONICS	EN	M	1	10.0	
--	--	--	Courses to be chosen from Group TAB1	--	--	--	--	10.0
054085	B	ING-INF/01	BIOCHIP	EN	M	2	5.0 [2.0 ☕]	
095394	B	ING-INF/01	SEMICONDUCTOR RADIATION DETECTORS	EN	M	2	5.0	10.0
090935	B	ING-INF/01	ELECTRONICS DESIGN FOR BIOMEDICAL INSTRUMENTATION	EN	M	2	10.0	
--	--	--	Courses to be chosen from Group TAB2	--	--	--	--	10.0
--	--	--	Courses to be chosen from Group TAB1	--	--	--	--	
090921	--	--	THESIS AND FINAL EXAM	--	V	1	20.0	20.0
090921	--	--	THESIS AND FINAL EXAM	--	V	2	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	Language	Type	Sem	CFU
052471	C	ING-INF/03	ADVANCED DIGITAL SIGNAL PROCESSING	EN	M	1	10.0 [1.0 ☕]
094790	C	ING-INF/03	RADAR IMAGING	EN	M	1	5.0
096129	C	ING-INF/04	ADVANCED AND MULTIVARIABLE CONTROL	EN	M	2	10.0
083047	C	ING-IND/34	BIOMATERIALS [C.I.]	IT	I	2	10.0
083042	C	ING-IND/34	CELLULAR BIOENGINEERING	IT	M	1	10.0
097589	C	FIS/03	ADVANCED OPTICS AND LASERS	EN	M	1	10.0
095942	C	ING-INF/05	DIGITAL SYSTEMS DESIGN METHODOLOGIES	EN	I	2	10.0
073011	C	ING-INF/06	BIOENGINEERING OF THE MOTOR SYSTEM	IT	M	1	5.0
099282	C	BIO/10	BIOINFORMATICS AND FUNCTIONAL GENOMICS	IT	M	1	5.0
096617	C	FIS/03	PHYSICS OF PHOTOVOLTAIC PROCESSES	EN	M	1	5.0
053351	C	ING-INF/04	MODEL IDENTIFICATION AND DATA ANALYSIS	EN	I	1	10.0
096081	C	FIS/03	QUANTUM OPTICS AND INFORMATION	EN	M	2	5.0
093062	C	ING-INF/04	AUTOMATION AND CONTROL IN VEHICLES	EN	M	2	5.0
054312	C	ING-INF/03	DIGITAL COMMUNICATION	EN	I	1	10.0 [2.0 ☕]
088949	C	ING-INF/05	ADVANCED COMPUTER ARCHITECTURES	EN	M	2	5.0
090914	C	ING-INF/04	CONTROL OF INDUSTRIAL ROBOTS	EN	M	1	5.0
095907	C	ING-INF/05	EMBEDDED SYSTEMS	EN	I	1	10.0
096660	C	MAT/08	NUMERICAL METHODS IN MICROELECTRONICS	EN	M	2	5.0
052470	C	ING-INF/03	QUANTUM COMMUNICATIONS	EN	M	2	5.0
089480	C	FIS/03	SOLID STATE PHYSICS A	EN	M	2	5.0
096532	C	ING-IND/31	ADVANCED CIRCUIT THEORY	EN	M	2	5.0

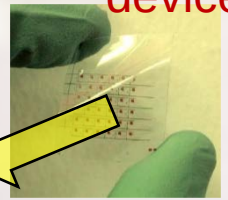
In TAB1 there are 5 and 10 credit electives taught in Italian that students can select.

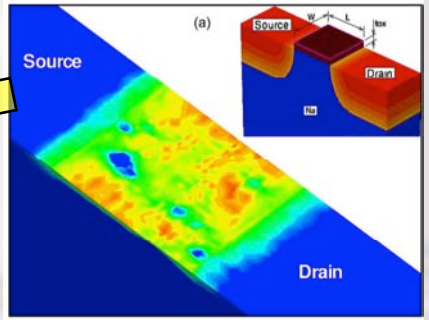
Courses of the Group TAB2

Code	Act type	SSD	Course Title	Language	Type	Sem	CFU
090918	B	ING-INF/01	POWER ELECTRONICS	EN	M	1	10.0

Research and Development at POLIMI

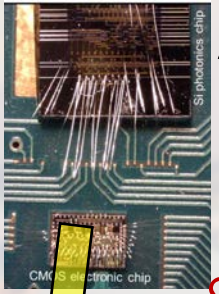
device



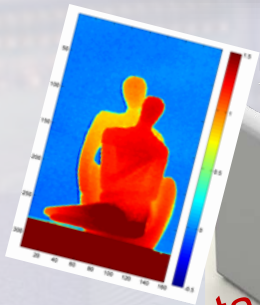


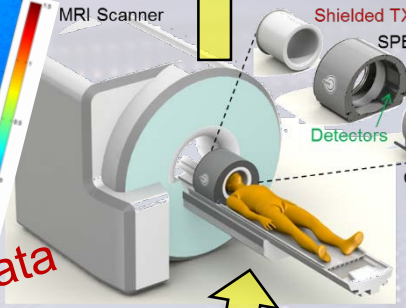
physics-chemistry-math

system

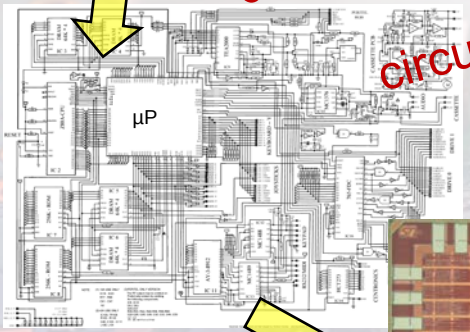


component

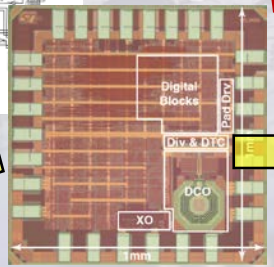




apparata

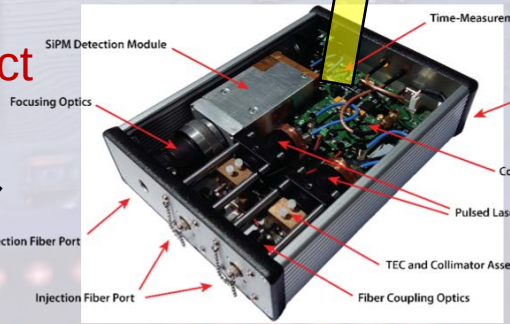


circuit



prototype

product



LM ELN / M.S.E.E. courses

in English

100 cfu total in about **12** courses
(25 cfu of choices)

20 cfu of experimental thesis
(at POLIMI labs or internship)

Moreover: **ERASMUS**,
Double Degree

	tipologia	Nome Insegnamento	Sem	CFU	di cui di D.I	CFU Gruppo
1° anno LM ELN	caratterizzante	ANALOG CIRCUIT DESIGN	1	10	1	10
	caratterizzante	ELECTRONIC SYSTEMS	1	10		10
	caratterizzante	ELECTRON DEVICES	1	10		10
	caratterizzante	MEMS AND MICROSENSORS	1	10		
	caratterizzante	SIGNAL RECOVERY	2	10		10
	caratterizzante	DIGITAL INTEGRATED CIRCUIT DESIGN	2	10		10
	caratterizzante	RF CIRCUIT DESIGN	2	10		
	caratterizzante	DIGITAL ELECTRONIC SYSTEMS DESIGN	2	5	3	5
	caratterizzante	MICROELECTRONIC TECHNOLOGIES	2	5	1	
	affine	***Insegnamenti a scelta dal Gruppo TAB1***	--	--		5
2° anno LM ELN	caratterizzante	MIXED-SIGNAL CIRCUIT DESIGN	1	10		10
	caratterizzante	POWER ELECTRONICS	1	10		
	affine	***Insegnamenti a scelta dal Gruppo TAB1***	--	--		10
	caratterizzante	BIOCHIP	2	5	2	10
	caratterizzante	SEMICONDUCTOR RADIATION DETECTORS	2	5		
	caratterizzante	ELECTRONICS DESIGN FOR BIOMEDICAL INSTRUM.	2	10		
	affine	***Insegnamenti a scelta dal Gruppo TAB1 o TAB2***	--	--		10
		THESIS AND FINAL EXAM		20		20

LM ELN / M.S.E.E. elective courses (your own choice)

POLITECNICO MILANO 1863

	SSD	Denominazione Insegnamento	Sem	CFU	di cui di D.I.
Insegnamenti del Gruppo TAB1	FIS/03	PHYSICS OF PHOTOVOLTAIC PROCESSES	1	5	
	FIS/03	ADVANCED OPTICS AND LASERS	1	10	
	FIS/03	QUANTUM OPTICS AND INFORMATION	2	5	
	FIS/03	SOLID STATE PHYSICS A	2	5	
	ING-IND/31	ADVANCED CIRCUIT THEORY	2	5	
	ING-INF/03	DIGITAL COMMUNICATION	1	10	1
	ING-INF/03	ADVANCED DIGITAL SIGNAL PROCESSING	1	10	1
	ING-INF/03	RADAR IMAGING	1	5	
	ING-INF/03	QUANTUM COMMUNICATIONS	2	5	
	ING-INF/04	CONTROL OF INDUSTRIAL ROBOTS	1	5	
	ING-INF/04	MODEL IDENTIFICATION AND DATA ANALYSIS	1	10	
	ING-INF/04	AUTOMATION AND CONTROL IN VEHICLES	2	5	
	ING-INF/04	ADVANCED AND MULTIVARIABLE CONTROL	2	10	
	ING-INF/05	EMBEDDED SYSTEMS	1	10	
	ING-INF/05	DIGITAL SYSTEMS DESIGN METHODOLOGIES	2	10	
	ING-INF/05	ADVANCED COMPUTER ARCHITECTURES	2	5	
	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	1	5	
	MAT/08	NUMERICAL METHODS IN MICROELECTRONICS	2	5	

	SSD	Denominazione Insegnamento	Sem	CFU	di cui di D.I.
Insegnamenti del Gruppo TAB2	caratterizzante	BIOCHIP	2	5	2
	caratterizzante	DIGITAL ELECTRONIC SYSTEMS DESIGN	2	5	
	caratterizzante	DIGITAL INTEGRATED CIRCUIT DESIGN	2	10	
	caratterizzante	ELECTRON DEVICES	1	10	
	caratterizzante	ELECTRONICS AND ELECTROACOUSTIC FOR SOUND ENG.	2	10	
	caratterizzante	ELECTRONICS DESIGN FOR BIOMEDICAL INSTRUM.	2	10	
	caratterizzante	MEMS AND MICROSENSORS	1	10	
	caratterizzante	MICROELECTRONIC TECHNOLOGIES	2	5	1
	caratterizzante	MIXED-SIGNAL CIRCUIT DESIGN	1	10	
	caratterizzante	POWER ELECTRONICS	1	10	
	caratterizzante	RF CIRCUIT DESIGN	2	10	
	caratterizzante	SEMICONDUCTOR RADIATION DETECTORS	2	5	
	caratterizzante	SENSOR SYSTEMS	1	5	3
	caratterizzante	ANTENNAS	2	5	
	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	

- proposed choices, among many others

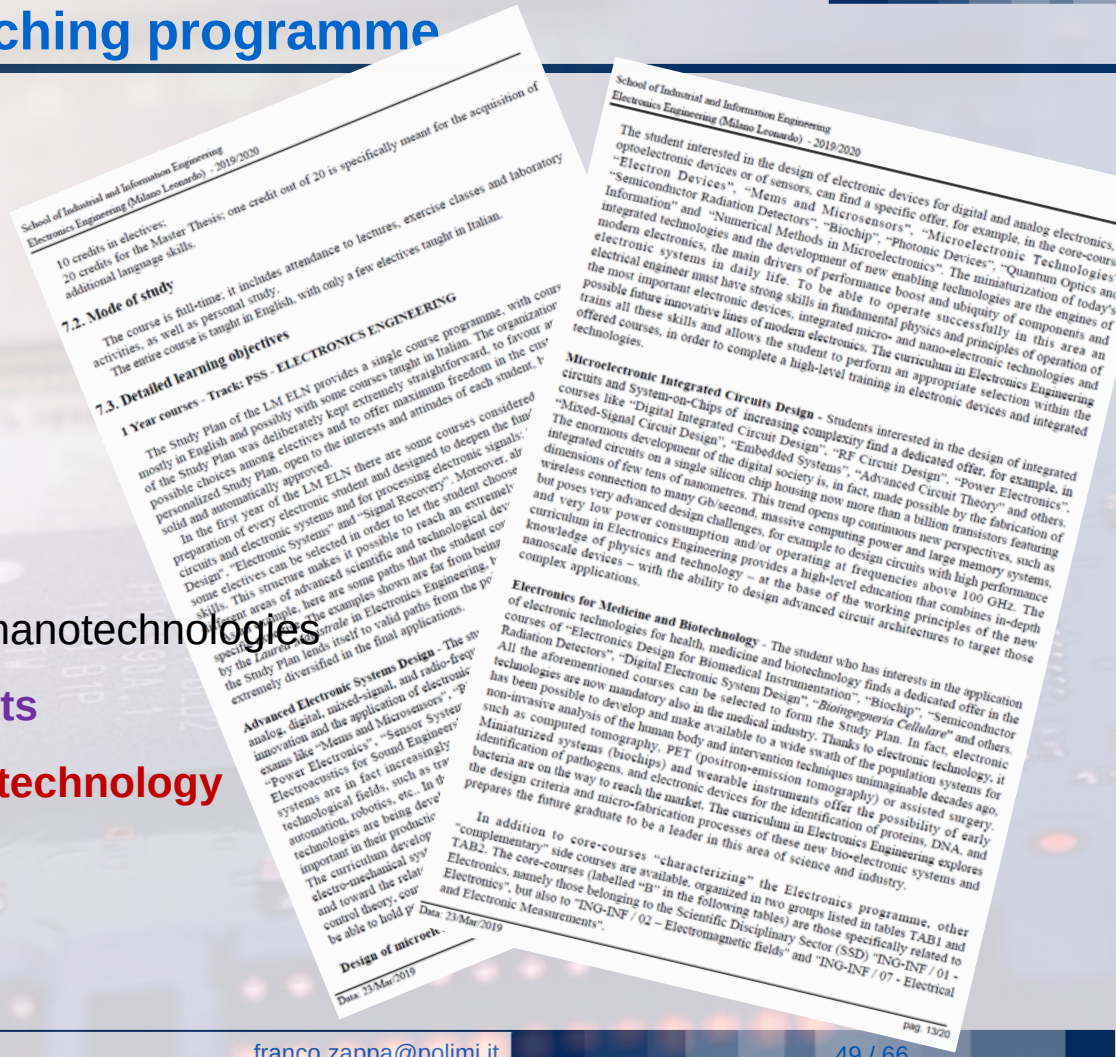
LM ELN / M.S.E.E. teaching programme

Only one track

(**PSS – ELECTRONICS ENGINEERING**)

Examples of paths:

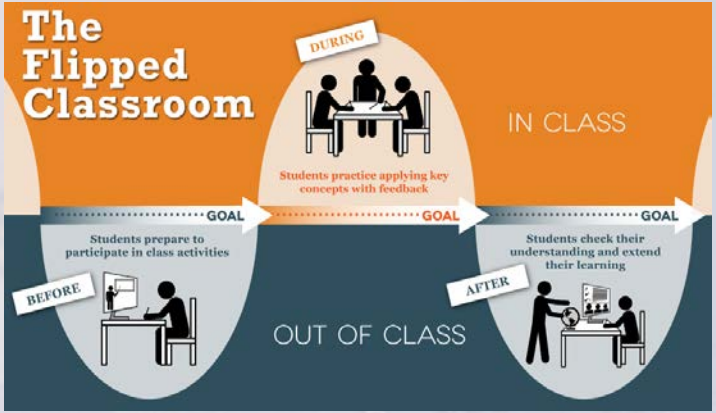
- advanced electronic **systems**
- **devices** for photonics, biochips, nanotechnologies
- microelectronic **integrated circuits**
- electronics for **medicine and biotechnology**



Didattica Innovativa (D.I.) – Innovative Teaching

ACTION 1 – curricolar (gives **credits**):

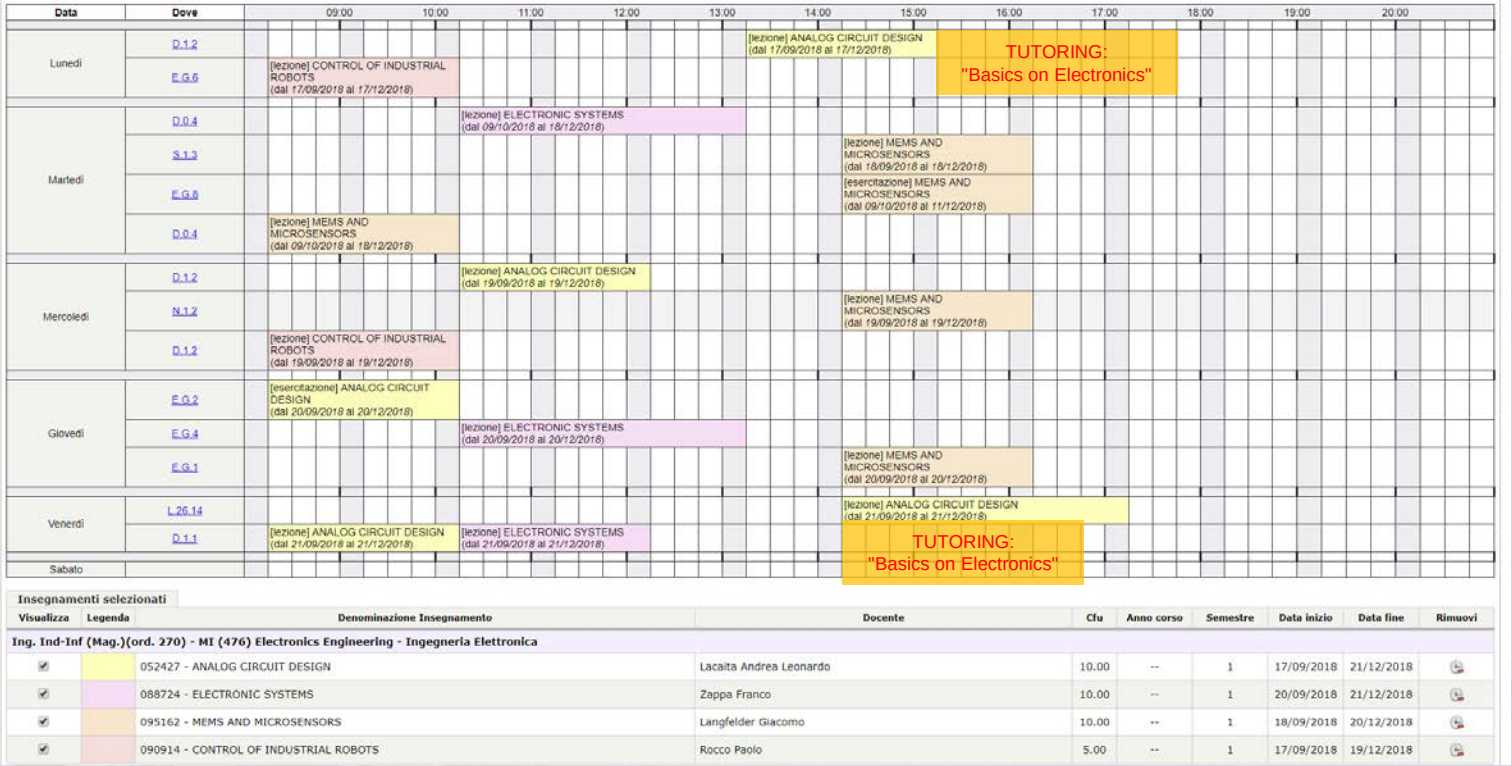
- *soft-skills* with cross-contents
- *flipped-class*
- co-tutoring with companies
- ***M**assive**O**pen**O**nline**C**ourses*, www.pok.polimi.it



ACTION 2 – extracurricolar (just in Diploma Supplement)

- *Kick-starter Workshop* *Public Speaking* *Mnemonic* *Goal Mapping* *Problem solving* *Project Management* *Pitch* *Entrepreneurial mindset* *Efficient Communication*
- Projects for training
- Contest, challenges, entrepreneurship

Example of weekly timetable



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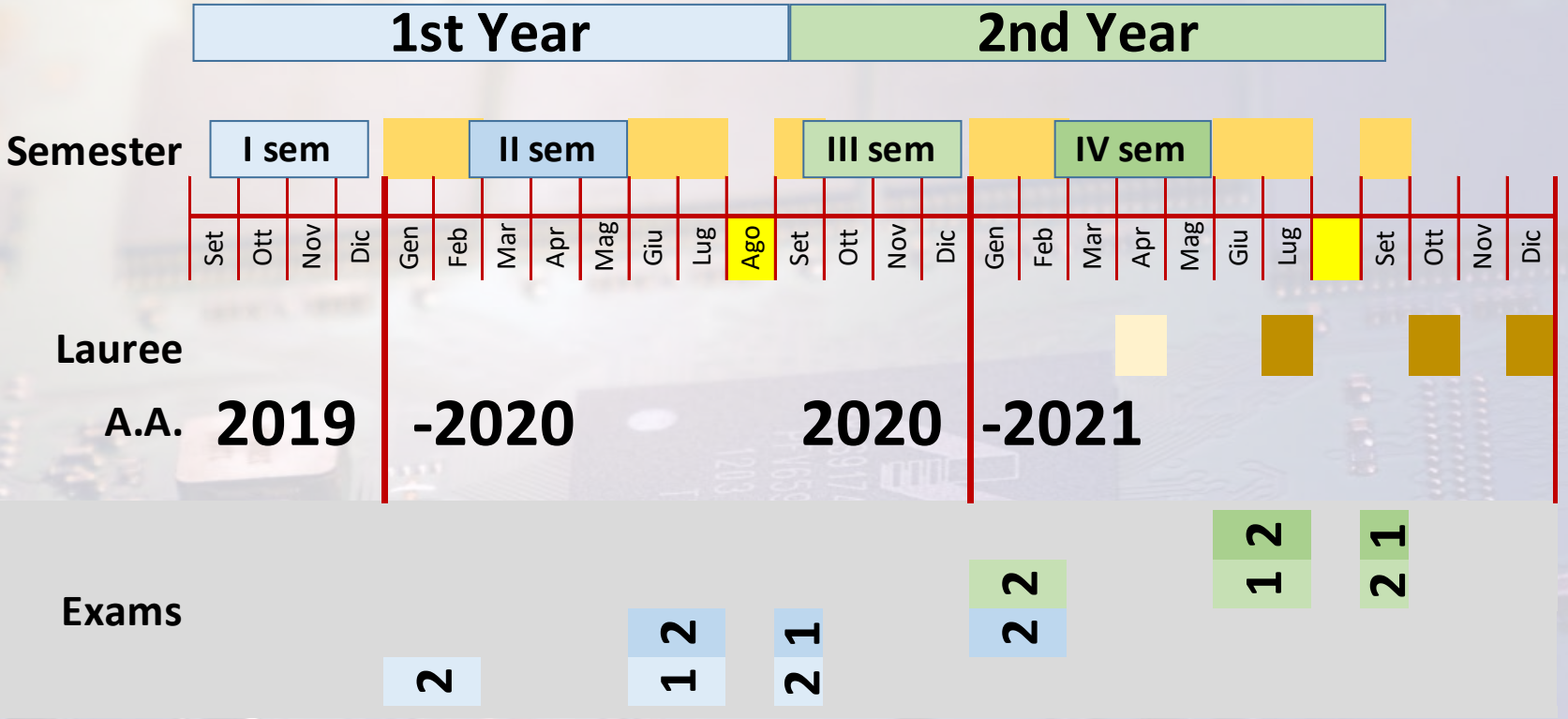
Lunedi	D.1.2						[lezione] ANALOG CIRCUIT DESIGN (dal 17/09/2018 al 17/12/2018)	TUTORING: "Basics on Electronics"					
	E.G.6	[lezione] CONTROL OF INDUSTRIAL ROBOTS (dal 17/09/2018 al 17/12/2018)											
Martedi	D.0.4			[lezione] ELECTRONIC SYSTEMS (dal 09/10/2018 al 18/12/2018)									
	S.1.3							[lezione] MEMS AND MICROSENSORS (dal 18/09/2018 al 18/12/2018)					
	E.G.8							[esercitazione] MEMS AND MICROSENSORS (dal 09/10/2018 al 11/12/2018)					
	D.0.4	[lezione] MEMS AND MICROSENSORS (dal 09/10/2018 al 18/12/2018)											
Mercoledi	D.1.2			[lezione] ANALOG CIRCUIT DESIGN (dal 19/09/2018 al 19/12/2018)									
	N.1.2							[lezione] MEMS AND MICROSENSORS (dal 19/09/2018 al 19/12/2018)					
	D.1.2	[lezione] CONTROL OF INDUSTRIAL ROBOTS (dal 19/09/2018 al 19/12/2018)											
Giovedi	E.G.2	[esercitazione] ANALOG CIRCUIT DESIGN (dal 20/09/2018 al 20/12/2018)											
	E.G.4			[lezione] ELECTRONIC SYSTEMS (dal 20/09/2018 al 20/12/2018)									
	E.G.1							[lezione] MEMS AND MICROSENSORS (dal 20/09/2018 al 20/12/2018)					
Venerdi	L.26.14							[lezione] ANALOG CIRCUIT DESIGN (dal 21/09/2018 al 21/12/2018)					
	D.1.1	[lezione] ANALOG CIRCUIT DESIGN (dal 21/09/2018 al 21/12/2018)		[lezione] ELECTRONIC SYSTEMS (dal 21/09/2018 al 21/12/2018)				TUTORING: "Basics on Electronics"					
Sabato													

Insegnamenti selezionati

Visualizza	Legenda	Denominazione Insegnamento	Docente	Cfu	Anno corso	Semestre	Data inizio	Data fine	Rimuovi
Ing. Ind-Inf (Mag.)(ord. 270) - MI (476) Electronics Engineering - Ingegneria Elettronica									
☑		052427 - ANALOG CIRCUIT DESIGN	Lacaita Andrea Leonardo	10.00	--	1	17/09/2018	21/12/2018	
☑		088724 - ELECTRONIC SYSTEMS	Zappa Franco	10.00	--	1	20/09/2018	21/12/2018	
☑		095162 - MEMS AND MICROSENSORS	Langfelder Giacomo	10.00	--	1	18/09/2018	20/12/2018	
☑		090914 - CONTROL OF INDUSTRIAL ROBOTS	Rocco Paolo	5.00	--	1	17/09/2018	19/12/2018	

- about 24 h of **LESSONS** and **EXERCISE CLASSES**
- about 3 h of **LABS**
- some free time for lunch, relax, study, enjoy

Academic Years, semesters and exams



5 exam dates per year per course

Tesi vs. Tesina

Tesi about 8 months duration

gives 7.4 max increment

28/30 = 102.7/110 could reach **110**

26.6/30 = 97.53/110 could reach **105**

24/30 = 88/110 could reach **95**

to be uploaded online, 3 weeks before graduation day

with **counter-reviewer** (who reads and ask questions)

discussed with slide projections, standing up, in front of all audience

Tesina about 4 months duration

gives 4.4 max increment

28/30 = 102.7/110 could reach **107**

26.1/30 = 95.7/110 could reach **100**

24.7/30 = 90.6/110 could reach **95**

to be uploaded online few days before graduation day, but no counter-reviewer

discussed on laptop, sitting in front of the Graduation Committee

Internal vs. External thesis

Internal

in the laboratories inside POLIMI

working with Ph.D. students, post-docs, researchers

"first and last time in your life" … apart from Ph.D. !

ask professors about their research (it could differ from teaching!)

External

in a Company or external Research Center or abroad

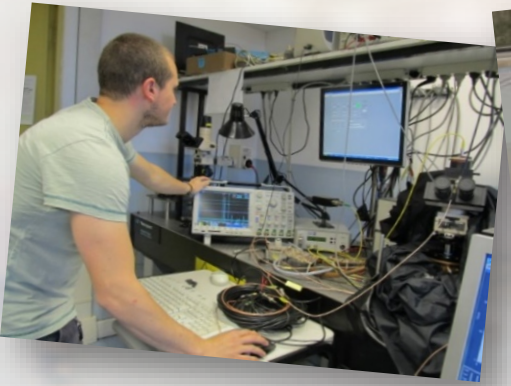
ask friends, parents, **career service**, profs, Zappa, …

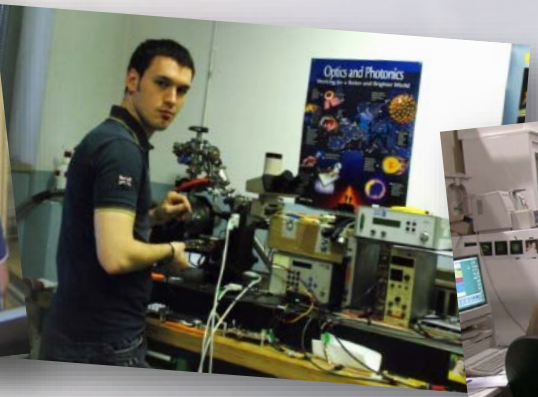
the internship requires to fill in some documents

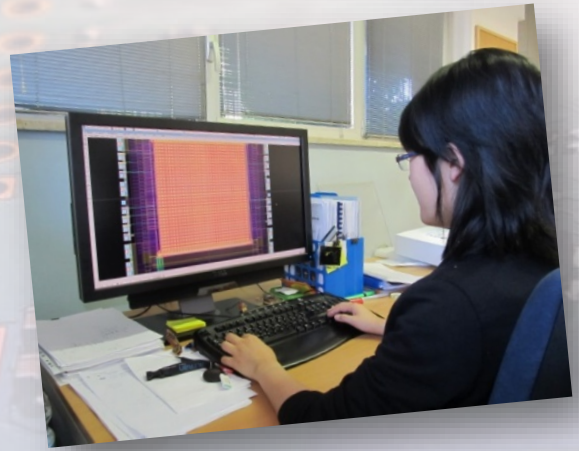
the Company is in charge to train you and assist you!

(avoid a mechanical company where you are the only ELN guy)

ELECTRONICS laboratories at POLIMI

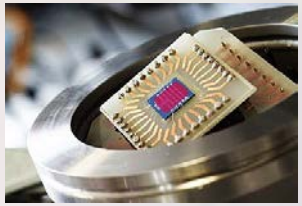
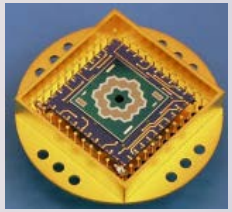
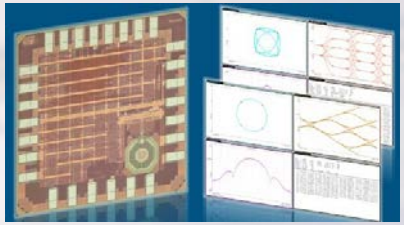
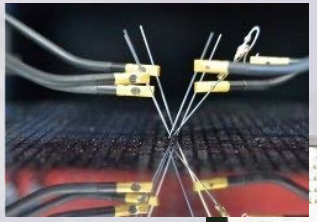
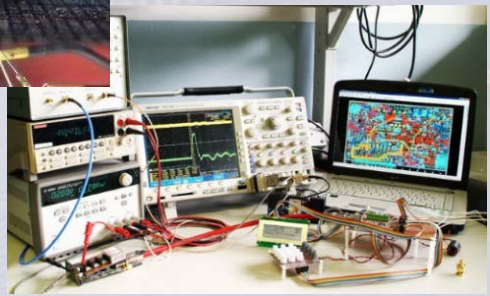
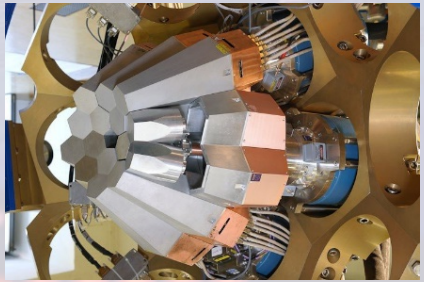






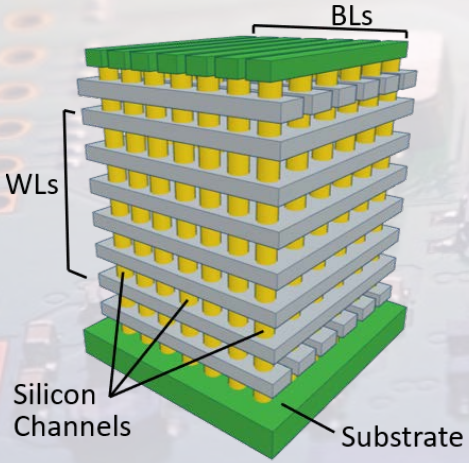
ELECTRONICS research & development at POLIMI

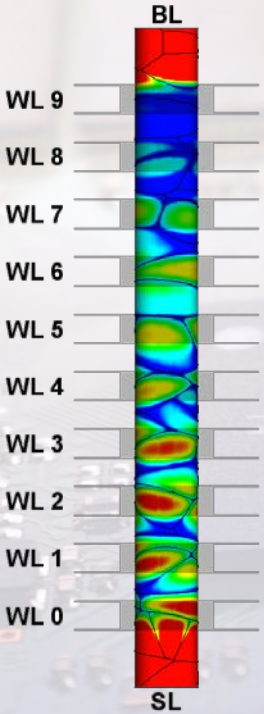
- Nano-electronics devices
- Electronic circuits design
- Digital systems
- Smart microsensors and microsystems
- Single-photon detectors and applications
- Radiation detectors and applications

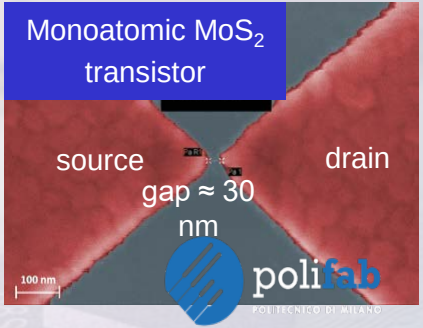
ELN R&D at POLIMI: Nano-electronic devices

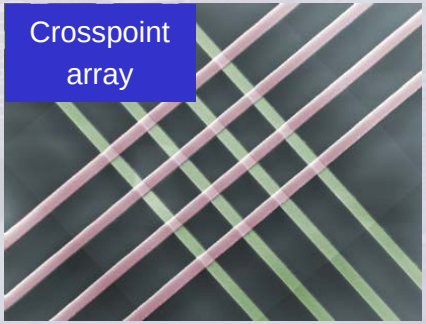
3D memory characterization and modeling

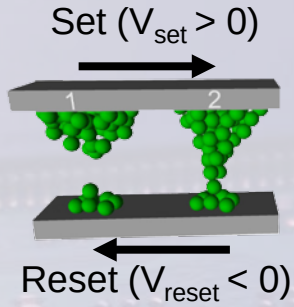


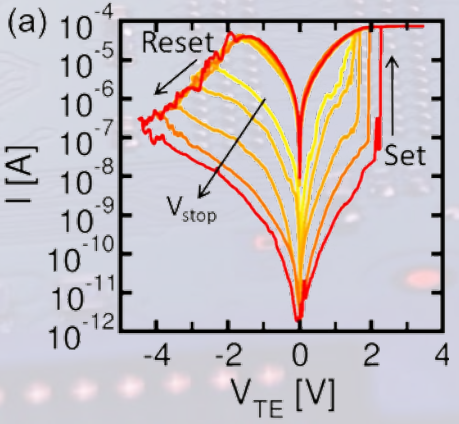


Emerging device fabrication, char. and modeling



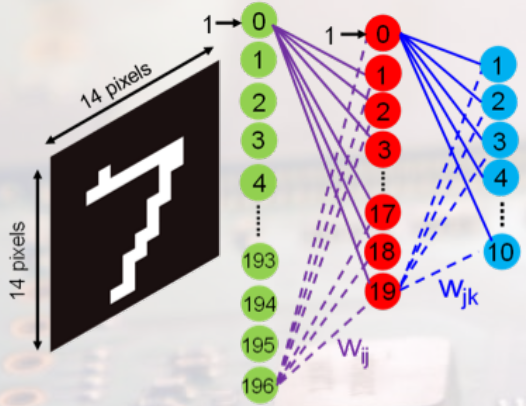


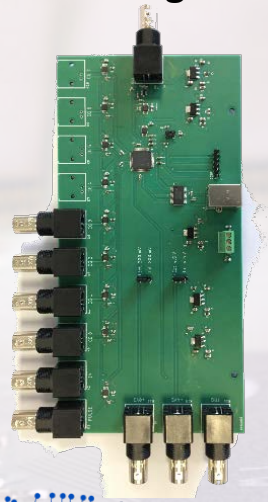


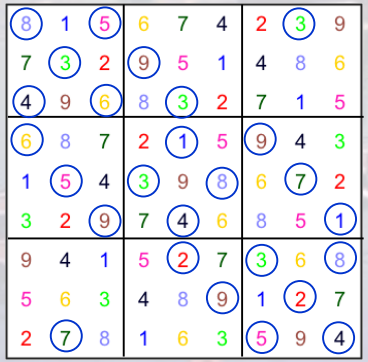


ELN R&D at POLIMI: Nano-electronic devices

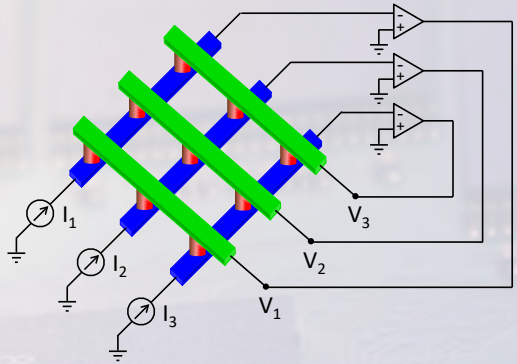
Neural networks and machine learning

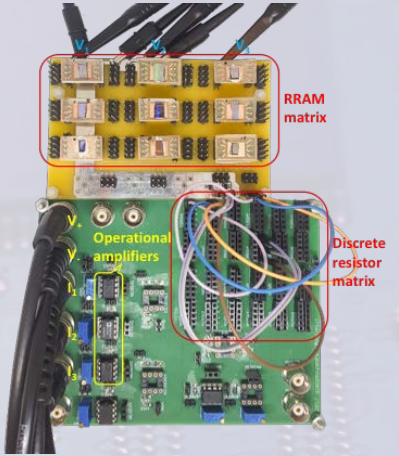


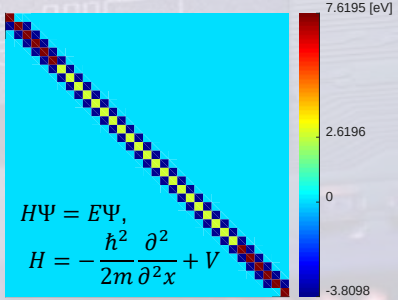


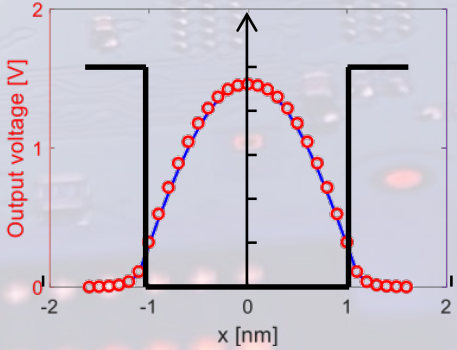


In-memory computing



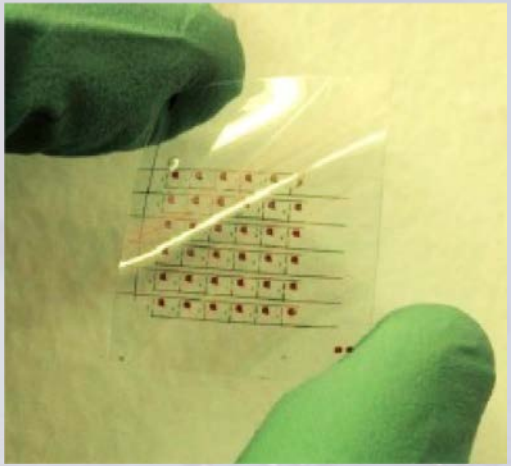


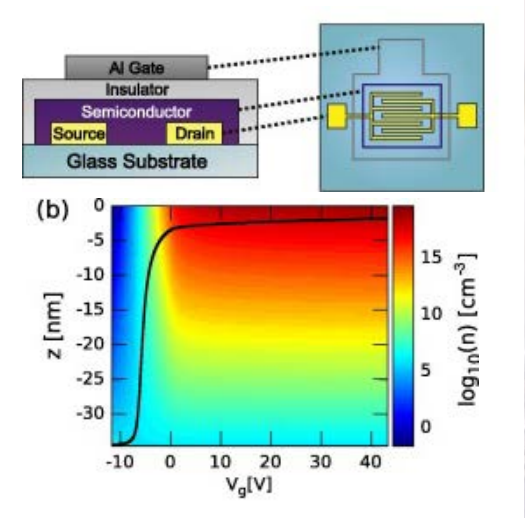




ELN R&D at POLIMI: Printed and flexible Electronics

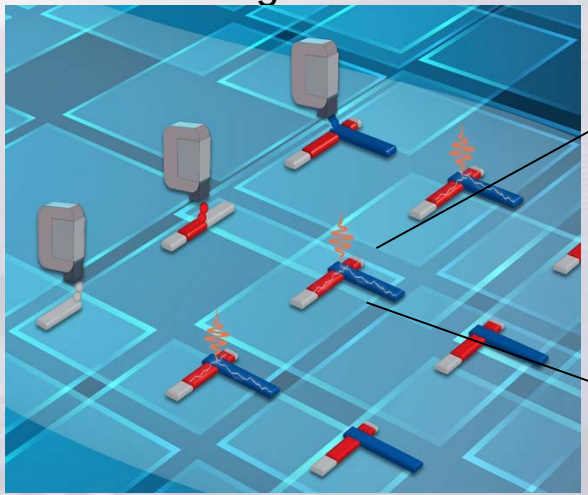
Printed, Large Area Imager

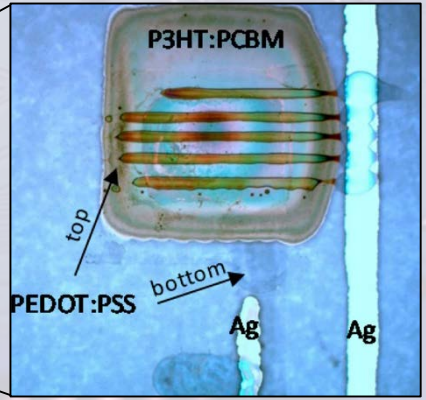




Organic semiconductors:
device modeling and simulation

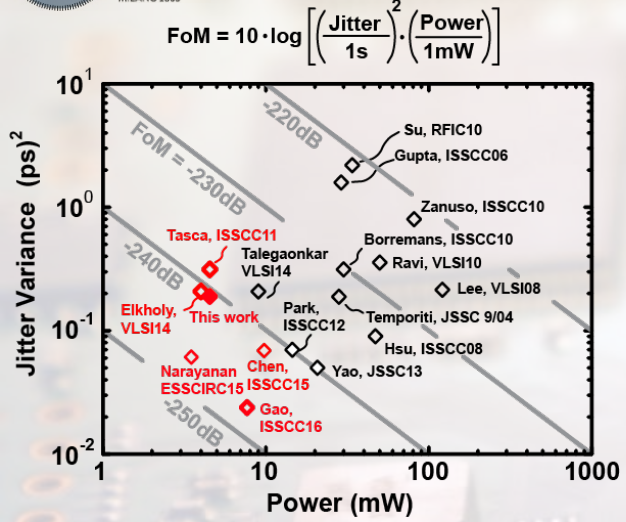
Organic semiconductors:
image sensor …





…single pixel

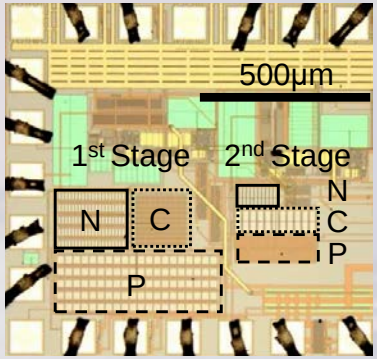
ELN R&D at POLIMI: Electronic circuit design

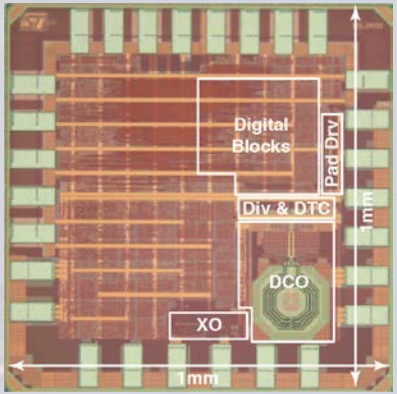


Fundamental limits of Phase Locked Loops (PLLs)

RF frequency synthetizers (1-30 GHz) for wireless applications (WiFi, LTE, 5G, IoT)

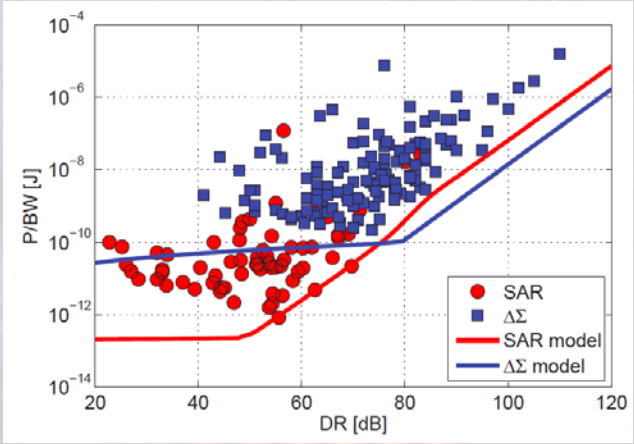
digitally-assisted analog design





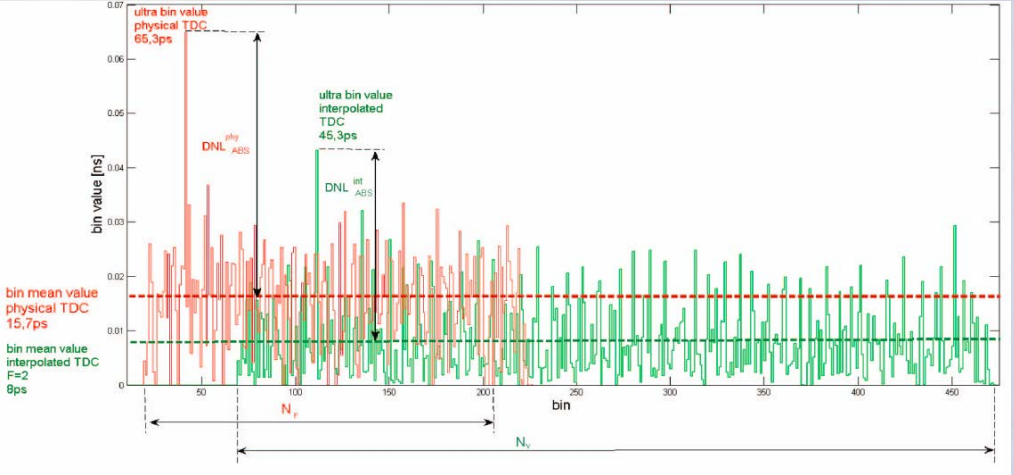
Fundamental power limits of SAR and ΔΣ Analog-to-Digital Converters

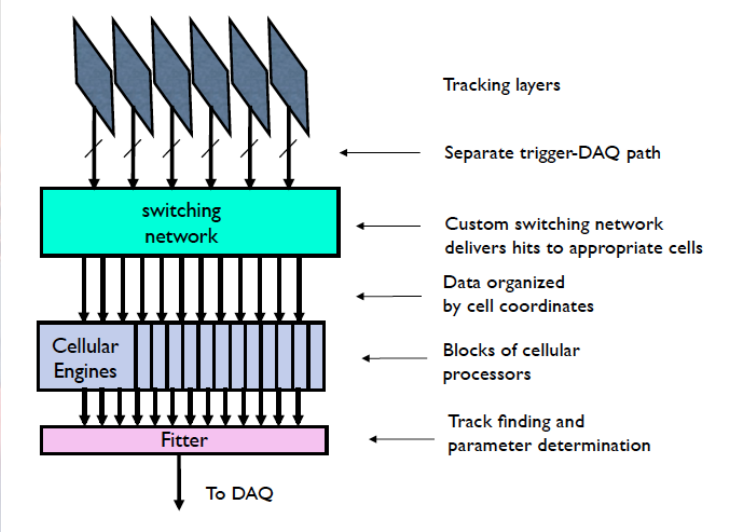
analog and mixed-signal (analog/digital) electronics for low-noise signal detection of MEMS sensors



ELN R&D at POLIMI: Digital electronic systems

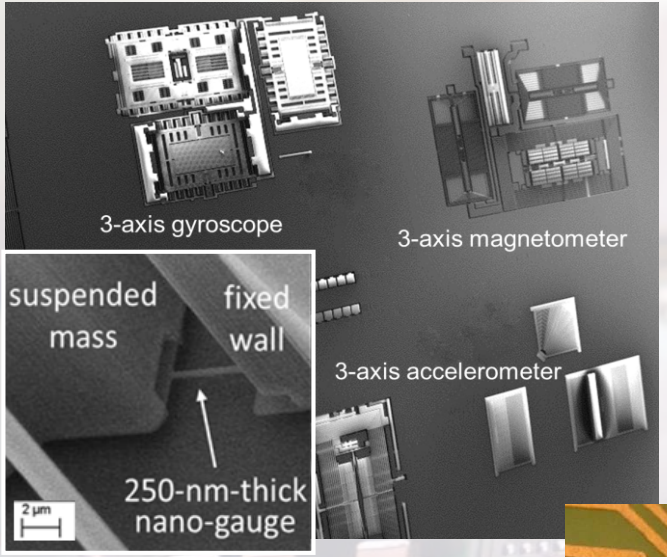
Digital real-time general-purpose processor for high performance timing of events (for nuclear science to medical imaging, for audio and video signal processing)



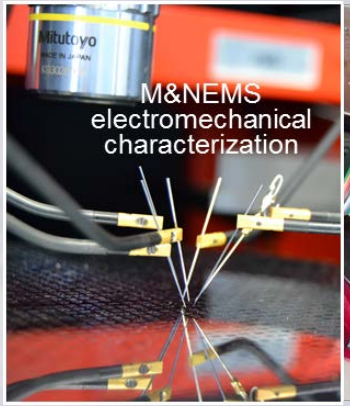


Digital processing architectures for System-on-Chip characterized by high performance, flexibility, scalability, low power and low cost

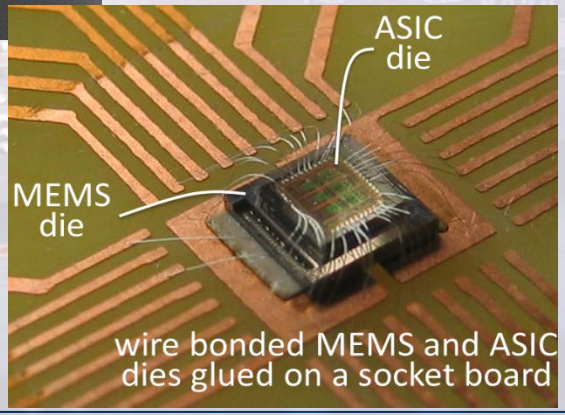
ELN R&D at POLIMI: Smart microsensors and microsystems



Advanced MEMS and NEMS for low-noise, high-stability inertial and magnetic sensors



Die-level and wafer-level characterization electronics for MEMS/NEMS and actuators



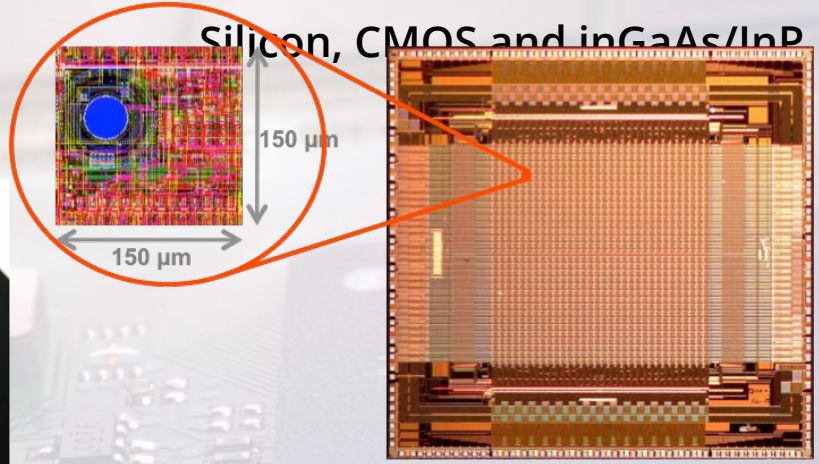
Ultra-low-power, low-noise mixed-signal electronics for sensors in consumer and biomedical applications

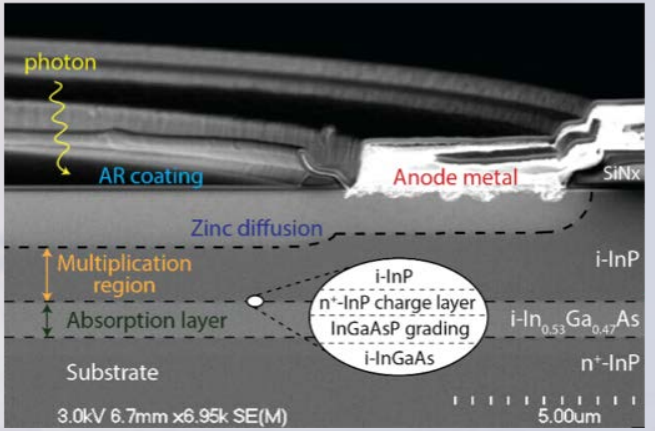
ELN R&D at POLIMI: Single-photon detectors and applications

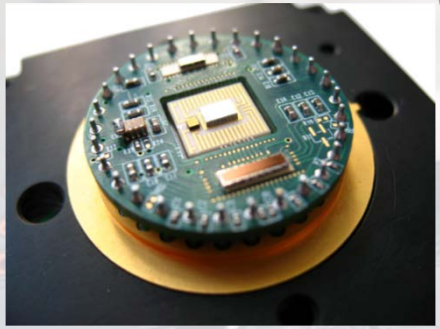
Design, fabrication and characterization of

Single Photon Avalanche Diodes (SPAD) in

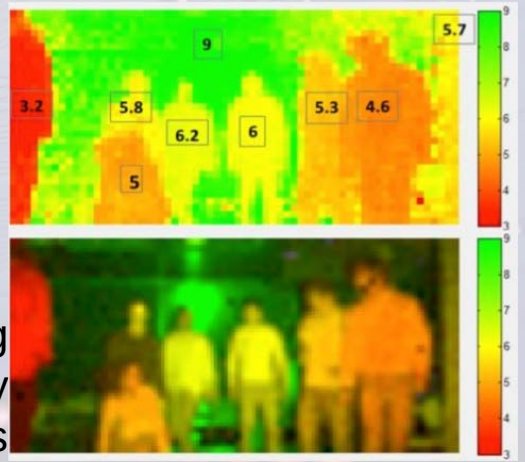
Silicon, CMOS and inGaAs/InP





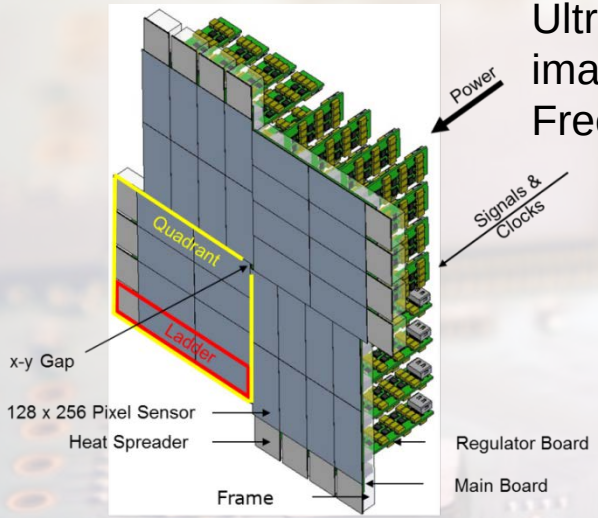


Single molecule spectroscopy for new drugs discovery and for studying Alzheimer and Parkinson



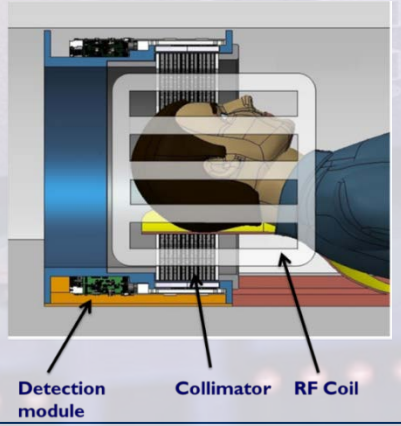
Imagers for 3D photon counting (LIDAR) from automotive safety to deep space explorations

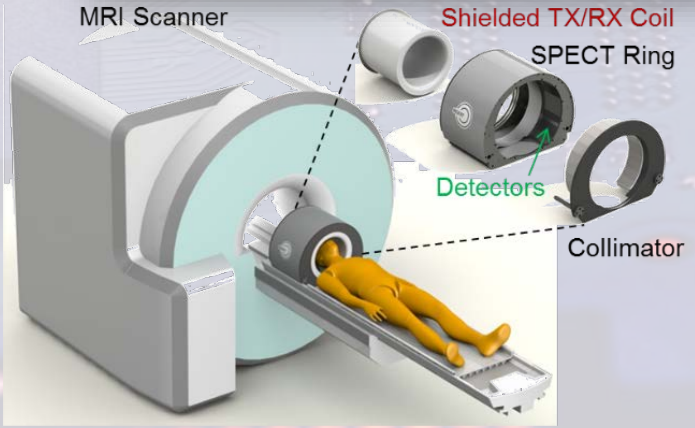
ELN R&D at POLIMI: Radiation detectors and applications



Ultra-fast and large-format X-ray imagers for the European X-ray Free Electron Laser (XFEL)

Ultra low-noise low-power ASICs for X-Gamma Ray Space Telescopes



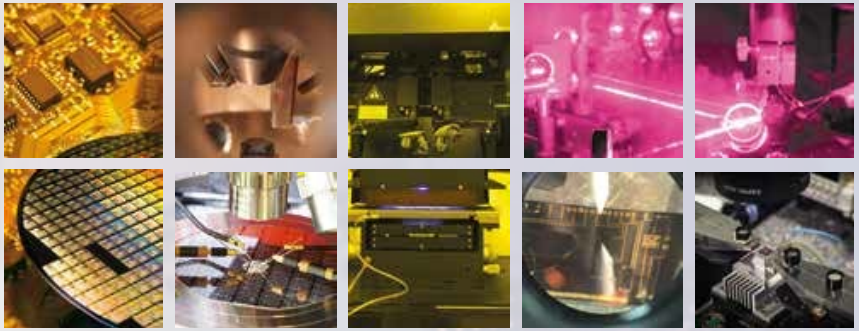


Sensors and ASICs for Multi-modality imaging systems

Microelectronic processing at POLIMI: POLI-FAB

polifab
POLITECNICO DI MILANO

www.polifab.polimi.it



POLITECNICO
MILANO 1863

"Welcome"

Have a wonderful (just 2 years) stay!