PhD School of Politecnico di Milano

Regulations of the
PhD Programme in Architecture, Built Environment and Construction Engineering (ABC-PhD)

Cycle XXXVI

Campus: Milano Leonardo
(version 1.1 – revised after the ABC-PhD Board of Professors, 25th March 2020)
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1. General Information

1.1 Executive summary
We are a Doctoral Program established in 2012, heritage of five other programs active since the first institution of Dottorato di Ricerca in Italy (from 1988 to 2016) that progressively merged in one with the aim to realize a national Point of Reference for training researchers and experts in our fields (progressively reaching this target). Our vision wishes our PhD holders to become self-sufficient, independent "actors", able to gain – as scientist, as intellectuals, as professionals, as entrepreneurs – an outstanding position at an international level. For this, the holder of our Doctoral Degree is:

- a “problem setter” trained to understand complex questions about complex contexts (physical, economic, environmental or social systems);
- a “problem solver” experienced in finding reliable solutions, based on in-depth analysis and sound models (theories) of those systems;
- a “professional doubter” trained in critical thinking and to understand the uncertainty of the problem-definition as well as the sensitivity of the proposed solution; and
- a “communicator” forged in a high-level communication environment and taught not only to create but also to transfer and to disseminate knowledge.

We teach, in a virtuous circle, how to transform solutions in methodology, methodologies in knowledge, knowledge in science and, again, science in solutions. Our working field includes any critical subject or question related to:

- the sustainable transformation, management and evaluation of the Built Environment, holistically viewed as an “environmental, economic, cultural and social ecosystem” or as time and space series of Architectures and cultural landscapes;
- the Engineering of their parts (buildings and components, structures and infrastructures, materials, technologies and service systems); and
- the organization of the Production and Industrial System that design, realize, manage and transform them as well as of the Public Administration System that defines the rules for taking care (and takes care) of their value as social assets.

1.2 The ten pillars and the main organization principles
The Program pursues the ten pillars of ABC-PhD program, strongly coherent with the Salzburg Principles (2005) and Recommendations (2010). Our Candidates:

1. are chosen in a transparent, efficient and supportive, open selection process;
2. are independent, constantly mentored, early stage researchers;
3. are trained for research through research;
4. have a Research and Training plan tailored on their topics and objectives;
5. are systematically and independently, periodically reviewed and assessed;
6. are embodied in the Department Research activities and all its competencies;
7. network with other researchers, at a national and international level;
8. keep clear track of their work in the scientific journal and conference networks;
9. do their best to establish relations with the stakeholders of their work; and
10. are active part of a growing Quality Management System for the improvement of the Program.

The attainment of the ABC-PhD title requires three things to the Candidates:
• to plan and carry out a three-year, full-time activity in research and training;
• to attend and pass, with a positive evaluation, the planned Doctoral Courses; and
• to develop a PhD thesis producing original advancements on a specific topic and to present and successfully defend it, in a Final Exam session.

Coursework is not the centre of ABC-PhD Program, although we may boast a rich, diverse and even growing educational assortment, thought to integrate Candidate research skills, coupled with PhD School’s transferrable skills courses, and other PhD Programs’ ones. The most important is the continuous mentoring and monitoring activity performed by Supervisors on their Candidates’ daily work, and the periodic, deep reviewing and control and assessment of on their Candidates’ plans, products and results, performed by Tutors, Board’s Members and external Reviewers during periodical Milestones (see 6.2).

Each Candidate is mentored by a Supervisor and inherits Supervisor’s Scientific Sector as a reference. Due to the multidisciplinary nature of the research field, nevertheless, her/his activity is systematically confronted with every expertise and discipline needed to make her/his final product the strongest from an academic point of view. Every professor that might take part of this refinement process (from the Department or, if needed, from other Departments or also from other Universities) is involved and welcome.

Each Candidate is progressively pushed to confront her/his position, project, intermediate and final results with any stakeholder that may acknowledge, enhance, valorize and exploit them, in particular through industrial or social collaborations. This is often done even before the selection of the Candidate, when the offered scholarships are funded or jointly funded by industry or international research projects involving industrial partners or other entities.

We are sure that our early stage openness toward stakeholders, Academy in general and scientific networks is the best way to provide future PhD Holders with occupational opportunities: for an academic career as well as for an employment in research centres, and in any other enterprise, public body or private societies that need highly qualified personnel trained to innovate.

1.3 Scientific Areas, Disciplines and ERC Panel structure reference

Following the Italian List of Academic Disciplines for University Research and Teaching, ABC-PhD refers to four Main Areas and twenty different Disciplines (in red the reference to the ERC panel structure code¹):

• Area 08 – Civil engineering and architecture
  – ICAR/05 – Transportation (ERC Code PE8_3)
  – ICAR/06 – Surveying and Mapping (ERC Code PE10_14/SH2_12)
  – ICAR/07 – Geotechnics (ERC Code PE8_3)
  – ICAR/09 – Structural Engineering (ERC Code PE8_3)
  – ICAR/11 – Building Production (ERC Code PE8_3/PE8_9/PE8_10)
  – ICAR/12 – Architectural Technology (ERC Code PE8_3/PE8_10/PE8_11/PE8_12/PE8_13)
  – ICAR/15 – Landscape Architecture (ERC Code PE8_3/PE8_12/PE8_16/SH3_1)
  – ICAR/14 – Architectural and Urban Design (ERC Code PE8_3)
  – ICAR/17 – Architectural Drawing (ERC Code PE8_3)
  – ICAR/18 – Architectural History (ERC Code SH6_6)

- ICAR/19 – Architectural Restoration (ERC Code PE8_3/SH5_7/SH5_8)
- ICAR/20 – Urban Planning (ERC Code SH3_1/SH3_9)
- ICAR/21 – Urban design and landscape (ERC Code PE8_3)
- ICAR/22 – Appraisal (ERC Code PE8_3)

- **Area 09** – Industrial and information engineering
  - ING-IND/11 – Building Physics and Building Energy Systems (ERC Code PE8_6)

- **Area 13** – Economics and statistics
  - SECS-P/06 – Applied Economics (ERC Code SH2_9)

- **Area 06** – Medicine
  - MED/42 – Hygiene and public health (ERC Code LS7_9/LS7_10/SH3_9)

- **Area 10** – Science of Antiquities
  - L-OR/02 – Egyptology and Coptic civilization (ERC Code SH6_2, SH6_3)

**Websites:**

- [http://www.polimi.it/phd](http://www.polimi.it/phd) (PhD School)
- [http://www.abc.polimi.it/en/abc-phd/](http://www.abc.polimi.it/en/abc-phd/) (Department)
- [https://beep.metid.polimi.it/web/abcphd](https://beep.metid.polimi.it/web/abcphd) (Forum, Blog and basic info)
2. General Presentation – The ABC-PhD Programme

The "Dottorato di Ricerca" is the highest level of education degree within the Italian academic system and is equivalent to the North American "Doctor of Philosophy", well known through its acronym Ph.D., that we will more familiarly write without dots (PhD). The PhD Degree is awarded by Italian Doctoral Schools, organized in "Corsi di Dottorato" (Doctoral Programmes).

History and development of ABC-PhD

ABC-PhD (Dottorato di Ricerca in Architettura, Ingegneria delle Costruzioni e Ambiente Costruito/Architecture, Built environment and Construction engineering) is the multi-disciplinary Doctoral Programme of the homonymous Department of Politecnico di Milano, established in 2012, following the complete reorganization of the area of Architecture, Built Environment and Construction Engineering in one Department.

Research fields

Research and training activities of each PhD Candidate will be planned and developed in one of the eight research fields of the Department (DABC) (see the linked pages for more information):

1. Advanced Construction Materials and Innovative Building Technologies
   Analysis of energy, mechanical, environmental performances of Advanced Materials, throughout their life cycle, and feasibility of their use in Construction Industry. Research activities about Innovative use of traditional materials (glass, wood, cement mortars, etc.). Investigation about innovative systems and their application to new and existing buildings to increase the level of their performances, cost, safety, durability, environmental profile, Life Cycle Assessment. See more here.

2. Energy and Environmental Efficient Buildings (E3B)
   Evolution of the construction industry in the next decade, these issues are in accordance with European Guidelines and Energy Efficient Buildings Initiative (E2B EI): New sustainable buildings and nearly zero/energy positive buildings. Deep Retrofit of energy efficiency and environmental performance of existing buildings (listed and not listed). Sustainable and energy efficient neighbourhoods, cities and territories. Sustainable and energy efficient urban landscapes through green infrastructures and natural based solutions. See more here.

3. Risk prevention and emergency management
   Research topics range from Risk assessment (hazard, vulnerability, exposure) to Condition Assessment, (Damage and condition identification, warning systems); from Asset Management (maintenance, restoration, conservation, upgrading and safety planning) for the reduction of vulnerability, to Emergency Planning and Management (first interventions, transition processes) and Design for Resilience (resistant, replaceable, repairable). See more here.

4. Architectural and Urban Design
   Research issues concern theory, history and design in architectural forms and spaces, public spaces, settlement dynamics, networks, territories and landscapes, in the following four sub-themes: 1) Forms of New and Existing Settlement and their Regeneration; 2) Public Buildings and Spaces in Cities and Communities; 3) Residential Units and Social Housing; 4) Architectural History, Theory and Criticism; 5) Landscape Design of open public spaces and residential landscape design. See more here.

5. Complex Buildings
   The research activity on this topic concerns the need of advanced experimentation and all-round innovation when “complex” as "exceptional" constructions are to be realized (and managed) for the challenges of a evolving society (Constructions for health, for production, service and culture, and for infrastructure). It concerns the practice of the synthesis of skills related to architectural, technological, structural and building services knowledge, project and construction management. See more here.

6. Preservation and Enhancement of Built Heritage

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Investigation about the needs of built heritage preservation, preventive and planned conservation, design enhancement the rationalization of their practices, and the optimization of governance strategies in order to activate regeneration processes able to cope with long-term environmental and economic sustainability issues, seismic and hydro-geological risks, the value enhancement of public and private assets, and the care of urban and regional landscape. Heritage preservation and conservation of urban and rural landscapes. See more here.

7. ICT and Smart Construction
The research activity on this topic is related to the application of Information and Communication Technologies (ICT) to the many activities of Built Environment Industry: from the design and management of new building projects to the planning of conservation, refurbishment and management of existing buildings and cultural heritage assets. The research activity is developed through the two chief lines: Building Information Modelling (BIM) and the optimization of information and data flows among the various process stages and stakeholders; Self-Monitoring Analysis and Reporting Technology (SMART) and the use of remote controls and mobile survey systems. See more here.

8. Built Environment Economy and Management: life cycle, land and territory
This research line targets the challenge of addressing, with a multidisciplinary approach, economic and management aspects to Territory and Built Environment transformation processes, analysed in spatial terms (component-building-territory) and in the different stages of their life cycle. The four main areas of research are: Management of Built Environment life cycle; Management of Construction Activities and spatial processes; Competitiveness, sustainability and inclusivity of urban growth; Real Estate and value of urban transformations. See more here.
3. Objectives

The aim of every PhD Programme is the development of a research-oriented mind-set and high-level expertise and skills, in a specific research field and for related applications. This means to acquire analytical and problem-solving capabilities, to be able to transform solutions in methodology, methodologies in knowledge, knowledge in science and, again, science in solutions.

The holders of a Doctoral Degree are problem setters, trained to model complex environments, to understand complex questions and to apply critical thinking. They are problem solvers, trained to turn uncertainty in methodology and to turn doubts in reliable solutions. Eventually, PhD-Holders are trained to create information, forged in high-level communication, educated to compete as well as to cooperate, tempered in complex multi-disciplinary and multicultural environments.

3.1 ABC-PhD mission

The mission of ABC-PhD Programme is to train researchers and experts endowed with:

- High-level scientific knowledge;
- Significant experience in Research and Development (R&D) activities; and
- Proven communication and management skills, applied to R&D activities.

The main aim of ABC-PhD Programme is to train researchers and experts for the extensive field of Architecture, Built Environment and Construction Engineering. Our Candidates are trained to face complex questions, to develop in-depth analysis and reliable models (theories) of complex contexts (physical, economic, environmental or social systems) and to innovate: concepts, products and their use, rules and organisations. Moreover, ABC-PhD Programme aims to work as a drive system between Academy (the Department and the world of research in general) and other non-academic entities, activating a continuous knowledge transfer toward these and giving back to Academy the great value of a reason to research.

3.2 ABC-PhD Vision

Our vision wishes:

- Our ABC-PhD Doctors to become self-sufficient, independent “actors”, able to gain – as scientist, as intellectuals, as professionals, as entrepreneurs – an outstanding position at an international level;
- Our ABC-PhD Programme to become – in few years from its start – the Italian Point of Reference for training experts in all the most critical subjects related to the sustainable transformation and management of the Built Environment (environmental, economic, social and cultural sustainability), viewed as "ecosystem."
4. Professional opportunities and job market

4.1 PhD Statistics
The most recent statistics about the employment clearly shows a constant competitive advantage of Italian PhD Holders, compared to other graduates (ISTAT, 2018). Their employment Rate is very high in every scientific sector (on average, >93% are employed within six years after PhD graduation) and, the share of fixed-term employment is growing (>45%). A vast majority of all the contracts deal with research and development activities (>70%). The main advantage underlined by the statistical sample, interviewed about the overall satisfaction of their employment, is about their autonomy and independence.

The employment of PhD Holders in Programs related to ABC Department, in the last three years, is mainly in Italy (80%). The majority of them (54%) work in Research and Academic Institutions for the first two-three years (later years the share drops to, about 30% and is expected to decrease further in time) while other 46% of PhD Holders work in SMEs or as professional free-lancers, public institutions or large companies (very often in the R&D sector).

4.2 The ABC-PhD Doctor (the holder of an ABC-PhD title)
The ABC-PhD Programme is structured with a strong relationship with the homonym Department of Architecture, Built Environment and Construction Engineering and the Schools of Politecnico di Milano.

The three years of study and participation to the research activity of the Department (and of its joint foreign institutions), in relation and together with other researchers, thanks to the opportunity to spend a period in other international research centres, forge a deep knowledge of the academic world. Doctoral experience, nevertheless, offer Candidates also other opportunities than academic.

Candidates have the chance:

- To take part in “knowledge transfer” processes;
- To enter in contact with the stakeholders, private companies and public bodies, of their work;
- To face actual societal needs and to work for the future ones;
- To understand the value, the complexities and the potential of innovation; and
- To manage a dedicated budget for carrying out the research activities.

This, together with the habit of communicating and working in English, qualifies the Doctorate for positions offered by the best international universities and research centres as well as by other private and public institutions. PhD Holders are trained by academic world but their proficiency and skills may be efficiently employed outside the academy, exploiting their best talent: innovation.

They have knowledge and creativity that can be applied to start as well as to support progressive and disruptive changing processes. They are young researchers able to promote development and progresses, with high profit, in any sector for which they are skilled and experienced and eased by that precious set of relations that they build during their training, roaming among experts, connecting expertise and gaining stakeholders’ interest for their work.

These characters make Doctoral experience a competitive advantage, exploitable in an academic environment and in research centres, as well as in professional enterprises, public bodies and private societies that need highly qualified personnel for activities, services and products related to construction processes, the transformation of the built environment and the management of its cultural, economic and physical assets, for planning and management of control activities and the critical assessment of any policy and
project concerning the built environment and the built asset, for public and private bodies.

The ABC-PhD Doctor is expected to become:

- An international investigator, as Post-Doc, research fellows and young lecturer, in Italian and international Universities and Research Centres;
- A highly qualified personnel in the R&D Department or in the Training Department of private Companies or in Technology Transfer Centres, providing a deep and advanced insight and link between universities and the business world and assuming managerial roles with a strong focus on innovation;
- An esteemed Professional, acting independently or in engineering and architectural firms;
- An entrepreneur, in contexts characterised by a high level of product and service innovation;
- A Project or Construction Manager or a Facility Manager, for Construction Industry, Real Estate and Asset Management;
- An independent Consultant able to develop criticality analysis of any built environment transformation at a strategic as well as detail level; and
- An outstanding Intellectual, at an international level.

4.3 Actions for PhD Holders

Universities, locally, and other national institutions already initiated actions to improve the appreciation of the added value of PhD Holders also outside Research bodies, in large as well as small and medium enterprises, and other public bodies. See, for example, the recent PhD-I-Talents project by the Ministry of Education and Research (MIUR) and the Confederation of Italian Enterprises.

The PhD School of Politecnico di Milano, as well as ABC-PhD Program, thanks to their Career Service, are active in supporting PhD holders in their post-doctoral period in activities outside academy, for example in CV writing, training them for job interviews, enforcing their soft-skills and their understanding of jobs in private firms, from the last period before their final exam. Check in the PhD School site in the pages After the PhD.
5. Enrolment in ABC-PhD Programme

5.1 Admission requirements
Graduated Italian and foreign citizens, with a good English Language proficiency, may apply to ABC-PhD Programme, following requirements, rules and suggestions collected in the PhD School site and in the Call. They are requested to have graduated in accordance with the pre-existing laws D.M. 3.11.1999 n. 509, or to have a Master of Science degree in accordance with D.M. 3.11.1999 n. 509, or a Master of Science in accordance with D.M. 22.10.2004 n. 270, or similar academic title obtained abroad, equivalent for duration and content to the Italian title, with an overall duration of the university studies of at least five years.
The certified knowledge of the English language is a requirement for admission.
The admission to the programme will be established according to the evaluation of the candidates' curriculum vitae, motivation letters, and an illustrative report about the development of a possible PhD research, which will be sent by the candidates with their application to the Call. Beyond the specific content of the proposed research, such a proposal is evaluated to understand the attitude of the candidate to do research. An Evaluation Commission will assess the admission to the programme as specified in the admission procedure. The admission procedure may include oral discussion, which can take place either in person or via remote media: Evaluation Commission may ask the Candidate to answer some questions, in order to have a better understanding of her/his research proposal and her/his real motivation.
Please refer to the PhD School website for details.

5.2 Admission deadlines and vacancies
Scholarships are available, in accordance with the Call, both about “general field themes” and about “specific topics”, as listed in the call for applications. Other “general field scholarships” may become available during the selection process.
6. Contents of ABC-PhD Programme

As said above, the main objective of ABC-PhD is the training, in the wide area of Architecture, Built Environment and Construction Engineering for:

- A research-oriented mind-set;
- High-level analytical and modelling skills; and
- Deep expertise about a specific research topic, in a multidisciplinary culture.

As any other PhD Program, ABC-PhD requires a long, intense and constant work and a systematic production, to reach the very high aims stated in its Vision and Mission.

We are looking for highly motivated people, able to sustain a full-time engagement in training for research and researching as training. In the following sections, these Regulations define:

1. The general requirements for the attainment of the title and the main steps we expect;
2. The procedure for the development and monitoring of Doctoral activities;
3. The objectives and general framework of teaching activities;
4. The procedure for the presentation and approval of the R&TPlan; and
5. Other procedures about yearly evaluations and other deep review activities (Milestones).

6.1 Requirements for the attainment of the title

The attainment of a PhD title in Architecture, Built Environment and Construction Engineering requires three full-time years of study and research activities.

In these three years of Doctoral Programme, Candidates will:

1. Schedule, attend and pass, with a positive evaluation, the Doctoral Courses needed to complete their skills and to enhance their knowledge in their research area, as well as those transferable skills useful for their future as researchers (see 6.1.2, for details);
2. Develop a PhD thesis showing original advancements on a specific Research Topic; and
3. Present, discuss and defend it in a Final Exam, showing their research expertise, their research-oriented mind-set or problem-solving aptitude.

The length of the doctoral Programme may be extended, without scholarship, if requested by the Programme Board; the Candidate, moreover, may obtain the suspension of attendance (see the Politecnico di Milano’s Regulations on Research Doctorates).

To obtain the best from this long period of work, a detailed research and training activities planning is a fundamental duty of the same Candidate. The approval and the control of the plan is a duty of the Candidate’s Tutor, Supervisors and the Programme Board, as specified in the following sections.

6.1.1 The plan of Doctoral activities (R&T Plan)

Candidates shall plan their research and training activities, in accordance with their Supervisors, detailing it in a Research and Training Plan (R&T Plan), giving evidence of their aims and of the global amount of time to be spent in each of them. The R&T Plan will be endorsed by Candidate’s Supervisor, overseen by Candidate’s Tutor and reviewed and approved by the Programme Board, during periodic meetings (Milestones). In occasion of each Milestone, PhD Candidates will submit a written report accounting the time dedicated to each performed activity and their products and update their R&T Plan. The total amount of time spent in each activity must be realistic and coherent with their effective outcomes.

Candidates may modify their R&TPlan, in particular to tune-up it with any change of Course Catalogues,
other research occasions and any other event useful to the progress of their research, as specified in section 6.4.

Candidate’s R&T Plan will schedule activities classified as:

1. Doctoral Courses (with exam);
2. Conferences, Seminars and Workshops (without exam);
3. Research and Publication activities (with deliverables);
4. Stages and Foreign stays; and
5. Teaching activities,

The minimum and maximum quantities for these activities are stated in the following sections.

6.1.2 The Training Activities and their choice

Candidates are requested to plan a minimum of 30 ECTS of Training Activities to complete their knowledge about the chosen Research Topic and to refine the skills needed for preparation of the PhD Thesis and its intermediate steps. Training Activities will comprehend:

1. 10 ECTS to be acquired by attending Doctoral Courses on transversal skills in the PhD School Catalogue;
2. 25 ECTS to be acquired by attending Doctoral Courses from the ABC-PhD Programme, or from other PhD-Programmes at Politecnico di Milano (including the PhD School Catalogue) and in other Universities and Research Centers; MSc courses might be chosen as well; and
3. 5 ECTS assigned on the basis of the attendance of a cycle of five seminars/workshops organized by ABC-PhD to train on different phases of the PhD development as marked by periodical Milestones (see 6.2): literature review and state-of-the-art, organization of a research project, scientific writing, scientific communication and public speaking, dissemination of research outcomes. In the case the Candidate has already followed a course (e.g., from the PhD School Catalogue or during other activities), the credit related to that topic will be granted without the need of following the relevant seminar.

In any case these selections should be approved by the Supervisor and the Programme Board.

As the research training of Candidates is mainly obtained through mentored research activities, Doctoral Courses must not exceed the maximum amount of 50 ECTS, in the whole Doctoral Programme.

As ABC-PhD Candidates are expected to acquire a multidisciplinary character, they may choose, if useful to complete their culture and education to research and positively related to their field of interest and Research Topic, also Courses outside of ABC-PhD Catalogue and not strictly connected to their major discipline, with the help of their Supervisors. Candidates are not only strongly invited to make this choice in accordance with their Supervisors but also to discuss with them the details of their exam work, in case they will be requested to propose something related to their thesis work or their thesis subject. It is recommended that the recognition of any course that is not listed in the university catalogue (including all courses at Doctoral and MSc levels) should be approved by the ABC-PhD Board, which will evaluate the specific

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2 ECTS is the acronym for European Credit Transfer and Accumulation System, a Bologna Process tool aiming to make National Academic systems, in EU, compatible and comparable, in terms of workload and learning outcomes. It is based on the following equivalence: 60 ECTS credits are associated to one full-time academic year. The measure of the engagement of the student of a Doctoral Course is based, as well as for other levels of qualification (Master, Bachelor) on the European Credit Transfer and Accumulation System (ECTS). The workload for a standard 5 ECTS PhD course, in Politecnico di Milano, account for about 35 hours of formal lectures, seminars and workshops activity, plus the individual study required to achieve the defined learning outcomes and to produce the stated home-work (one credit corresponds to 25 to 30 hours of work; see the ECTS Users’ guide, downloadable here)
programme and the inheritance to the education track of the candidate. It is also recalled that a course should be completed by a final evaluation to be recognized.

Eventually, the Board may ask Candidates to attend specific preparatory courses, when they need to fill specific gaps between their competencies and the advanced skills needed to complete the chosen research projects or to face a specific topic. In this case, some extra-credits to be acquired are assigned. The credits acquired in this way will be considered as additional, in relation to the mandatory credits. As Research Topics may be defined before the official start of the Programme (e.g., for Thematic Scholarships), the Head of the Board (or his Delegates) may interact with registered Applicants, also before the official start of their Program, in order to draft their R&T Plan and to let them attending Courses, as soon as possible.

6.1.3 Research (and other) activities

Courses usually account for the first, introductory, commitment of PhD Candidates, but not for their main work, that mainly consists in taking part in Department’s Research Activities, to obtain direct experience in research design, planning, management and production of original research, up to the communication and marketing of their results. Research Activities must be detailed in Candidate’ R&T Plan (as well as Courses) and planned under the guidance of their Supervisor.

Candidates are also expected to take part of:

- Conferencing activities (attending and preparing presentations in research meetings, working groups and conferences), in particular, Seminars, Conferences and Workshops organized by the ABC Department (Candidates are expected to be involved in the definition, organization and management of these events, not only in passively taking part in them: see the ABC PhD OPENTalks) or other research groups;
- Networking and Technology Transfer activities (encouraged as opportunities for profitable confrontation with the stakeholders of research activity, from the earliest moments); and
- Writing and publishing.

As far as this last topic is concerned, ABC-PhD Programme encourages publication:

- Candidates are expected to write and to start publication activity as soon as possible, about topics related to their Research Project or other synergic ones, in order to gain a direct experience of the external review process at the basis of every relevant Scientific Conference and Scientific Journal, and the earliest visibility of their work;
- Their commitment in publication activity is expected to grow together with their autonomy; and
- Full authorship is, in particular, expected, at the end of their PhD Program.

Nevertheless, ABC-PhD is not a “PhD-by-publication” programme (see also the next 6.1.5, about “The PhD Thesis”).

Candidates’ publication activity must be guided and reviewed, as well as any other public activity, and authorized by their Supervisors. Such a control is mandatory during their entire Program and whenever they present themselves as ABC-PhD Programme Candidate or Politecnico di Milano PhD Student (see also 6.2.4, 6.7 and 6.8).

6.1.4 The External Period

A period spent in external institutions (International laboratories or Research Centres, Italian or foreign Companies or other external research Bodies and Universities) with other working groups, as “visiting PhD” or apprentice or equivalent form, is warmly encouraged to acquire a deeper insight of Candidate’s research
topic. While the length of staying abroad should be preferably of 3-6 months, a longer external period is possible up to 18 months but must be authorized by the PhD Programme Board. An increase of the amount of the Scholarship is allowed for a maximum of six months (except special cases of Thematic Scholarships that are already published in the call for Candidate selection). Politecnico di Milano proposes also the opportunity of jointly supervised PhD paths, with foreign universities and double PhD Programmes. Further information is available on the PhD School Website or can be queried to the ABC-PhD Office (see 7.1).

6.1.5 The PhD Thesis

PhD Candidates are expected to study, take lessons, work hard for a long period and to become active part of a scientific community (at a global as well as at a local scale), but they are also expected to produce a significant, original contribution to a specific knowledge field, to organize this contribution in a dissertation (the PhD Thesis) and to defend it publicly in front of a committee of experts. At the end of the third year, after its Admission to and before the Final Exam (FEA), the Candidate’s Thesis will be reviewed and its original contribution assessed by two external, independent Examiners, before her/his Final PhD-Exam. Eventually, the final PhD-Exam will be organized, an examination Committee, composed by three members, of which at least two external evaluation members, appointed, and their research work evaluated.

WARNING: Candidates may partially anticipate the results of their work in publications, but the final dissertation must be something more than a simple sum of their publications. As the value of a PhD Holder is assessed on the basis of the original advancements achieved during her/his Program, PhD Candidates must, as soon as possible, focus on their PhD Thesis or, in alternative, must start weaving through their activities and their results (publications but not only) a sort of red thread that will make them visible as a unique one.

6.1.6 Activities as teaching assistant

PhD Candidates may take part to Teaching activities about subjects closed to their PhD Thesis topics. Teaching of any types (i.e., BSc, MSc, Master programmes and others) may be good occasions for training in education and communication of research. However, such “extra-work”, to be conducted in parallel of the ordinary activities, should not exceed a reasonable amount of teaching hours per year, in order not to limit too much the time for doing research. This amount will be evaluated case by case by PhD Programme Board. Authorization by the Head of ABC-PhD programme is necessary to participate to competitive calls to obtain temporary retributed appointments as teaching assistants.

6.2 Development and monitoring of Doctoral activities

The activity of ABC-PhD Candidates will be organized in the following ten phases:

- Choice of the Research Topic and official appointment of the Supervisor (Milestone Zero)
- Definition (and review) of the State of the Art for the chosen Research Topic (Milestone One)
- Definition (and review) of the Research Project (Milestone Two)
- Presentation (and review) of the Position Report (Milestone Three)
- Definition (and review) of the PhD Thesis Index (Milestone Four)
- Presentation (and review) of the First Draft of the PhD Thesis (Milestone Five)
- Presentation (and review) of the Final Draft of the PhD Thesis (Milestone Six)
- Admission to the Final Exam (FEA)
- Evaluation of the PhD Thesis (by at least two, independent, academic experts)
• PhD Thesis defense (final Exam)

The general content of these ten phases, in terms of work to be presented, is detailed in the following sections, while the exact timescale and schedule is defined, yearly, by the Programme Board.

Milestones will be organized in the form of an open, public, roundtable meeting (Milestone Session) among a little number of interviewed PhD Candidates, chosen following the affinity of their topic and their collaboration and sharing potential, together with their Supervisors and their Tutors.

Each Milestone has associated a type of document to be uploaded in the Candidate’s personal area before a submission deadline (in general at least 20 days before the start of the Milestone Sessions). Each Candidate’s discussion is supported by a presentation, to fit in the maximum time communicated before each Milestone Session. The reviews of each document will be transmitted to the Candidates, who is invited to prepare a Post-Milestone Report where those comments and suggestions received during the Milestone Session will be recorded. Such a Post-Milestone Report will be archived in the Candidate’s personal area (see 9.4).

Milestones are divided into two main categories:

1. Deep review Milestones (namely milestones One, Three, Five), with the aim of deeply reviewing the activity done so far by the Candidates (without any final formal evaluation); and

2. Evaluation Milestones (namely milestones Two, Four, Six), with the aim of reviewing the activity done so far by the Candidates but also to decide End-of-Year (EoY) Evaluation.

Milestones are scheduled on a regular basis, to take place at approximately six months steps from the beginning. Starting from the Academic Year 2020-2021, the entrance to ABC-PhD Programme is limited to the official start of the year (in November) and during May. Any official break in the individual carrier may introduce a subsequent modification in the milestone schedule of the Candidate. In any case, when a break is finished, an extra formal check should be operated.

Candidates who follow a four-year programme (for instance in the case of Executive Programmes or international agreements) should reorganize their Milestone schedule according to their specific needs and the research topic.

Milestone Sessions (MS) are grouped on a thematical basis into eight Thematic Working Groups (ThWG), each of them focusing on one of the Main Research Lines of ABC Department (see Section 2). The aim of ThWGs is to coordinate those MSs related to affine topics. All PhD Candidates supposed to attend the Milestones are assigned to a specific MS. This is coordinated by a Chair and a Co-Chair, who are in charge to invite Candidates’ Supervisors and Tutors to be member of the MS Committee. Independent experts could be also invited to contribute to the MS discussion. Chairs of MSs will take care that documents submitted by each candidate are reviewed by at least two members of the MS Committee. Tentatively, MSs are organized in the way that Candidates are reviewed by the same core experts during different Milestones, which however is likely to be integrated by new members from time to time. The document of a Candidate will never be reviewed by her/his Supervisor and (possibly) her/his Tutor.

The Chairs of a MS will also have the role of defining the exact schedule of the meeting, promoting the debate among all the participants and verifying that it is produced a confidential written report about the advancements and the results of their work, the proposed assessments, the advice and suggestions to Candidates, as better specified in the description of each milestone. These pieces of information should be reported to the ABC-PhD Board as basis for the candidate assessment.

When a MS corresponds to an EoY evaluation, the Chairs will be responsible, together with the MS Committee (with the exclusion of the Supervisor of the Candidate under evaluation) to approve (or not) the enrollment into the following year (or the Admission to the Final Exam - FEA) and to propose an evaluation.
These decisions should take into account those preliminary comments from the Supervisor and the Tutor of each candidate, and will be discussed and approved later by the ABC-PhD Board.

6.2.1 Before the official start
After registration, each PhD Candidate will receive an institutional (@polimi.it) email address, by Politecnico di Milano.

Before the official start of the 1st year, each Candidate must contact the possible Supervisor, in order to identify the Research Topic and, then start working together with the latter version of her/his Research and Training Plan (R&TPlan - see Par. 6.1.5). After Milestone Zero (see Par. 6.2.3) the ABC-PhD Board will appoint each candidate a tentative Tutor, chosen, among members of the ABC-PhD Board.

The Research Topic of Candidates with Thematic Scholarship is defined by the Thematic Scholarship file, together with the name of the Supervisor, as the Principal Investigator of the research associated to the Thematic Scholarship. The Research Topic of Candidates without Scholarship or with a “general field” one may be proposed by the same Candidate, but must be endorsed by Supervisor, and approved by the Board, as a research topic compatible with a Department Strategic Research line (see Section 2.).

It may be related to their Application Research Proposal, but that is not binding.

6.2.2 MILESTONE ZERO – Supervisor and Research Topic
After the official kick-off of their PhD Program, Candidates will be called to their first meeting with the Board (MILESTONE ZERO), to present their Research Topic and to discuss their R&T Plan, and to appoint or confirm the Candidate’s Supervisor. After this meeting the ABC-PhD Board in agreement with Supervisors will propose Tutors.

6.2.3 MILESTONE ONE – State of the Art
The first period of Candidate’s work is – usually – devoted to exploration, to Doctoral Courses and to other basic training activities, to consolidate the choice of the Research Topic, to obtain a deep understanding of the research activity about that topic and to define the main objectives of her/his work, explaining which advancement (and how) he/she is going to produce.

About six months after the start of the Program, the Candidate will be invited to submit and to present to the MS Committee the State of the Art (SoA) of the Research Topic under investigation and the related Reference Bibliography for Deep Review.

The SoA will be realized in order to give a detailed picture of People and Institutions who produced the main advancements about the chosen Research Topic, their Activity (what – and when – they have done, are doing and are going to do), their Reasons (why), their Networks and their periodic appointments (Conferences), together with the other Scientific Disciplines (minors) that could be profitable to connect with.

The State of the Art and the Bibliography will be continuously updated and upgraded during the whole PhD course of study, together with their R&TPlan.

The review of the research work and scientific networking already existing should not intended as a mere list. As far as possible, PhD candidates are expected to start understanding and critically analyzing the main topics and lines related to the research domain of interest.

6.2.4 MILESTONE TWO – Research Project
Candidates are expected to focus their work and attention on the specific subject that will become their PhD Thesis within the end of their first year. They will still follow Doctoral Courses and perform planned research activities, upgrading and modifying, if needed, their R&TPlan, but they are expected to define their proposal,
6.2.5 MILESTONE THREE – Research Paper

During the third semester, Candidates may still follow Doctoral Courses, will take part to events or other research and scientific activities, if useful for their Research Project and for completing their training experience, but they are mainly expected to start publication activity and to expose some first results of their work to the Scientific society. At the end of their third semester, Candidates are expected to translate, under Supervisor’s control, their Research Project in a Research Paper, to be submitted to the MS Committee for Deep Review. In particular, the Committee will test their ability in written communication and to assess the originality and the scientific relevance of their projects, as well as their feasibility. The submitted Research Paper may be integrated with the analysis done with the Antiplagiarism tools of the “Servizio applicazioni bibliotecarie” of Politecnico di Milano.

6.2.6 MILESTONE FOUR – PhD Thesis Index

Before the end of their second year, Candidates are expected to produce a clear view of their Research Project and to start their PhD Thesis, under the guidance of their Supervisors. If useful for their Research Project and for completing their training experience, they may still follow Doctoral Courses and perform other research activities. The second year is, usually, the best period for a visiting period to other Universities, Research Centres or other Institutions (but Candidates may, in theory, take the occasion for such an experience, in earlier or later periods).

At the end of their fourth semester, Candidates will present the progress of their research activity in an Evaluation Milestone, explain their first results and give a complete picture of their work. A clear vision of their PhD Thesis, the main parts and the activities to be performed is expected. The MS Committee will evaluate it and the Research and Training Report and give a synthetic evaluation of Candidate’s activity, commitment and results, deciding her/his admission to the third year. These documents will be transferred to the PhD-ABC Board to be analyzed and confirmed (or revised).

6.2.7 MILESTONE FIVE – First Thesis Draft

After the end of the fifth semester, Candidates are expected to present their first draft of the thesis, together with a synthesis of the results: planned, attained or not and still to be reached. The MS Committee will carry out a Deep Review to examine and assess the value and the originality of the PhD Thesis, the advancements and the feasibility to be completed. At this stage, Candidates should start selecting the couple of External Examiners, to be appointed later after the FEA.

6.2.8 MILESTONE SIX – Final Thesis Draft

The third Doctoral Program year shall be devoted to the preparation of Candidate’s PhD Thesis. At the end of the third year, Candidates will present the final draft of their thesis to the MS Committee for Evaluation. If they have achieved sufficient results, they will be admitted to the final exam (see 6.5). A negative evaluation may imply a re-enrolment in the same year as a repeating candidate, but in general, Candidates who have achieved sufficient results but need more time to conclude their research work and write their theses, may obtain the admission to a further year. In the case the candidate is ready, the final defense may be organized before the end of the year.
6.2.9  **Thesis EVALUATION**

In case of positive evaluation, the Candidate is admitted to the Final Exam and her/his thesis is submitted to the External Examiners, for revision. If they provide a positive evaluation as well, the defence follows. The Examiners may require some mandatory improvements to be implemented and delay the defense up to six months. The revised version of the PhD Thesis must undergo a new evaluation by the External Examiners, after which (even in the presence of a negative report) it is admitted to the defense.

6.2.10 **FINAL MILESTONE – FINAL EXAM (or Thesis Defense)**

In the final PhD-Exam, the research work carried out by the Candidate and her/his thesis will be evaluated by the Defense Committee. Such a Committee will consist of three members, at least two of whom do not belong to the Department and preferably they are not in the staff of Politecnico di Milano. Different compositions are allowed in the presence of specific agreements (Double Degree or Jointly supervised candidates) with other research Institutions or PhD Schools. Defense will occur in the six months following the end of the final year or within the extended years. In exceptional cases, the Board may establish an earlier date, in the last three months of the final year.

The Defense Committee can be created only once the Candidate has been admitted to the Final Exam by the Board. It must be registered online at least 45 days before the defense date and Candidates must register at least 30 days before the defense, and upload their thesis at least 20 days before the defense. Candidate’s Supervisor (or the Head of ABC-PhD Programme) will approve it at least 15 days before the defense, in order to grant access to the thesis to the Defense Committee.

The positive outcomes of a PhD defense are: ‘PhD granted’ or ‘PhD granted cum Laude’. A negative outcome of the Final Exam is irreversible.

6.3  **Objectives and general framework of the teaching activities**

To support the attainment of the general training aims and the specific objectives of each Candidate, the *ABC-PhD Programme* will organize, together with the PhD School, a wide set of training activities, as well as research opportunities. Courses offered by *ABC-PhD Programme* are updated in the official Page of the PhD School offer and anticipated here in a general form. The effective activation of each Course, nevertheless, depends on the number of registered students: if a reasonable number of registered students is not reached, the Course may be cancelled. Moreover, other Courses may be added during the year, following the identification of a specific training need.

The Course Programme (see below) may also comprehend some courses that are not offered in the current Academic Year, but they will be scheduled in the next one according to a two-year cycle.

6.3.1  **RESEARCH and TRANSFERREABLE SKILLS Courses**

Transferrable skills courses are offered by the **PhD School**:

<table>
<thead>
<tr>
<th>Titolare</th>
<th>Insegnamento</th>
</tr>
</thead>
<tbody>
<tr>
<td>Michela Arnaboldi</td>
<td>Advanced Interaction Skills for Academic Professionals</td>
</tr>
<tr>
<td>Hans De Bruijn</td>
<td></td>
</tr>
<tr>
<td>Alessandro Balducci</td>
<td>Approaches to Resilience: Social, Economic, Environmental and Technological Challenges of Contemporary Human Settlements</td>
</tr>
<tr>
<td>Emanuela Jacchetti</td>
<td>Communication Strategies That Score in Worldwide Academia</td>
</tr>
<tr>
<td>Paolo Biscari</td>
<td>Complementary Doctoral Skills</td>
</tr>
<tr>
<td>Anna Maria Paganoni</td>
<td>Disseminare la Ricerca</td>
</tr>
</tbody>
</table>

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### 6.3.2. DIGITAL SKILLS Courses

<table>
<thead>
<tr>
<th>SSD</th>
<th>Name of the Course</th>
<th>ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ING-INF05</td>
<td>Information Technology for Planning, Architectural Design and Built Environment Management</td>
<td>5</td>
</tr>
<tr>
<td>ICAR12</td>
<td>Material Culture &amp; Computational Design Techniques</td>
<td>5</td>
</tr>
</tbody>
</table>

### 6.3.3. DISCIPLINE RELATED SKILLS – Structures

<table>
<thead>
<tr>
<th>SSD</th>
<th>Name of the Course</th>
<th>ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICAR09</td>
<td>Seismic design and retrofitting of structures</td>
<td>5</td>
</tr>
<tr>
<td>ICAR08</td>
<td>Modelling the Mechanics of Masonry Structures</td>
<td>5</td>
</tr>
<tr>
<td>ICAR07</td>
<td>Distinct Element modelling of granular materials, rocks and stone structures</td>
<td>5</td>
</tr>
</tbody>
</table>
ICAR09  Experimental Methods for Structural Mechanics
ICAR08  Fiber Reinforced Materials: Manufacturing, Mechanical Properties, Modelling, Applications

### 6.3.4. DISCIPLINE RELATED SKILLS – Architecture

<table>
<thead>
<tr>
<th>SSD</th>
<th>Name of the Course</th>
<th>ECTS</th>
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</thead>
<tbody>
<tr>
<td>ICAR14</td>
<td>Architects and Engineers at work</td>
<td>5</td>
</tr>
<tr>
<td>ICAR14</td>
<td>Architectural Theory &amp; Design Seminar</td>
<td>5</td>
</tr>
<tr>
<td>ICAR12</td>
<td>Italian architecture and construction from the post-war period to nowadays: Dialogues between inheritance and project</td>
<td>5</td>
</tr>
<tr>
<td>ICAR12</td>
<td>Temporary Architecture, textile technology, Lightweight construction: Speeches on Sustainability and eco-efficiency</td>
<td>5</td>
</tr>
<tr>
<td>ICAR14 / ING-IND11</td>
<td>Cutting-Edge Architecture: creativity and innovation</td>
<td>5</td>
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</tbody>
</table>

### 6.3.5. DISCIPLINE RELATED SKILLS – Construction and Asset Management

<table>
<thead>
<tr>
<th>SSD</th>
<th>Name of the Course</th>
<th>ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICAR12</td>
<td>Real Estate (Re) Process Management and Innovation</td>
<td>5</td>
</tr>
<tr>
<td>ICAR11 / ICAR17</td>
<td>Research in Building Process Management: Towards a Digital and Circular Economy</td>
<td>5</td>
</tr>
<tr>
<td>ICAR12</td>
<td>Future-Proof Design for Infrastructure and Construction: Processes and methods to minimize the risk of inadequate level of service through time</td>
<td>5</td>
</tr>
<tr>
<td>SECS-P/06</td>
<td>Tools and Methods for the Economic Analysis of the Built Environment</td>
<td>5</td>
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### 6.3.6. DISCIPLINE RELATED SKILLS – Heritage conservation and design

<table>
<thead>
<tr>
<th>SSD</th>
<th>Name of the Course</th>
<th>ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICAR06 / ICAR17</td>
<td>Holistic Heritage Building Information Modelling and Built Environment toward XR</td>
<td>5</td>
</tr>
<tr>
<td>ICAR19</td>
<td>The Search of Knowledge: Operational Protocols for Knowledge, Protection and Intervention for the Built</td>
<td>5</td>
</tr>
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</table>

### 6.3.7. DISCIPLINE RELATED SKILLS – Energy Efficient Built Environment

Courses of this section will not be activated during A.Y. 2020-2021, but they will be on the successive A.Y.

This is the list of courses available at the moment of writing these Regulations. New courses may be added later to be already activated during A.Y. 2020-2021.

Other PhD Programmes of the Politecnico PhD School offer other Courses that may be planned in ABC-PhD Candidates R&T Plan, to complete their skills and knowledge: Candidates are invited to check it in advance.

### 6.4 Presentation and approval of the R&T Plan

The Tutor must approve the R&T Plan defined by the Candidate in accordance with the Supervisor, and any change of it, reporting to the Head of PhD-ABC Programme. The approval of Head of PhD-ABC Programme is requested for any activity that will provide additional revenue to the Candidate, either from the Department or from other institutions, or if it is longer than one month. Each change of the R&TPlan for a period longer than three months, as well as any significative change about the research topic, will
require the approval of the Board. R&TPlan approval will be based on:

- The coherence of the planned activities with the assigned Research Topic;
- The achievability of the aims of the Research Topic, first, and the Research Project, once defined, against the amount of available resources;
- The feasibility of the general ABC-PhD Programme Objectives (see Mission and Vision); and
- The conformity of the R&TPlan against the following requirements.

6.5 Instructions for the yearly Evaluation Milestones and other reviews

At the end of each year, the PhD Programme Board will periodically meet each Candidate, in a public (viva voce) Evaluation Milestone (types: Two, Four, Six), in order to monitor her/his advancements, results and plans. The PhD Programme Board may appoint this task to a Committee. The Candidate will be asked to submit:

- The updated R&T Plan (for future activities);
- The updated R&T Report (about active and completed Research and Training tasks); and
- An upgraded copy of Candidate’s scientific outcomes, achieved or delivered in Courses, Research Activities, Scientific Journals or Conferences, or other public activities.

The Candidate’s Supervisor and Tutor, will endorse the R&T Report and submit a synthetic written evaluation of Candidate’s activities.

The Board will give a motivated evaluation of Candidate’s activities and results. If the evaluation is positive (possible scores: A/B/C/D), he will be admitted to the next year. Candidates who do not pass the end-of-year exam are qualified either as “Repeating candidate” (Er) or “not able to carry on with the PhD (Ei)”. In the former case (Er), the Candidates are allowed to repeat the PhD year at most once. The PhD scholarships – if any – are suspended during the repetition year. In the latter case (Ei) the Candidates are excluded from the PhD programme and definitely lose their scholarships – if any. In case the Faculty Board holds appropriate to assign directly an exclusion evaluation (Ei) without a previous repetition year, the request must be properly motivated, and validated by the PhD School.
7. Services and Benefits

7.1 ABC-PhD Office
PhD Office will provide information to Candidates about deadlines to be respected, Courses, Training Programmes, etc. Foreign Candidates are also supported with specific services such as Italian courses, housing, residence permits, the possibility of joining a double PhD course in agreement with foreign Universities. For information write to dottorato-dabc@polimi.it.

7.2 Budget for the research activity
Beginning with the second year, each PhD student is awarded a budget of € 3.068,66 (€ 1.534,33 per each year) for the research activity. This budget can be used, prior authorization, to fund (partially or totally) the participation to external training activities, summer schools, workshops and conferences, to purchase study books or other material related to the PhD research (that will remain to ABC Department at the end of the PhD study period). This budget cannot be normally used in the first year. Rare and motivated exceptions may be granted by the Head of the Board, for example in the case the candidate is invited to give a key-note or an invited paper to an important conference, or he/she has been selected to attend a high-end Summer School on a competitive basis. The presentation of a paper at an international conference is not sufficient to grant such a funding.
Under specific Thematic Scholarships, a higher budget for research activity may be available to afford special needs. In such a case, the use of the budget for research activity during the first year may be allowed.
Anyway, each activity must be preventively authorized by the Head of the ABC-PhD Programme. This occurs also in the case when funding does not come from the ABC-PhD budget.

7.3 Financial aids and benefits
Each year, the Politecnico di Milano opens a call for the assignment of a financial aid for doctoral students who enrol or are going to enrol in a PhD programme, in order to encourage its attendance also by students without or limited financial means. The benefits are awarded through a competition based on an online application form, on the basis of specific financial and merit requirements.
For further information, visit the DIRITTO ALLO STUDIO UNIVERSITARIO (DSU) web page (https://www.polimi.it/en/current-students/tuition-fees-scholarships-and-financial-aid/diritto-allo-studio-universitario-dsu).
The Politecnico di Milano also opens a call for scholarship supplements (for participation in international mobility programmes) for the duration of a stay abroad (usually up to a maximum of 10 months) and for subsidised accommodation in Regional Campuses, for “away-from-home students” and subsidized catering service.
A special care is devoted to:

- Foreign students coming from “developing countries”, who are only requested to certify (through the Italian Representation in the country of origin) that they do not belong to a notoriously high-income, high-social status family;
- Stateless or political refugee students who must attach to their application the official statement certifying her/his stateless situation or status as political refugee as issued by the Italian Ministry of the Interior or by the delegated UN Office; and
- Disabled students, who may be granted, according to the type and level of disability, of individual
Students who have applied or intend to apply for financial aid must ask and give prompt written notice to the Financial Aid and International Mobility Service.

7.4 Laboratories

ABC-PhD promotes experimental research. The ABC-PhD Programme has the experimental support of all the laboratories of Politecnico di Milano. The involvement of these Laboratories will be planned in the Training Programme and organized following the Training Programme needs. The Department, may offer experimental facilities, with the following objectives:

- for testing **entire structures** under static/dynamic/fatigue loads (steel and concrete structures);
- for the investigation of **advanced cement-based composites**;
- for the mechanical testing and technical approval of **textiles**.
- for the investigation of **soil-structure interaction**;
- for the investigation of **fire and blast interaction**;
- for the assessment of **local climate**, weather and weathering conditions;
- for testing the **durability** of building components;
- for the assessment of **radiative properties** of building surfaces and components;
- for the **survey and the diagnosis** of existing building performances and degradation conditions;
- for the evaluation of **acoustic climate, conditions and performances** of the built environment and building components;
- for testing **solar components** (thermal and photovoltaic); and
- 3D printing of construction components, also at 1:1 scale.
### 8. Internationalisation and other activities

#### 8.1 From visiting periods to joint/double supervision and PhD titles

Networking with other researchers is always strongly recommended: at a national as well as an international level. Candidates are also invited to carry out study and research activities at other laboratories or institutions, to be carefully planned in a section of their R&TPlan or in a specific Learning Agreement, agreed by the Supervisor and approved by the Board and the hosting Institution. Moreover, PhD Candidates, as other students from Politecnico di Milano, have the opportunity to spend a period abroad at a European Institution with which has signed a PhD level Erasmus agreement, without additional taxes at the host site. They can also receive an additional economic support, if selected after applying to a competitive call. A similar opportunity for the Candidate is the Erasmus’ Traineeship that allows students to carry out an internship abroad in a company. More information will come as available in the PhD School site and in the Career Service site. The Politecnico di Milano is also always keen to collaborate with other researchers and experts also for the supervision activities, the management and the final evaluation of a PhD Candidate. Other experts may be added to the supervision team and two universities may organize a joint or a double degree (issued by two joint PhD programs or even two separate ones), with an agreement to be approved by the Board, the PhD School and the other Institutions involved. Further information can be found on the PhD School and PhD programme websites.

#### 8.2 ABC PhD OPENTalks

ABCPhD OPENTalks, started in 2016. It is a series of meetings that ABC professors and researcher, if possible with the help of a PhD Candidate (or a "just-doctor"), organize to take to ABC-PhD other researchers, from other foreign or Italian research Institutions, from other Departments of Politecnico di Milano or even in our department, if not already involved in the management of the program. The organization of an OPENTalk follows few rules:

- The OPENTalk is not a conference but a short meeting, centered on one speech (1-2h max, but a series of OPENTalks may be organized!);
- The main focus/objective of the speech of the invited expert is to tell a “research story”: her/his personal experience as researcher (the efforts, the path, the attained success ...) or the research program of her/his research institution;
- At least one PhD Candidate is part of the organization of the OPENTalk, who takes care of the communication before and after the event; and
- Every PhD Candidate will be invited, at the end of the OPENTalk, to expose her/himself to the guest and to tell (in an elevator-pitch-mode talk) the topic, the main aims and the first results of her/his research activity, looking for an interaction with the OPENTalk speaker.

PhD Candidates are invited to propose the organization of OPENTalks, with the help of their Supervisors or Tutors, either to take the occasion of experts visiting the Department or other close institutions, or to enhance their review.
9. Other rules

9.1 Publication policy

The 4th Article of Politecnico di Milano’s Statute encourages full and open access to knowledge, promoting the free circulation and the widest possible dissemination, also in digital format, of teaching, cultural and organizational contents. In addition, the Politecnico di Milano has signed Messina Declaration, transposing the Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities4. This policy allows users to make available their own scientific products in open access mode through the institutional repository “Re.Public”. This repository enhances visibility of the scientific activity of each Researcher and makes valuable and valued the Politecnico of scientific activity for users, partners and customers of Politecnico di Milano enhancing our reputation. Candidates are requested to deposit the work at Politecnico di Milano (in the online catalog UGOV) and encouraged to give consent to its visibility. It will automatically be transferred into the institutional repository and made visible to anyone who looks for.

9.2 Ethical issues

This PhD Programme wants to contribute to develop a culture of institutional integrity and moral responsibility. PhD Candidates are requested to adhere to the recognized ethical practices and fundamental principles defined in National, Regional and University’s Ethical Codes. Candidates are accountable towards their funders, if any, and for the efficient use of taxpayers’ money, if their scholarship is funded by public funds. In any case, they are accountable towards society as a whole, for which their research work must be relevant and their products must not simply duplicate research previously carried out elsewhere.

In compliance with their contractual arrangements, PhD Candidates must disseminate and exploit, also commercially, or make accessible to the public (or both) whenever the opportunity arises, communicating and transferring them, also into other research settings.

They must avoid plagiarism of any kind, respect regulations about Intellectual Property Rights, joint data ownership in the case of research carried out in collaboration with other researchers, and the requirements and conditions of any sponsor or funder, independently of the nature of their contract. Researchers should adhere to these regulations by delivering the required results (e.g., thesis, publications, patents, reports, new products development, etc.) as set out in the terms and conditions of the contract or equivalent document. They must validate new observations by showing that experiments are reproducible. Methods of collection and analysis, the outputs and, where applicable, details of the data should be open to internal and external scrutiny, whenever necessary and as requested by the appropriate authorities.

Researchers should at all times adopt safe working practices, in line with national legislation, including taking the necessary precautions for health and safety and for recovery from information technology disasters, e.g., by preparing proper back-up strategies and by using tools for defending against network informatic attacks. They should also be familiar with the current national legal requirements regarding data protection and confidentiality protection requirements, and undertake the necessary steps to fulfil them at all times.

More in general, also Candidates (as everyone else) has the responsibility to help to ensure a positive work

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3 The text is a short synthesis of Politecnico di Milano’s policy, you can find here.
4 Open access aims the full, free availability of scientific literature, on the internet and no (financial, legal or technical) barriers to its diffusion, except those associated with the access to the web. The publication of “Berlin Declaration” is dated 22 October 2003 and you can find the original version in the MaxPlank site (The Max Planck Society is one of the founders of the international Open Access movement) the linked English page.
environment, in which the respect of personal dignity and integrity is ensured, the value of diversity recognized and intimidating, hostile or humiliating climate is discouraged and bullying prevented. The ABC-PhD programme promotes and support Candidates social and community making activities.

9.3 Intellectual Property Management and Technology Transfer
The Politecnico di Milano, in addition to the development of scientific knowledge, has, among its objectives the enhancement and the valuation of the results of scientific research and the scientific and technological transfer. With this purpose, it promotes creativity and intellectual property of PhD Candidates, as well as of other researchers, students, fellows and contractors, and supports them in the economic exploitation of their ideas.

In accordance with current regulations, when PhD Candidates – as well as any other employee or student – develop an invention during their institutional activity or during independent research activities developed using equipment and facilities of Politecnico, during research activities funded or co-funded by third parties who do not exploit directly or indirectly the results, the Politecnico di Milano is the owner of the economic rights and the protection of the invention is to be considered a duty of all parties, with the help of the competent office for the valorization of Research (TTO - Technology Transfer Office), that must be informed as soon as possible. If the PhD Candidate realizes the invention independently, he is also owner of the economic rights, but he/she should always ask Politecnico di Milano to acquire relevant rights. The details of the rights and duties of the parties are defined in the Regulations on industrial property of the University.

9.4 Candidate’s Document Management
Every document representing the activity of the PhD Candidate as student and early-stage researcher of Politecnico di Milano must be made available to the Board Members, at least for the annual evaluation, using the following naming rule:

MILESTONE DOCUMENTS:
SURNAME NAME NN title of the document (i.e., ROSSI PAOLO 03 Position Report or ROSSI 03 notes)

OTHER DOCUMENTS (papers, reports, course products):
SURNAME NAME YYYY title of the document (i.e.: ROSSI PAOLO 2015 Love in the Romantic Literature)

NN = progressive number of the milestone
YYYY = year of the document

All documents will be uploaded in the Candidate’s personal area.
Attachment A1 – PhD Programme Board – Collegio dei Docenti

1. **Marco Scaioni** - *Head of ABC-PhD*
   (Surveying and mapping - ICAR/06)

2. **Fulvio Re Cecconi** - *Deputy Head*
   (Building Production - ICAR/11)

3. **Valter Carvelli** - *Deputy Head and Delegate for ABC-PhD Training Programme*
   (Structural Mechanics – ICAR/08)

4. **Valeria Natalina Pracchi** - *Deputy Head and Delegate for ABC-PhD Training Programme*
   (Conservation and restoration of architecture - ICAR/19)

5. **Oscar Eugenio Bellini** - *Delegate for Relationships with Industry and Associations*
   (Architecture Technology - ICAR/12)

6. **Francesca Bonfante**
   (Architectural and urban design – ICAR/14)

7. **Federico Bucci**
   (History of architecture – ICAR/18)

8. **Michele Giovanni Caja** - *Delegate for Open Talks*
   (Architectural and urban design – ICAR/14)

9. **Paola Caputo**
   (Building physics and building energy systems – IGN-IND/11)

10. **Andrea Antonio Caragliu** - *Delegate for Milestones Organization*
    (Applied Economics - SECS-P/06)

11. **Sara Cattaneo** - *Delegate for Relationships with Industry and Associations*
    (Structural engineering - ICAR/09)

12. **Pierluigi Colombi** - *Delegate for Open Talks*
    (Structural Mechanics – ICAR/08)

13. **Tommaso D’Antino**
    (Structural engineering - ICAR/09)

14. **Laura Daglio** - *Delegate for Seminar Organization*
    (Architecture Technology - ICAR/12)

15. **Enrico De Angelis** - *Delegate for Public Communication*
    (Architectural engineering - ICAR/10)

16. **Claudio Del Pero** - *Delegate for Relationships with Italian Universities and Research Centres*
    (Building physics and building energy systems – IGN-IND/11)

17. **Valentina Ferretti** - *Delegate for Development of Individual Skills*
    (Real estate appraisal - ICAR/22)

18. **Martina Elena Landsberger**
    (Architectural and urban design – ICAR/14)

19. **Monica Lavagna** - *Delegate for Assessment and Statistical Data Analysis*
    (Architecture Technology - ICAR/12)
20. Laura Elisabetta Malighetti - Delegate for Milestones Organization
(Architectural engineering - ICAR/10)

21. Marzia Morena
(Architecture Technology - ICAR/12)

22. Laura Anna Pezzetti - Delegate for Seminar Organization and Delegate for Relationships with China and Chinese Scholarship Council
(Architectural and urban design – ICAR/14)

23. Corinna Rossi - Delegate for International Relationships
(Egyptology and coptic civilization – L-OR/02)

24. Matteo Ruta
(Building Production - ICAR/11)

25. Andrea Tartaglia
(Architecture Technology - ICAR/12)

26. Nerantzia Tzortzi
(Landscape architecture – ICAR/15)

27. Marco Vincenzo Valente
(Structural engineering - ICAR/09)
Attachment A2 – ABC-PhD Advisory Board

The Advisory Board is consulted – as matter of principle – at the end of every year, for a qualitative assessment of the PhD Programme, for an independent assessment of the results of the Candidates of each cycle, and to receive suggestions for the improvement of its relationship with the society. The next meeting of the Advisory Board is scheduled during Spring Milestones on April 2021. The following highly referenced experts are the members of the ABC-PhD Advisory Board.

<table>
<thead>
<tr>
<th>Teresa Bagnoli</th>
<th>Alessandra Faggian</th>
<th>Mary McNamara</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teresa Bagnoli is graduated in Scienze Politiche Internazionali, specialized in Industrial Policy and local development @LSE and Project Management (1995). She is managing director of the area Building and Constructions Strategic Development of ASTER and Coordinator of the Emilia-Romagna ‘s Construction Platform of High Technology Network, with a long experience of project manager of R&amp;D projects in different areas.</td>
<td>Alessandra Faggian is professor of Applied Economics, Director of Social Sciences and Vice Provost for Research at the international PhD school Gran Sasso Science Institute, L’Aquila, Italy. Moss Madden Memorial Medal (2007) and Geoffrey Hewings Award (2015) she is also President of the North American Regional Science Council (NARSC) and co-editor of the journal Papers in Regional Science with Roberta Capello. In a recent ranking of the top 100 regional scientists in the world (Rickman and Winters, 2016), she was ranked 19th.</td>
<td>Mary McNamara, fellow of the Royal Society of Chemistry and an active researcher in the development of novel drug delivery systems, is Head of the Graduate Research School at Dublin Institute of Technology (the largest provider of higher education in Ireland) and former member (2012-2018) of the steering committee of the Council of Doctoral Education of the European Universities Association (EUA CDE). She is also member of the Irish National Forum on Research Integrity and of the National Advisory Forum for Ireland’s National Framework for Doctoral Education.</td>
</tr>
</tbody>
</table>
Catherine MAUMI, Architect, Doctor (EHESS), HDR (Paris 8) is full Professor (tenure) of History and theories of architecture and urban forms at the Ecole nationale supérieure d'architecture of Grenoble. She is the scientific director of the “Laboratoire de recherche Les Métiers de l'Histoire de l'Architecture, édifices-ville-territoires” (MHAevt) and Doctoral supervisor of the Doctoral School 454: Sciences de l'Homme, du Politique, du territoire, University Grenoble Alpes.

Agnes WEILANDT (MSc in structural engineering @RWTH Aachen and PhD at the Technical University Stuttgart) is project manager at Bollinger + Grohmann Ingenieure since March 2006, involved in many national and international projects, and Professor for structural analysis and construction engineering at the University of Applied Science in Frankfurt, since 2010. Before and also during her time at the Technical University Stuttgart, Agnes Weilandt worked with Werner Sobek Ingenieure in Stuttgart.
Attachment A3 – Figures and responsibilities of ABC-PhD Programme

1. The Candidate
Admitted Applicants, once evaluated, accepted, completed the administrative procedures and registered, become PhD Candidates and carry out full time study and research for three years (four years in the case of “executive” or double-degree programmes).
Candidates are expected to have a proactive approach: in planning and reviewing their research activities with their Supervisors, in their interaction with their Tutor and with their colleagues.

2. The Board of Professors of the PhD Programme (the “Board”)
The Board of Professors of ABC-PhD Programme (see Attachment A1) is currently composed of 27 members from ABC Department. This number may slightly change, including also professors from other research Institutions. The Board and its Head are the governing bodies of the Programme:

- The Board defines the Educational Plan of the PhD programme and is responsible, also from an administrative point-of-view, for the management and execution of every teaching and cultural activity related to it (lessons, seminars, Milestones, project workshops, laboratories and similar). The Board is also responsible for ensuring the widest possible publicity about its activities, within the scientific community, in order to gain the widest confrontation and sharing;
- The Board proposes to the Rector the commissions appointed with the comparative assessment of the candidates for the Access to PhD programmes and the Examining Boards for the Final Assessment and the award of the PhD title;
- Moreover, the Board appoints, with the consent of the Candidate, the Supervisor of her/his PhD Thesis (and authorizes, if requested, the use of a language other than Italian or English) and it approves the proposed Research Topic, the title of the PhD thesis and the Research and Training Plan that will describe how the Candidate will develop it; and
- Eventually, the Board authorizes and recognizes the research and teaching activities of the Candidate in other universities, summer schools and cultural institutions and, at the end of each year, assesses Candidate’s activity, commitment and results, in order to decide whether he/she may continue on to the next academic year or to the final examination, if the Candidate attended the last regular year. The Board, if suggested by the Tutor, may nevertheless review and assess the activity of a Candidate and proposes in any moment of the year.

3. The Head of the Board
The Board selects a coordinator (Head of the Board), in Conformity with Politecnico’s Regulations, in charge of the programme management, supported by the ABC-PhD Office. He represents the Programme in the PhD School Council and, in agreement with the Department’s Head, organises the educational and cultural activities of the project.

4. The Tutor
The Candidate’s Tutor is chosen among the members of the PhD Programme Board, with the double goal of proximity of research topics with the potential candidate and independence from the Candidate’s Supervisor. The Tutor has the following assignments:

- To oversee the Research and Training Plan of the Candidate and to monitor its execution, periodically, in the overall training path;
• To report to the Board about the attainment of Candidate’s objectives and the quality of her/his work;
• To be a friendly point-of-reference for the Candidate to help her/him dealing with problems related to research, training and relationships with others in the university.

The Tutor operates, in agreement with the Supervisor, a periodic review of the Candidate’s plan, work and products, at least during the periodic Milestone meetings. The Tutor will evaluate the Candidate whenever required by the Board or by the same Supervisor and, at least, before the End of the Year Evaluation Milestones. In such occasions, in particular, the Tutor is expected to provide a synthetic written evaluation of the intermediate status of the Candidate’s dissertation, following a proposal of evaluation carried out by the Candidate’s Supervisor.

If requested, needed and opportune, the PhD Programme Board may change the Tutor and assign tutorship responsibility to another Member.

In the case a Tutor ends her/his appointment as member of the Board, the position should be replaced by another effective member of the Board. Exception to this rule may be made when the tutored candidate has already completed the basic three years (or four years in the case of “executive” or double-degree programmes).

5. The Supervisor

Supervisors are responsible to the Board for ensuring that the Candidates’ thesis work is performed and that they commit to comply with the directives of the Board and their PhD Training Programme. They are expected to act as mentors, imparting wisdom and the best principles and sharing knowledge with the Candidate. They support their Candidates in the development of their personal skills and research expertise, encourage the Candidate to attend specific Courses and to take part in selected Research Activities. Moreover, they push their Candidates to find an early confrontation about their research results, i.e., publishing their work or taking part in peer-reviewed international conferences, and to enforce networking with other Candidates and other researchers, in particular at an international level.

The Supervisor is chosen with the Candidate’s consent, is a specialist in Candidate’s Research Topic, may not be a member of the Board and may belong to other Institutions than Politecnico di Milano. One or more co-Supervisors may be appointed, to support the Supervisor with specific competencies and expertise. They commit to complying with the directives of the Board and the Regulations of the PhD Programme.

Supervisors and co-Supervisors are expected to practice a continuous monitoring activity on their Candidates’ work, in order to understand if their plan is followed, if it is to be modified, accelerated or slowed.

At the end of each year, the Supervisor screens the quality of the end-of-the-year output of the Candidate and of her/his whole activity and proficiency. To this aim, the Supervisor drafts an evaluation form which is sent to the Tutor, who is then responsible for carrying out a formal evaluation proposal to be presented to the Board or to the MS Committee.

If requested, needed and opportune, the PhD Programme Board may change the Supervisor and assign this responsibility to another expert, with the Candidate’s consent. The Board may also establish a maximum number of candidates who are under the supervision of the same Supervisor.

6. The Evaluation Committee

The Board may delegate to an Evaluation Committee, that will be made up with at least five experts among which at least three members of the Board (from at least two different SSDs), the task of assessing Candidates during Evaluation Milestones. The Evaluation Committee will report to the Board the results of its assessment, starting from the evaluation proposal of their Tutors.
7. **The Final Examination Committee**
The *Final Examination Committee* is composed of at least three experts, two of which, at least, are “external assessors”, i.e., not part of the ABC Department and, possibly, not a member of the university teaching staff.

8. **The ABC-PhD Office**
The PhD Office, organized by the ABC Department, supports the organization of all the activities of the PhD programme.

9. **The Candidates’ representative**
Following the ABC Department Regulation, Candidates have a representative in the Department Council. Candidates may autonomously elect one or more representatives, i.e., per each Cycle, in order to discuss teaching problems with and to be consulted by the *Board of Professors* and the *Head of the Programme*.

10. **The Research and Training Plan**
The Candidate details and plans her/his activity in the *Research and Training Plan* (*R&T Plan*). It gives evidence of every educational activities that has been planned to let the Candidate reach adequate proficiency in her/his field, master the chosen Research Topic, develop a research-oriented mind-set and a strong communication ability, and realize that significant original research contribution to the knowledge that will be implemented in the PhD Thesis. 
The *R&T Plan* should be prepared by each Candidate during the first year and submitted before Milestone Two.

11. **The Research Project**
The *Research Project* of the Candidate will identify the *reasons* (why), the *drivers* (needs) and the *hypotheses* (constraints) of her/his Research proposal. Moreover it will explain the *methodologies* to be applied, schedule the many research and training activities to be performed, the work packages to be produced and their final *outcomes*, the *skills* and the *resources* needed to produce these outcomes, the *people* to connect with, in order to share and review the results, and, finally, an evaluations of its unsuccess risk.

12. **The Doctoral Courses**
A *Course* is a structured teaching activity, with a stated *training mission* (*knowledge* to be acquired) and a final *learning assessment*. It may focus on *basic issues* (problems, theories, methods) or on the *founding elements of a discipline*, teach specific skills and tools, report a *debate* and *cultural positions*, propose *analytical strategies* and *models*. It may be based on *lectures*, *cooperative learning activities* (laboratory experiments, design projects, group-homework assignments, etc.), *brainstorming workshops* and *discussions*, *case-study analysis* and *role playing* or other lesson plans.
A *Doctoral Course* is characterized by the aim to foster *critical attitude* and *research mind-set* and to represent the state of the art of a specific research field and the evolution of the scientific debate it produces. The product as homework or as classwork) requested by a Doctoral Course to Candidates is, as far as possible, oriented to their PhD Thesis work or to something that could take to the redaction of a scientific paper, a conference presentation or similar. The average 5 ECTS Doctoral Course, with a standard mix of lectures, exercises and other classwork activities, engage the student from a minimum of, about, 30 hours to a maximum of 40 hours. These limits nevertheless are not strictly mandatory.
13. **The Course Catalogue**
The *Course Catalogue* is the sum of all the courses and cultural activities offered and endorsed by the PhD Program, that PhD Candidates may take advantage of, to pursue the aims of their *Research and Training Plan*. On the contrary, with the term “teaching activity” we will refer to activity performed by the Candidate, when authorized.

The main objective of a PhD *Candidate* is the development of an original research contribution. This contribution will be reported in the *Candidate’s* PhD Thesis, written under the guidance of the appointed *Supervisors*. The thesis may report results that the Candidate has already published only if they have been obtained during her/his PhD Programme activities.
Attachment A4 – International, Industrial and Social Relations

Funders and co-supervising partners
The following list the Associations, Research Institutes and private enterprises with which the ABC-PhD Program started a relation to support a scholarship or other formal collaboration:

1. Allubel, an Italian company working in the field of alloy constructive systems.
2. Arcidioesi di Ferrara-Comacchio
3. Assimpredil ANCE, the association of construction companies in Milano, Lodi and Monza-Brianza
4. CNR-ITC (Institute for Construction Technologies) a scientific facility of the National Research Council (CNR) operating in the civil engineering sector.
5. DCR PROGETTI srl, an engineering company in Milano, working in the field of architectural, structural and plant engineering, planning, urban renewal and safety on construction sites.
6. Digitarca srl, an Italian company working in the field of 3D data acquisition, modelling, visualization and fruition.
7. Equilibrium an Italian manufacturer that develops and produces biocomposites materials for the construction industry.
8. European Academy of Bozen/Bolzano (EURAC), an applied research centre organised into four main areas of research: Autonomies, Mountains, Health and Technologies.
9. Federlegno e Arredo, federazione di associazioni di imprese e di artigiani del settore legno e arredo
10. Fondazione Sviluppo Ca’ Granda, the foundation that manages the real estate assets of Ca’ Granda Ospedale Maggiore Policlinico.
11. Fondazione Università di Mantova (UniverMantova), is the foundation that promotes and manages the growth of Mantova’s University System, promoting educational and research initiatives aimed at developing and expectations of the local productive fabric innovation.
12. Garibaldi Costruzioni e Restauri spa, Contractor.
13. Gala Spa, the GALA Group operates in the sector of Electricity, Gas and Energy Efficiency in European and Asian markets.
14. Gewiss Spa, is an international Group of manufacturers in the electrotecnic sector, with approximately 1,600 employees and a presence in 80 countries with 7 production sites.
15. Italcementi spa, the Italian brand in the cement sector, now merging with HeidelbergCement.
16. Jacobs, chemical industry
17. Lombardini 22 Srl is a group dedicated to architecture and engineering, operating in Italy and the Mediterranean.
18. Qatar University, foreign university.
19. Pontificio Istituto di Archeologia Cristiana, istituto universitario dello Stato del Vaticano
20. Pedone Working, contractor
21. Rigamonti Francesco Spa, contractor
22. Secoval Srl, società di gestione servizi della Comunità Montana di Valle Sabbia
23. Società Agricola Marchesina Srl, a group active, since the early 50s, in the agro-livestock sector, in Italy and in France.
24. Université de Grenoble – École National d’Architecture
25. Valsir Spa, a group of plumbing and heating industries with over 2,600 employees located in Italy (Brescia) and many other foreign countries.
25. SUPSI - Scuola universitaria professionale della Svizzera italiana
26. Bollinger + Grohmann Ingenieure
27. INNOVHUB SSI - Stazioni sperimentali per l'industria innovazione e ricerca
28. HidROS

**Other ABC-related institutions**

- Associazione Rete Italiana LCA - Italian network on Life Cycle Assessment
- International Association for Shell Structures (IASS), founded by Eduardo Torroja in 1959, has as its goal the achievement of further progress through an interchange of ideas among all those interested in lightweight structural systems such as lattice, tension, membrane, and shell structures.
- Tensinet
Attachment A5 – Communication and Social Media

See our site, whose purpose is to offer a space for discussion and sharing of ideas, news, events and specific documents available through the world wide web, about issues directly or indirectly related with the research topics of ABC Department, in order to inform Candidates – and to let Candidates inform other Candidates, about any cultural, scientific, social and also occupational opportunity offered to them. Other social network services may be activated, to improve the communication among Candidates and among Candidates and the researchers of ABC Department.