



POLITECNICO
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Ph.D. School - Politecnico di Milano
Regulations of the Ph.D. Programme in:

Ingegneria dell'Informazione / Information Technology
(IT Ph.D.)

Cycle XXXVIII

1. General Information

Ph.D. School - Politecnico di Milano

Ph.D. Programme: Information Technology Course start: November 2022

Location of the Ph.D. Programme: Milano Leonardo

Promoter Department: Electronics, Information and Bioengineering [Elettronica, Informazione e Bioingegneria (DEIB)]

Scientific Disciplinary Sectors

- ING-INF/05: Information processing systems
- ING-INF/04: Systems and control engineering
- ING-INF/03: Telecommunications
- ING-INF/01: Electronics
- ING-INF/02: Electromagnetic fields

Ph.D. School Website: <http://www.polimi.it/phd>

Ph.D. Programme Website: <http://dottoratoit.deib.polimi.it>

Areas:

- 1) Computer Science and Engineering (ING-INF/05: Information processing systems)
- 2) Electronics (ING-INF/01: Electronics)
- 3) Systems and Control (ING-INF/04: Systems and control engineering)
- 4) Telecommunications (ING-INF/03: Telecommunications - ING-INF/02: Electromagnetic fields)

2. General presentation

The Ph.D. Programme in Information Technology is organized at the Department of Electronics, Information and Bioengineering (DEIB) and provides the Ph.D. School of the Politecnico di Milano with a significantly large programme, that encompasses all research areas in Computer Science and Engineering, Electronics, Systems and Control, and Telecommunications, and amounts to about 20% of the total number of Ph.D. students in the School.

These research fields are of great scientific and technical interest to both industry and governmental organizations, as well as to society in general. They are crucial to foster the technological development and digital transformation of our economy and society, as also recognized by the EU research funding policies. This doctorate opens up interesting possibilities of extended study and participation in state-of-the-art research in Information Technology (IT). The many scientific collaborations of DEIB with renowned research institutes in Europe, the United States, and worldwide, facilitate access to the world of international research through meetings with scientists and visits to laboratories abroad. The intense industrial collaboration of DEIB in applied research allows the doctoral student to become acquainted with the activities of technologically advanced companies, thus acquiring the elements needed to support a career choice in industrial research as well as at university.

DEIB's scientific IT activities are organized along many research lines, organized in four areas: Computer Science and Engineering, Electronics, Systems and Control, and Telecommunications.

Computer Science and Engineering aims at the development of computing methods and at their application to innovative products and services in many fields. The research activity focuses on the following research areas: artificial intelligence, machine learning, data analysis, robotics, information systems, database management, bio-informatics, security and reliability, information design for the web, methods and applications for interactive multimedia, computer vision, advanced software architectures and methodologies, embedded systems design, computer architectures, dependable systems, and computer performance.

The research activities in the **Electronics** area focus on new developments of innovative devices, circuits and systems which are pervasive in most all our life as well as in all scientific and industrial application targets. Just to name a few of these fields, there are nanoelectronics, sensors and diagnostic technologies, genetics and biomedicine, diagnostics of cultural heritage, astrophysics investigations. The research framework is naturally dynamic and evolving, continuously driven by prospects and new initiatives in national and international application environments.

The research activity in **Systems and Control** covers various research areas related to control systems science, robotics and industrial automation, nonlinear and networked systems, ecosystems and environmental modelling, and operations research. Specific research topics are: predictive, distributed, and robust estimation and control, model identification and data analysis, data-driven modeling and decision making, automation of automotive, transportation, energy, and manufacturing systems, collaborative and mobile robotics, modeling and control of biological, social, and economic systems, ecology, natural resources management, and climate change, discrete and nonlinear optimization models and algorithms.

Given the interdisciplinary nature of the world of **Telecommunications**, many different topics are covered in this area of research. Among these are transmission systems and telecommunication networks, radio and optical wireless transmissions, digital signal processing, electromagnetic methods, remote sensing methods and systems, audio and video analysis and production.

The four curricula supported by the aforementioned areas correspond to a traditional partition of IT, but their presence in the same Ph.D. Programme facilitates and encourages interdisciplinary research projects as well. Interdisciplinarity is also exploited through the collaboration with other Ph.D. Programmes, as it is intrinsic to the pervasive nature of IT. IT is bringing about a deep reorganization of industrial structures, with mergers and alliances between electronics, computer, and telecommunication companies. Interesting opportunities in public administrations and personal entrepreneurship are also available.

The Ph.D. course is managed by a Coordinator and a Faculty Board. The Coordinator chairs the Faculty Board, coordinates the preparation of the annual Educational Programme and organises the general educational activities of the Ph.D. course (see Attachment A1). The Faculty Board is responsible for the Educational Programme and for the teaching and administrative activities related to the Ph.D. course (see Attachment A2).

3. Objectives

The Ph.D. Programme in IT enrolls more than 100 students per year, mostly supported by scholarships from public institutions and private companies. After admission, each Ph.D. student chooses a research advisor and a professor of the Doctoral Board as a tutor. Study activities consist of courses and

individually guided study.

Advanced courses (in English), reserved for doctoral students and senior graduate students, bring attendees to the frontiers of knowledge in the sectors where DEIB's research is most active. Specific courses on relevant subjects are also organized by various national and international schools regularly accessed by our Ph.D. students. Participation in local and external courses supplies the necessary knowledge to approach research problems in the most serious and competitive way. Our Ph.D. students also have to follow courses to develop so-called transferable skills, offered by the Ph.D. School of the Politecnico di Milano.

All research is performed under the guidance of a scientific supervisor, or advisor. Throughout the three-year period, the student will have several possibilities to publicly illustrate both his/her studies and research results to DEIB professors and colleagues, and to international audiences, *e.g.*, at international scientific conferences or at school and project meetings. In doing this, the Ph.D. candidates will leverage the soft skills acquired from the Ph.D. School courses, developing a capacity for public speaking as well as improving their ability in oral and written communication.

The Ph.D. Programme is held within a large international framework that includes also joint programmes established with foreign institutions, aimed at training young researchers and Ph.D. students.

4. Professional opportunities and job market

The Ph.D. degree in Information Technology gives access to the highest levels of scientific research in the ICT and related areas. Depending on their interests, their personal inclinations, and circumstances, students who have achieved the Ph.D. degree may head for a career either in academia or in companies and research institutions, both in Italy and abroad.

Each year, Politecnico di Milano and neighboring universities award post-doctorate positions oriented towards research and teaching. In recent years, the number of positions offered in IT has fulfilled the expectations of the best Ph.D. graduates. As a result of the experience gained with their Ph.D. studies, in seminary courses, conferences, and other educational activities, the research graduate is also qualified to undertake teaching activities.

The practice of communicating and working in English, as well as the knowledge of the academic world, acquired during visits and stays abroad, qualifies the Ph.D. graduate for positions offered by the best universities, research centers, and innovative companies worldwide.

As evidence of the interest shown by the industrial sector for this Ph.D. path, many scholarships for graduate students at DEIB have been funded by major companies, to promote research in their respective fields of interest. More than half of IT Ph.D. graduates get a satisfactory position in companies, while about 44% access a career in academia and research centers.

Those aiming for a research career in industry should consider that the globalization of the economy has led to industrial research centers often established in other countries and organized into intercontinental research structures that impose great mobility on the researchers themselves.

Openings are also available in sectors that are not tied to industry, but to services (*e.g.*, transport planning, natural and human resource management, web services), in important engineering firms, in technical services of government and EU bodies, and in international institutions.

Finally, the skills and results developed in Ph.D. activities may lead, as it happened in the past for

about 6% of graduates, to the founding of innovative and creative companies, where it is possible to combine personal interests and entrepreneurial attitudes.

5. Enrollment

5.1 Admission requirements

Both Italian and international citizens may apply. They are requested to have graduated in accordance with the pre-existing laws, Ministerial Decree (D.M.) No. 509 of 03/11/1999, or to hold a Master of Science degree in accordance with D.M. No. 509 of 03/11/1999, or a Master of Science in accordance with D.M. No. 270 of 22/10/2004, or a similar academic title obtained abroad, equivalent for duration and content to the Italian title, having an overall duration of university studies of at least five years.

The certified knowledge of English is a requirement for admission. Please refer to the Ph.D. School website for details.

The admission to the Programme is granted upon evaluation of the candidate's curriculum, motivation letters, and proposal for a possible Ph.D. research, which candidates will send together with their application to the admission announcement.

5.2 Admission deadlines and number of vacancies

The number of positions is reported in the Call for admission to the 38th Ph.D. cycle Programmes, available at <http://www.polimi.it/phd>. Various calls are issued throughout the year, the main call being issued in April 2022, for Ph.D. students starting in November 2022, followed by additional calls (November 2022, February 2023). Check regularly <http://www.polimi.it/phd> for precise deadlines and call announcements.

Both scholarships on general and on specific topics are available, as specified in the call for admission.

Scholarships may be granted from the University and Research Ministry, from Politecnico di Milano, from companies, or from the Dipartimento di Elettronica, Informazione e Bioingegneria, based on research project funds.

6. Contents

6.1 Requirements for the achievement of the Ph.D. title

At the beginning of the Ph.D. activities:

- Students have to select a *Supervisor*, or *Advisor*, who will guide and support their research activities aimed at the development of the Ph.D. thesis. The advisor is not necessarily a member of the Faculty Board, and may also belong to an institution different from Politecnico di Milano. The advisor can be supported by one or more co-supervisors.
- The Faculty Board assigns a *Tutor* to each Ph.D. candidate to supervise and assist him/her in the overall training Programme. The tutor is a professor belonging to the Faculty Board. The tutor assists the candidate in the choice of courses to be included in the study plan, which has to be submitted every year for approval to the vice-Coordinator of the Ph.D. Programme for the related

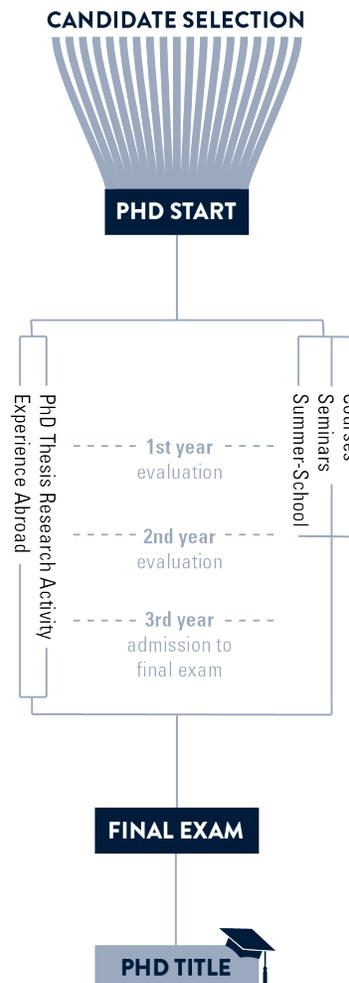
research area (see also section 6.4 below). The Faculty Board may assign extra course credits to one or more candidates, in case they need to complete their preparation in specific topics, relevant for their research projects.

All activities related to courses (attendance/evaluation) should preferably be completed by the end of the second year of the Ph.D. activity.

At the end of each year, each Ph.D. candidate has to pass an evaluation exam to continue the Programme.

At the conclusion of the Ph.D. studies, the Board of Professors evaluates the candidates for possible admission to the final exam. Candidates who receive a positive evaluation can submit their theses to two external reviewers. If the evaluation provided by the reviewers is positive (or after the revisions possibly required by them), the candidates can defend their thesis in a final exam, in front of a committee composed of three (or more) members. At least 2/3 of the committee must be external experts, and at least 2/3 of the committee must be from academia.

The set of activities of the Ph.D. student within the Programme are summarized in the following graph:



6.2 Research development

The main aim of all Politecnico di Milano Ph.D. Programmes is the development of a research-oriented mindset in the candidates, with general research-oriented skills and expertise in a specific research topic. To this end, candidates must develop the ability to formulate and solve problems in complex contexts, perform deep problem analysis, identify original solutions, and evaluate their applicability in practical contexts. These skills provide the Ph.D. candidates with major opportunities for development in their research both in the academic field and in public and private organizations.

Ph.D. candidates are required to develop an original research contribution, coherent with the research topics developed in the Department where the Ph.D. Programme is carried out. The Ph.D. thesis must thus contribute to increasing the knowledge in the candidate's research field. The original research results are collected in the Ph.D. thesis, where the candidate's contribution is positioned in relation to the state of the art in the specific research field.

The Ph.D. research is developed under the guidance of the supervisor, who supports the candidate in the setting-out and in the everyday activities related to the thesis development. The supervisor can be supported by one or more co-supervisors.

Further activities intended to develop the candidate's personal skills and research expertise are encouraged during the Ph.D. path.

Candidates must acquire the ability to present and discuss their work in their research community. Consequently, both participation in international conferences and publication of the research results in peer-reviewed journals are encouraged. A minimum number of publications is required by the end of the Ph.D. path.

The Ph.D. Programme favors the candidates' research interactions with other groups in their research field, preferably abroad. Research visits of at least three months are strongly encouraged, since through them the candidates can acquire further skills to develop their research work and thesis.

The duration of the Programme is normally three years.

6.3 Objectives and general framework of educational activities

The Ph.D. Programmes and the Ph.D. School provide educational activities of different kinds and credit value, including courses, seminars, project workshops, and laboratories. Educational activities cover both basic research issues (problems, theories, methods) that represent the founding element of the Ph.D. Programme and identify its cultural position, and research issues connected with the problems developed in the theses, which are deeply studied and investigated. Lessons are usually offered in English.

The Ph.D. School of the Politecnico di Milano proposes a set of courses aiming to train the Ph.D. candidates in soft and transferable skills. The skills and abilities provided by these courses are expected to help candidates across different areas of their careers in order to respond to the rapidly evolving needs of the global economy and society at large.

The Ph.D. Programme in Information Technology offers courses, held at DEIB by internal or foreign professors, in the four areas in which it is structured, *i.e.*, Computer Science and Engineering, Electronics, Systems and Control, and Telecommunications, as well as some cross-area courses. All courses are worth 5 credits.

Candidates must earn a **minimum of 25 ECTS** credits from courses consistent with their Ph.D.

activities, preferably during the first two years. Of these credits, at least 10 should be obtained from characterising Ph.D. courses offered by the Ph.D. Programme in Information Technology, at least 10 from courses on soft and transferable skills proposed by the Ph.D. School, and at most 5 credits from external Ph.D. courses, *e.g.*, from other Ph.D. Programmes or from Ph.D. Summer Schools. A positive evaluation of the student's performance in a course is mandatory for the corresponding credits to be assigned. Other activities, for which no credits are assigned, fall within the scientific activities that the Faculty Board takes into account in the overall evaluation. Courses from the Master Degree may be inserted in the curriculum of the student, in agreement with the Supervisor and the Tutor, but do not contribute to the acquisition of credits. The Faculty Board may assign extra course credits to candidates, in case they need to complete their preparation in specific topics, that are relevant to their research projects.

The table below summarizes the candidate's path (as regards coursework activities). At the same time, the Programme assumes that the candidates are devoted to research activity in a continuous way, following the lead of their supervisors, and of the Faculty Board.

First/Second Year

COURSES	DETAILS OR REFERENCE	CREDITS
Courses characterizing the Ph.D. program	See Table A (details in Ph.D. School website)	min 10
Ph.D. School Courses	See Ph.D. School website	min 10
Other Ph.D. courses	External courses with evaluation	max 5
Other activities	Seminars, courses without evaluation (to be agreed in advance with the Tutor) Language courses	No credits

Third year

In the third year, the candidates should devote their time entirely to research and to the finalization of their Ph.D. thesis.

Ph.D. Course List

A) Characterising Courses of the Ph.D. Programme in Information Technology

The scheduled courses planned for academic year 2022-2023 are listed in the following table.

All courses will be held in English and amount to 5 credits (CFU).

Other courses may be activated during the year. In this case, the candidates will be promptly informed, and will be allowed to insert these new courses in their study plan. The topics and schedules of the courses organized by this Ph.D. Programme are available from <http://dottoratoit.deib.polimi.it>.

AREA	COURSE TITLE	PROFESSORS	TENTATIVE SCHEDULE
Systems and Control	Large Scale Optimization	Panagiotis Patrinos (KU Leuven, 5 CFU) Lorenzo Mario Fagiano	May-July 2023
	Hybrid systems	John Lygeros (ETH, 2 CFU) Prandini Maria (3 CFU)	June 2023
	Dealing with uncertainty in data-based learning	Fredy Orlando Ruiz Palacios (2 CFU) Carlo Novara (Pol. Torino, 2 CFU) Lorenzo Fagiano (1 CFU)	June-July 2023
	Data-Driven Approaches to Uncertain Optimization and Decision-Making: Theory and Applications	Simone Garatti (3 CFU) Marco C. Campi (Univ. Brescia, 2 CFU)	September 2023

	Models of Opinion Dynamics in Social Networks	Paolo Bolzern (2 CFU) Patrizio Colaneri (1 CFU) Giuseppe De Nicolao (Univ. Pavia, 2 CFU)	September 2023
Electronics	The digital imaging pipeline: from photons to modern cameras	Giacomo Langfelder (5 CFU)	January-February 2023
	High Resolution Electronic Measurements in Nano-Bio Science	Marco Sampietro (2 CFU) Giorgio Ferrari (2 CFU) Marco Carminati (1 CFU)	January-March 2023
	Digital circuits and systems for DSP and FPGA-based processing	Angelo Geraci (5 CFU)	June 2023
	Microcontrollers for industrial electronic applications	Nicola Lusardi (5 CFU)	June 2023
Computer Science and Engineering	Data management and analysis for computational biology	Pietro Pinoli (2 CFU) Anna Bernasconi (2 CFU) Marco Masseroli (1 CFU)	November-December 2022
	Advanced Topics in Deep Learning: The rise of Transformers	Matteo Matteucci (2 CFU) Mark Carman (1 CFU) Giacomo Boracchi (1 CFU) Manuel Roveri (1 CFU)	January-February 2023
	Human-Computer Interaction for AI (HCI4AI)	Maristella Matera (1 CFU) Federico Cerutti (Univ. Brescia, 1 CFU) Luigi De Russis (Pol. Torino, 1 CFU) Massimo Zancanaro (Univ. Trento and FBK, 2 CFU)	January-February 2023
	Advanced Research Topics in Cybersecurity	Carminati Michele (3 CFU) Polino Mario (2 CFU)	January-February 2023
	A Primer on Software Analytics Research	Massimiliano Dipenta (Univ. Sannio, 5 CFU) Luciano Baresi	January-February 2023 or June-July 2023
	Enabling AI at the edge: design, security, performance and runtime management	Danilo Ardagna (1 CFU) Giacomo Verticale (1 CFU) Matteo Matteucci (1 CFU) German Molto (Univ. Politècnica València, 1 CFU) Andre Martin (Dresden Univ. of Technology, 1 CFU)	February 2023
	Learning Sparse Representations for Image and Signal Modeling	Giacomo Boracchi (5 CFU)	February-May 2023
	Multi-agent Learning: from Theory to Practice	Nicola Gatti (2 CFU) Alberto Marchesi (3 CFU)	March 2023
	Thermal modeling and management of MPSoCs	Federico Terraneo (3 CFU) David Atienza (EPFL, 2CFU)	March-June 2023
	Advanced Topics in Hardware Security	Luca Maria Cassano (3 CFU) Christian Pilato (2 CFU)	Spring or Summer 2023
	Blockchain and distributed ledger technologies: principles, applications, and research challenges	Francesco Bruschi (3 CFU) Pierluigi Plebani (1 CFU) Vincenzo Rana (1 CFU)	May-June 2023
	Parallel computing on traditional core-based and emerging GPU-based architectures through openmp and openacc / cuda	Luca Breveglieri Lara Querciagrossa (CINECA, 1 CFU) Andrew Emerson (CINECA, 1 CFU) Nitin Shukla (CINECA, 1 CFU) Luca Ferraro (CINECA, 1 CFU) Maurizio Cremonesi (CINECA, 1 CFU)	May-June 2023
	Telecommunications	Switching architectures and forwarding algorithms	Guido Maier (5 CFU)

Numerical methods for electromagnetics	Gian Guido Gentili (4 CFU) Lorenzo Codecasa (1 CFU)	November 2022- February 2023
Quantum information theory	Luca Barletta (3 CFU) Maurizio Magarini (2 CFU)	November 2022- February 2023
Photonics for interconnection and computing	Andrea Melloni (3 CFU) Francesco Morichetti (2 CFU)	March-April 2023

B) Ph.D. School Courses

The Ph.D. School of the Politecnico di Milano proposes a set of general and inter-doctoral courses aimed at training the Ph.D. candidates in soft and transferable skills. The skills and abilities provided by these courses are expected to help candidates across different areas of their careers in order to respond to the rapidly evolving needs of the global economy and society at large. The acquisition of at least 10 credits from these courses within the first two years is mandatory.

The list of Ph.D. School courses activated for the academic year 2022-2023 is available on the website

<https://www.dottorato.polimi.it/en/current-phd-candidates/during-the-phd/study-plan>

The following courses are suggested to IT Ph.D. candidates:

COURSE TITLE	PROFESSOR
English for Academic Communication	Paolo Biscari
Professional Communication	Nicoletta Di Blas
Project Management Basics	Alfonso Fuggetta
Project Management (in Action)	Mauro Mancini
Ethical Aspects of Research on Dual-Use Technologies	Pierangelo Masarati
The Copernicus Green Revolution for Sustainable Development	Daniele Oxoli
La comunicazione nella scienza	Anna Maria Paganoni
Science, Technology, Society and Wikipedia	Guido Raos
Research Skills	Donatella Sciuto
Introduction to academic research	Paolo Gaetano Volontè

Ph.D. candidates can choose also other courses from the Ph.D. School list of courses. In particular, participation in courses on research management and project management is encouraged.

C) Other Ph.D. courses

A maximum of 5 credits can be obtained by choosing among courses provided by other Ph.D. Programmes at Politecnico di Milano and/or external Institutions.

D) Preparatory courses

If the Advisor and the Tutor find it useful or necessary for the candidate to attend preparatory courses (chosen among the courses activated at the Politecnico di Milano), the Faculty Board of the Ph.D. Programme may assign some extra-credits to be acquired to complete the training path. The credits acquired in this way will be considered as additional to the mandatory credits to be acquired with Ph.D. courses.

A preparatory course for early-stage researchers, entitled “Being a researcher”, is available online as a MOOC at <https://www.pok.polimi.it/>, where other preparatory courses of general interest can be found as well.

E) Specialistic courses, long-training seminars

The attendance of specialistic courses, workshops, schools, seminar cycles is strongly encouraged and (if these seminars, workshops are certified and evaluated) may earn the candidates further credits, subject to the prior approval of the study plan submitted by the candidate. These courses and workshops can be inserted in the study plan, even if they are not evaluated (and therefore do not qualify as credits), as optional “additional educational activities”.

F) Language courses

Language courses (English, Italian as a foreign language, German, Chinese, other European languages) are offered by Politecnico di Milano to Ph.D. candidates and enrolled students in general. The detailed list and calendar are published on the Politecnico website before the beginning of each semester. The IT Ph.D. Programme supports the enrolment in these courses, refunding the registration fee.

6.4 Presentation of the study plan

Ph.D. candidates must submit a study plan, which may be revised periodically, in order to accommodate for possible modifications or needs motivated by the development of their Ph.D. career. The study plan must be approved by the Tutor and by the Ph.D. Programme vice-Coordinator in the Area of the Ph.D. candidate.

6.5 Yearly evaluations

Candidates present their work to the Faculty Board at least once a year. In particular, the candidates must undergo an annual evaluation in order to be admitted to the following Ph.D. year. The third-year evaluation establishes the candidate’s admission to the final Ph.D. defense.

As a result of each annual evaluation, the candidates who pass the exam receive an evaluation (A/B/C/D) and may proceed with the enrolment for the following year. Candidates who do not pass the exam are qualified either as “Repeating candidate” (Er) or “Unable to carry on with the Ph.D. (Ei)”. In the former case (Er), the candidates are allowed to repeat the Ph.D. year at most once. The Ph.D. scholarships (if any) are suspended during the repetition year. In the latter case (Ei) the candidates are excluded from the Ph.D. Programme and lose their scholarships (if any).

Should the Faculty Board directly assign an exclusion evaluation (Ei) without a previous repetition year, the decision must be properly motivated and validated by the Ph.D. School.

After the final year, candidates who have achieved sufficient results but need more time to conclude their research work and write their theses may obtain admission to a further year.

6.6 Ph.D. thesis preparation

The main objective of the Ph.D. career is the development of an original research contribution. The Ph.D. thesis is expected to contribute to the advancement of knowledge in the candidate’s research field.

The Ph.D. study and research work is carried out, full time, during the three years of the Ph.D. course. Stages or study periods in (Italian or international) companies or external institutions may complete the candidate’s preparation.

The thesis must be coherent with the research issues developed in the Department where the Ph.D. Programme is developed.

The candidate must present an original thesis, discussing its contribution to the state of the art in the research field in the research community.

The Ph.D. research is developed following the lead of a supervisor, who supports the candidate in the setting out and in the everyday activities regarding the thesis development.

6.7 Laboratories

The Dipartimento di Elettronica, Informazione e Bioingegneria hosts many laboratories for Computer Science and Engineering, Systems and Control, Electronics, and Telecommunications, and participates in interdepartmental laboratories. Professional technicians continuously update the laboratory infrastructures and assist researchers and students.

The list of laboratories is provided on the following website:

<https://www.deib.polimi.it/eng/laboratories>

6.8 IT Ph.D. Secretariat

This office provides information about teaching activities and support about the formal aspects of the Ph.D. Programme. In particular, candidates are informed about deadlines to be respected, how to enter the study plans, training, etc. The office provides information about the possibility of joining a double doctorate course in agreement with foreign universities.

Foreign students are also supported by specific services that offer support to cope with administrative issues (visa, residence permits, documents, and so on to access Italian language courses, and housing.

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Information Technology Ph.D. head of administration

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7. Internationalization and interdisciplinarity

Carrying out study and research activities at external sites is strongly recommended.

Long stays are possible for up to 18 months. Scholarships are increased by 50% (of the base scholarship as defined at national level) for a maximum of 6 months abroad. The external visit requires a formal approval by the Faculty Board. Additional funds for long travel/visits abroad may be available from various Ph.D. fundings. Additional support may come from research funds and from teaching assistance activity (≤ 40 hours/year).

Politecnico di Milano supports joint Ph.D. paths with International Institutions, as well as joint and double Ph.D. Programmes. Further information is available on the Ph.D. School website and on the

Ph.D. Programme website.

Interaction with non-academic sectors provides significant benefits to doctoral candidates as well as to research- and innovation-intensive employment sectors. Direct exposure to the challenges and opportunities in non-academic sectors of economy and society at large is fostered by networking, connectivity, inter-sectoral mobility and wide access to knowledge. The Ph.D. Programme in Information Technology collaborates with numerous research agencies and industrial companies, which regularly fund Ph.D scholarships.

8. Attachment A1 – Ph.D. Programme Coordinator

Short CV of Programme Coordinator

Luigi Piroddi graduated in Electrical Engineering at the Politecnico di Milano, Italy, in 1990, with a thesis on the identification of periodic ARMA models. He received his Ph.D. degree from the Politecnico di Milano in October 1995 with a dissertation on the application of neural networks for nonlinear predictive control. Between 1994 and 1999 he was professor of Fundamentals of Automation at the Università degli Studi di Bergamo, Italy. He was then assistant professor (1999-2005) and associate professor (2005-2015) at the Dipartimento di Elettronica, Informazione e Bioingegneria of the Politecnico di Milano, where he is currently full professor in the systems and control area (from 2015).

He holds various courses in the systems and control area, among which “Fundamentals of Automation”, “Industrial Automation”, “Model Identification and Data Analysis”, “Model Identification and Adaptive Systems”, and “Active Control of Noise and Vibrations”.

His research activity focuses mainly on model identification and industrial automation. More precisely, his current research interests are: nonlinear model and switched model identification, randomized feature selection methods, modeling and control of flexible manufacturing systems and batch processes, active control of noise and vibrations. He has participated in various projects, related both to industrial and public sponsored research programs. L. Piroddi is author of 64 international journal papers, 2 international book chapters, 93 papers presented at international conferences, and 7 patents.

Web site: <http://piroddi.faculty.polimi.it/>

9. Attachment A2 – Ph.D. Faculty Board

NAME	AFFILIATION	SCIENTIFIC DISCIPLINARY SECTOR
Piroddi Luigi, coordinator	DEIB	ING-INF/04
Alippi Cesare	DEIB	ING-INF/05
Amigoni Francesco, vice-coordinator for Computer Science and Engineering area	DEIB	ING-INF/05
Baresi Luciano	DEIB	ING-INF/05
Bertuccio Giuseppe	DEIB	ING-INF/01
Cappiello Cinzia	DEIB	ING-INF/05
Cesana Matteo	DEIB	ING-INF/03

Dercole Fabio	DEIB	ING-INF/04
Fagiano Lorenzo, vice-coordinator for Systems and Control area	DEIB	ING-INF/04
Ferrari Giorgio	Dip. di Fisica	ING-INF/01
Ferrigno Giancarlo	DEIB	ING-INF/06
Garatti Simone	DEIB	ING-INF/04
Gatti Nicola	DEIB	ING-INF/05
Geraci Angelo, vice-coordinator for Electronics area	DEIB	ING-INF/01
Mari Lorenzo	DEIB	BIO/07
Martelli Paolo	DEIB	ING-INF/03
Martinenghi Davide	DEIB	ING-INF/05
Matera Maristella	DEIB	ING-INF/05
Mirandola Raffaella	DEIB	INF/01
Monti Guarnieri Andrea	DEIB	ING-INF/03
Rech Ivan	DEIB	ING-INF/01
Riva Carlo, vice-coordinator for Telecommunications	DEIB	ING-INF/02
Silvano Cristina	DEIB	ING-INF/05
Sottocornola Spinelli Alessandro	DEIB	ING-INF/01
Tornatore Massimo	DEIB	ING-INF/03
Zanchettin Andrea	DEIB	ING-INF/04
Zanero Stefano	DEIB	ING-INF/05