PhD School of Politecnico di Milano

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

Cycle XXXIII

Campus: Milano Leonardo
(approved by the ABC-PhD Faculty Board, July 24th, 2017)
# Index of the ABC-PhD Regulations

PhD School of Politecnico di Milano .................................................................................................................................................. 1
Regulations of the PhD Programme in Architecture, Built Environment and Construction Engineering (ABC-PhD) .............................................. 1
Cycle XXXIII......................................................................................................................................................................................... 1
Index of the ABC-PhD Regulations ............................................................................................................................................................ 2

## 1. General Information

1.1 Executive summary ..................................................................................................................................................................... 4
1.2 The ten pillars and the main organization principles .................................................................................................................. 4
1.3. Scientific Areas, Disciplines and ERC Panel structure reference ............................................................................................... 5

## 2. General Presentation – The ABC-PhD Programme

......................................................................................................................................................................................................................... 7

## 3. Objectives

3.1 ABC-PhD mission ......................................................................................................................................................................... 9
3.2 ABC-PhD Vision .......................................................................................................................................................................... 9

## 4. Professional opportunities and job market

4.1. PhD Statistics ........................................................................................................................................................................... 10
4.2. The ABC PhD Doctor (the holder of an ABC-PhD title) ........................................................................................................... 10
4.3. Actions for PhD Holders .......................................................................................................................................................... 11

## 5. Enrolment in ABC-PhD Programme

5.1. Admission requirements ............................................................................................................................................................ 12
5.2. Admission deadlines and number of vacancies ......................................................................................................................... 12

## 6. Contents of ABC-PhD Programme

6.1. Requirements for the attainment of the title .................................................................................................................................................. 13
6.1.1 The plan of Doctoral activities (R&T Plan) .................................................................................................................................................. 13
6.1.2. The Doctoral Courses and their choice .................................................................................................................................................. 14
6.1.3. Research (and other) activities ...................................................................................................................................................... 15
6.1.4. The External Period .............................................................................................................................................................. 15
6.1.5. The PhD Thesis .............................................................................................................................................................. 15
6.1.6. Other rules and requirements ................................................................................................................................................. 16
6.2. Development and monitoring of Doctoral activities .................................................................................................................. 16
6.2.0. Before the official start .......................................................................................................................................................... 17
6.2.1. MILESTONE ZERO – Tutor and Research Topic ...................................................................................................................... 17
6.2.2. MILESTONE ONE – State of the Art .................................................................................................................................................. 17
6.2.3. MILESTONE TWO – Research Project .................................................................................................................................................. 17
6.2.4. MILESTONE THREE – Research .................................................................................................................................................. 18
6.2.5. MILESTONE FOUR – PhD Thesis Index .................................................................................................................................................. 18
6.2.6. MILESTONE FIVE – First Thesis Draft .................................................................................................................................................. 18
6.2.7. MILESTONE SIX – Final Thesis Draft .................................................................................................................................................. 18
6.2.8. Thesis EVALUATION.......................................................................................................................................................... 19
6.2.9. FINAL MILESTONE – Thesis Defence or Final Exam ............................................................................................................... 19
6.3 Objectives and general framework of the teaching activities ..................................................................................................... 19
6.3.1. RESEARCH and TRANSFERRABLE SKILLS Courses .................................................................................................................. 19
6.3.2. DIGITAL SKILLS Courses ...................................................................................................................................................... 19
6.3.3. DISCIPLINE RELATED SKILLS – Structures .................................................................................................................................................. 20
6.3.4. DISCIPLINE RELATED SKILLS – Architectural and Urban Design .............................................................................................. 20
6.3.5. DISCIPLINE RELATED SKILLS – Construction and Asset Management .......................................................................................... 20
6.3.6. DISCIPLINE RELATED SKILLS – Heritage .................................................................................................................................................. 20
6.3.7. DISCIPLINE RELATED SKILLS – Energy Efficient Built Environment .......................................................................................... 20
6.3.7. DISCIPLINE RELATED SKILLS – Others .................................................................................................................................................. 20
6.4. Presentation and approval of the R&T Plan .................................................................................................................................................. 21
6.5 Instructions for the yearly evaluation and other reviews ............................................................................................................. 21

## 7. Laboratories, PhD Secretariat, other Services

7.1. Laboratories ................................................................................................................................................................................ 23
7.2. PhD Staff ..................................................................................................................................................................................... 23
7.3. Financial aids and benefits ......................................................................................................................................................... 23
7.3. Quality Box ................................................................................................................................................................................ 24

## 8. Internationalisation and other activities

8.1. From visiting periods to joint/double supervision and titles .................................................................................................... 25
8.2. ABC PhD OPENTalks ............................................................................................................................................................. 25

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- pag. 2 di 35 -
9. Other rules ................................................................................................................................. 26
  9.1. Publication policy ....................................................................................................................... 26
  9.2. Ethical issues ............................................................................................................................. 26
  9.3. Intellectual Property Management and Technology Transfer ...................................................... 27
Attachment A1 – PhD Programme Board – Collegio dei Docenti ..................................................... 28
Attachment A2 – ABC-PhD Advisory Board .................................................................................... 29
Attachment A3 – Figures and responsibilities of ABC-PhD Programme .......................................... 30
  1. The Candidate ............................................................................................................................. 30
  2. The Board of Professors of the PhD Programme (the "Board") ..................................................... 30
  3. The Head of the Board ............................................................................................................... 30
  4. The Tutor ..................................................................................................................................... 30
  5. The Supervisor ............................................................................................................................ 31
  6. The Examination Committee ..................................................................................................... 31
  7. The PhD Programme Secretariat ............................................................................................... 31
  8. The Candidates’ representative .................................................................................................. 31
  9. The Research and Training Plan ............................................................................................... 31
 10. The Research Project ............................................................................................................... 32
 11. The Doctoral Courses .............................................................................................................. 32
 12. The Course Catalogue .............................................................................................................. 32
 13. The PhD Thesis ....................................................................................................................... 32
Attachment A4 – International, Industrial and Social Relations .......................................................... 33
  Funders and co-supervising partners ............................................................................................. 33
  Other ABC-related (mainly hosting visiting Candidates) institutions ............................................ 34
Attachment A5 – Communication and Social Media ......................................................................... 35
1. General Information

1.1 Executive summary
We are a new (2012) **Doctoral Program**, 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.
- 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 and management 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);
- the organization of the Production and Industrial System that design, realize, manage and transform them and 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;
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*;
• 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 *transferrable skills courses* and other PhD Programs’ ones. The most important of the Program is the monitoring activity performed by Candidates’ Supervisors, in their daily work, and the periodic, deep reviewing and assessing activity of *Tutors*, *Board Members* and *external Reviewers* during the seven *Main Milestone Meetings*.

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, his/her activity is systematically confronted with every expertise and discipline needed to make his/her 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, also from other Universities, at an international level) is involved and welcome.

Each Candidate is progressively pushed to confront his/her 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.

In many cases, stakeholders are funding the training of the candidate from the beginning, as partial or full sponsor of candidate’s scholarship.

### 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 thirteen different *Disciplines* (in red the reference to the *ERC panel structure code*):

- **Area 08 – Civil engineering and architecture**
  - ICAR/06 – *Surveying and Mapping* (ERC Code PE10_14/SH2_12)
  - 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)
  - ICAR/14 – *Architectural and Urban Design* (ERC Code PE8_3)
  - ICAR/18 – *Architectural History* (ERC Code SH6_6)
  - ICAR/19 – *Architectural Restoration* (ERC Code PE8_3/SH5_7/SH5_8)

- **Area 09 – Industrial and information engineering**

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• ING-IND/11 – Building Physics and Building Energy Systems (ERC Code PE8_6)
• ING-INF/05 – Information processing systems (ERC Code PE6_10/PE6_11)

• 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)

Fig. 1. Share of the Scientific Sectors enriching the ABC-PhD Program.

Websites:  
http://www.polimi.it/phd (PhD School)  
http://www.abc.polimi.it/didattica/dottorato/ (Department)  
https://beep.metid.polimi.it/web/abcphd (Forum, Blog and basic info)  
https://www.facebook.com/groups/ABCPPhD/
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).

ABC-PhD (Dottorato di Ricerca in Architettura, Ingegneria delle Costruzioni e Ambiente Costruito) 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, as merge of the following four PhD Programmes, separately active since the first institution of Dottorato di Ricerca in Italy (1988):

- **Architectural Composition**
- **Building Engineering**
- **Design and Technologies for Cultural Heritage**
- **Technology and Design for Environment and Building**

These four Programmes have been partly joined by a group of researchers from a fifth one: the PhD Programme in Structural Seismic and Geotechnical Engineering. The merge of these Programmes, was not only aiming to reengineer their organization but also to start a new, trans-disciplinary unit, able to face and solve the need for Higher Education, in this extensive sector.

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, and and value in their life cycle. See more [here](#).

   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. Deep Retrofit of energy efficiency and environmental performance of existing buildings (listed and non listed). Sustainable and energy efficient Neighbourhoods, cities and territories. 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 activities about buildings and spaces, architectural forms and behavioral patterns, settlement dynamics and functional aspects, networks, territories and landscapes, in the following four sub-themes: 1) **New Forms of Settlement**; 2) **Public Buildings and Spaces in Cities and Communities**; 3) **Residential Units and Social Housing**; 4) **Architectural History, Theory and Criticism**. 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**

   Investigation about the needs of built heritage preservation, preventive and planned conservation, 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. 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
PhD Programs train for research. 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.
- 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, 2015). Their employment Rate is very high in every scientific sector (in average, >93%) and, although the share of fixed-term employment is low (>40%), such a percentage is growing and a vast majority of all the contracts deals 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%). They work in Research and Academic Institutions (58%), for a first period, while such a share drops from about 2/3 to 1/3 and is expected to decrease further. The other part works in SMEs (16%) or as professional free-lancer (12%), while public institutions or large companies employ only about 6-7% of them.

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 to “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.

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 built environment and the management of its cultural, economic and physical assets, for the planning and management of control activities and the critical assessment of any policy and project concerning built environment and 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 foreign 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.
- 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 university studies of at least five years.

The certified knowledge of the English language is a requirement for admission.

The admission to the programmes will be established according to the evaluation of the candidates’ curricula, motivation letters, and an illustrative report about the development of a possible PhD research, which candidates will send with their application to the Call. An Evaluation Commission will assess 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 computer: the Evaluation Commission may ask the Candidate to answer to some questions, in order to have a better understanding of his/her Research Proposal and his/her real Motivation.

Please refer to the PhD School website for details.

5.2. Admission deadlines and number of vacancies
The number of vacancies is 28 (twenty-eight), as stated in the Call for admission to the 32nd PhD Programmes Cycle. 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
- 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&T Plan
5. Other procedures about yearly evaluations and other review activities

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
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&T Plan, 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
5. Teaching activities

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

6.1.2. The Doctoral Courses and their choice
Candidates are requested to plan a minimum number of Doctoral Courses (30 ECTS\(^2\)), to complete their knowledge about the chosen Research Topic and to refine the skills needed for their PhD Thesis; other Courses are offered to enhance their proficiency in scientific communication, in managing research activities and its conformity with international standards and in other transferable skills. At least 5 ECTS Credits must be acquired attending Doctoral Courses in the PhD School Catalogue.

As the research training of Candidates is mainly obtained through mentored research activities, Doctoral Courses must not exceed the maximum amount of 60 ECTS, in the whole Doctoral Programme.

Every PhD Programmes, in Politecnico di Milano, and in many other Universities and Research Centres, offer Doctoral Courses that can be chosen and proposed as part of the Candidate’s R&T Plan. 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.

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 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.

\(^2\) 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 25-35 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).
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&TPlan (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, workgroups and conferences), in particular, Seminars, Conferences and Workshops organized by ABC Departments (Candidates are expected to be involved in the definition, organization and management of these events, not only in passively taking part of them: see the ABC PhD OPENTalks) or other research groups.
- **Networking and Technology Transfer activities** (encouraged as opportunity for profitable confrontation with the stakeholders of research activity, from the earliest moments).
- **Writing and publishing.**

For what concerns this last topic, 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 good 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.
- 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 Company or other external entities and Universities) with other working groups, as “visiting PhD” or apprentice or equivalent form, is mandatory for a minimum of 15 ECTS-equivalent (three months), to a maximum of 30 ECTS-equivalent period (six months) in order to acquire a deeper insight of Candidate’s research topic. A longer length of this external period is possible up to 18 months, but must be authorized by the PhD Programme Board.

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 and on the ABC-PhD Programme Website.

6.1.5. The PhD Thesis

PhD Candidates are expected to study, take lessons, work hardly 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 “viva voce” (publicly) in front of a committee of experts.

At the end of the third year, after its admission to and before the Final Exam, the Candidate’s Thesis will be reviewed and its original contribution assessed by two external, independent Examiners (Valutatori), before his/her 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 their work 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 his/her 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. Other rules and requirements
PhD Candidates may take part to Teaching activities about subjects closed to their PhD Thesis topics. The Head of the Board may authorize limited teaching activity, as an “extra-work”, out of their R&TPLAN, within the maximum number of teaching hours set by PhD Programme Board. Every number of hours that exceed this maximum must be approved by the Board.

6.2. Development and monitoring of Doctoral activities
The activity of ABC-PhD Candidates will be organized in the following nine 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)
- Evaluation of the PhD Thesis (by at least two, independent, academic experts)
- PhD Thesis defence (final Exam)

The general content of these nine 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 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, chaired by an independent expert chosen – if possible – among Department’s professors, or other experts, who have not working relationships with all the Candidates involved in the meeting. The Chair will have the role of defining the exact schedule of the meeting, promoting the debate among all the participants and creating a confidential written report, about the advancements and the results of their work, the proposed assessments, the advice and suggestions to Candidates, reported to the Board as basis for their assessment.
6.2.0. Before the official start

After registration, each PhD Candidate will receive an institutional (@polimi.it) email address, by Politecnico di Milano and, the Head of the Board will appoint them a tentative Tutor, chosen, if possible, among those members of the Board who were part of the Selection Commission. Before the official start of the 1st year, each Candidate must contact the appointed Tutor, in order to identify the Research Topic and the possible Supervisor, then start working together with this last and define a first version of his/her Research and Training Plan (see section 6.1.5). 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.

6.2.1. MILESTONE ZERO – Tutor and Research Topic

After the official kick-off of their PhD Program and about three month from that date, 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 and Tutor.

6.2.2. 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 his/her work, explaining which advancement (and how) he/she is going to produce.

About eight months after the start of the Program, the Candidate will be invited to submit and to present to the Board the State of the Art (SoA) of the Research Topic under investigation and the related Reference Bibliography.

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 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&T Plan.

6.2.3. 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&T Plan, but they are expected to define their proposal, giving consistency to their objectives, translated in a complete Research Project, that will be presented to a Deep Review Commission. The Board shall take the results of the Deep Review, assess the Candidate’s Research and Training Report and give a synthetic evaluation of Candidate’s activity, commitment and results, deciding his/her admission to the second year (see 6.5).
6.2.4. MILESTONE THREE – Research
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 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 an internal Review Commission that will test their ability in written communication and assess the originality and the scientific relevance of their projects, as well as their feasibility. The Review Commission may be integrated with the analysis done with the Antiplagiarism tools of the Servizio applicazioni bibliotecarie of Politecnico di Milano.
Candidates will report a synthesis of the result of the review process results in a document:

- the results (if any) of the antiplagiarism analysis;
- the notes and the suggestions you received from your reviewers;
- your answer to and the discussion with your reviewers (if any).

6.2.5. 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 Institution (but Candidates may, in theory, take the occasion for such an experience, in earlier or later period).

At the end of their fourth semester, Candidates will present the progress of their research activity in a Deep Review meeting, 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 Deep Review Commission will evaluate it and the research results achieved, reporting to the Board (see 6.5).

The Board shall take the results of the Deep Review, assess the Candidate’s Research and Training Report and give a synthetic evaluation of Candidate’s activity, commitment and results, deciding his/her admission to the third year.

6.2.6. 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 Deep Review Commission will examine and assess the value and the originality of the PhD Thesis, the advancements and the feasibility to complete the PhD thesis. The two External Examiners (“Valutatatori”) are appointed.

6.2.7. 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 Board and, if they have achieved sufficient results, they will be admitted to the final exam (see 6.5). A negative evaluation may either imply a re-enrolment in the same year as a repeating candidate, or the exclusion of the candidate from the programme.

The Board may grant an extension to Candidates who receive a positive final-year evaluation, in order to allow them to conclude their thesis. The Board may grant 6- or 12-months extensions. In exceptional cases 18- or 24-months extensions may be granted, but these require an explicit authorization from the PhD
School. It is also possible to expand the delay, although within the above-mentioned limits, while it is not possible to remove or to shorten any granted extension.

6.2.8. Thesis EVALUATION

In case of positive evaluation, the Candidate is admitted to the Final Exam and his/her thesis is submitted to the External Examiners (Valutatori), for evaluation. If they provide a positive evaluation as well, the defence follows. The Examiners may require some mandatory improvements to be implemented and delay the defence up to 6 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 defence. The defence procedures start only once the extension period expires.

6.2.9. FINAL MILESTONE – Thesis Defence or Final Exam

In the final PhD-Exam, the research work carried out by the Candidate and his/her thesis will be evaluated by the Defence Committee. Such a Committee will consist of three members, at least two of whom do not belong to the Department. Different compositions are allowed in the presence of specific agreements (Double Degree or Jointly supervised candidates) with other research Institutions or PhD Schools. Defence will occur in the six months following the end of the final year or the end of the extended period. In exceptional cases, the Board may establish an earlier date, in the last three months of the final year. The Defence 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 defence date and Candidates must register at least 30 days before the defence and upload their thesis at least 20 days before the defence. Candidate’s Supervisor (or the Coordinator) will approve it at least 15 days before the defence, in order to grant access to the thesis to the Defence Committee.

The positive outcomes of a PhD defence are: PhD granted, 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 is 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 Courses in red are not going to be offered in 2017/18 but in the next year (2018/19).

6.3.1. RESEARCH and TRANSFERRABLE SKILLS Courses

From 2017/18, transferrable skills courses will be mainly offered by the PhD School. Our PhD Program will offer, anyway, a few number of them:

<table>
<thead>
<tr>
<th>SSD</th>
<th>Name of the Course</th>
<th>ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICAR12, BIO07,</td>
<td>1. Sustainability Metrics, Life Cycle Assessment and</td>
<td>5</td>
</tr>
<tr>
<td>INGIND22, ICAR03</td>
<td>Environmental Footprint</td>
<td></td>
</tr>
<tr>
<td>SECSPO6</td>
<td>2. Social and Economic Sustainability Metrics</td>
<td>5</td>
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<tr>
<td>---</td>
<td>3. Scientific writing</td>
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</tbody>
</table>
6.3.2. DIGITAL SKILLS Courses

These courses offer basic and advanced skills tuned up with the specific needs of ABC-PhD Candidates in improving their modelization and automatization capabilities:

<table>
<thead>
<tr>
<th>SSD</th>
<th>Name of the Course</th>
<th>ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>INGINF05</td>
<td>5. Information Technology for Planning, Architectural Design and Built Environment Management</td>
<td>5</td>
</tr>
<tr>
<td>MAT08</td>
<td>7. Numerical Methods for Engineering and Architectural Applications</td>
<td>5</td>
</tr>
<tr>
<td>ICAR12</td>
<td>8. Design Computational Techniques in Architecture</td>
<td>5</td>
</tr>
<tr>
<td>ICAR06/ICAR20</td>
<td>9. Digital Mapping and Spatial Data Analysis</td>
<td>5</td>
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</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>ICAR08/09</td>
<td>10. Composites as Reinforcement for Concrete Structures and Strengthening for Existing Structures</td>
<td>5</td>
</tr>
<tr>
<td>ICAR08/09</td>
<td>11. Non-Linear Behavior of Structures and their Design Principles</td>
<td>5</td>
</tr>
<tr>
<td>ICAR08/09</td>
<td>12. Modelling the Mechanics of Masonry Structures</td>
<td>5</td>
</tr>
<tr>
<td>ICAR08/09</td>
<td>13. Wood as Construction Material</td>
<td>5</td>
</tr>
<tr>
<td>ICAR07</td>
<td>14. Soil Mechanics and Geotechnical Applications</td>
<td>5</td>
</tr>
<tr>
<td>ICAR08/09</td>
<td>15. Steel Structures</td>
<td>5</td>
</tr>
<tr>
<td>ICAR08/09</td>
<td>16. Structural Dynamics for Condition Assessment and Seismic Monitoring</td>
<td>5</td>
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<tr>
<td>ICAR08/09</td>
<td>17. Structural Damage Identification: Measures and Approaches</td>
<td>5</td>
</tr>
<tr>
<td>ICAR08/09</td>
<td>18. Introduction to Solid Mechanics – Nonlinear Continuum Analysis and Discrete Element Approach</td>
<td>5</td>
</tr>
<tr>
<td>ICAR08/09</td>
<td>20. Experimental Methods for Structural Mechanics</td>
<td>5</td>
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</tbody>
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6.3.4. DISCIPLINE RELATED SKILLS – Architectural and Urban Design

<table>
<thead>
<tr>
<th>SSD</th>
<th>Name of the Course</th>
<th>ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICAR12, ICAR14, MED42</td>
<td>22. Complex constructions: architectures for healthcare, production, services and culture</td>
<td>5</td>
</tr>
<tr>
<td>ICAR14-ICAR19</td>
<td>23. Design/Memory/Invention</td>
<td>5</td>
</tr>
<tr>
<td>ICAR14, ICAR15</td>
<td>25. Urban and Cultural Landscape</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>
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<tbody>
<tr>
<td>ICAR22</td>
<td>27. Cost modelling and estimation in construction projects</td>
<td>5</td>
</tr>
<tr>
<td>ICAR11, INGIND17</td>
<td>28. Dealing with Uncertainty in Construction</td>
<td>5</td>
</tr>
<tr>
<td>ICAR12</td>
<td>29. Real Estate Process Management and Innovation</td>
<td>5</td>
</tr>
<tr>
<td>ICAR11</td>
<td>30. Research in Building Process Management</td>
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</tbody>
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6.3.6. **DISCIPLINE RELATED SKILLS – Heritage**

<table>
<thead>
<tr>
<th>SSD</th>
<th>Name of the Course</th>
<th>ECTS</th>
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<tbody>
<tr>
<td>ICAR19/ICAR12</td>
<td>31. Cultural Heritage Conservation and Valorization</td>
<td>5</td>
</tr>
<tr>
<td>ICAR06</td>
<td>32. Cultural Heritage and Built Environment surveying, modelling and monitoring (GIS-BIM based)</td>
<td>5</td>
</tr>
<tr>
<td>ICAR18</td>
<td>33. History of construction techniques in Architectural Treatises and Manuals in the XV-XX centuries</td>
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6.3.7. **DISCIPLINE RELATED SKILLS – Energy Efficient Built Environment**

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<tr>
<th>SSD</th>
<th>Name of the Course</th>
<th>ECTS</th>
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</thead>
<tbody>
<tr>
<td>INGIND11</td>
<td>34. Low carbon districts in urban regeneration processes</td>
<td>5</td>
</tr>
<tr>
<td>ICAR10, INGIND11</td>
<td>35. Heat and Moisture Transport Fundamentals and Applications in Building Envelope Design</td>
<td>5</td>
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</table>

6.3.7. **DISCIPLINE RELATED SKILLS – Others**

<table>
<thead>
<tr>
<th>SSD</th>
<th>Name of the Course</th>
<th>ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICAR05</td>
<td>36. Planning Mobility and Accessibility in Emergency Situations</td>
<td>5</td>
</tr>
</tbody>
</table>

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 the Programme. The approval of the Head of the 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 a month. Each change of the R&T Plan for a period longer than three months, as well as any important change about the research topic, will require the approval of the Board. R&T Plan 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);
• The conformity of the R&TPlan against the following requirements.

6.5 Instructions for the yearly evaluation and other reviews
At the end of each year, the PhD Programme Board will periodically meet each Candidate, in a public (viva voce) meeting, to monitor his/her advancements, results and plans. The PhD Programme Board may appoint this task to a Commission. 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).
• 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 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 (A/B/C/D), he will be admitted to the next year. If the evaluation is negative, the Candidate will be qualified as a “Repeating Candidate” (Er) or “not able to continue with the PhD (Ei)”. The Board may organize meetings with the Candidate, also in addition to the official Milestones, to verify the respect of the program (R&T Plan) and to evaluate the attainment of its general objectives.
7. Laboratories, PhD Secretariat, other Services

7.1. 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.

Moreover, the Department, may offer the following experimental facilities:

- Building Modelling (3d printing and numerical controlled pantographs).
- Characterization of physical properties of building products and components (also in situ).
- Characterization of durability of building products, components and existing structures (with a particular attention to products for conservation and retrofit);
- Whole Building Performance Simulation (energy, mechanical, Environmental Impact (LCA) and others);
- Building Survey (APR with HD cameras) and Survey data analysis;
- Information modelling (BIM, GIS and cartography, CAD 3D).

7.2. PhD Staff

PhD Staff 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 courses in agreement with foreign Universities. Just ask: Arch. Cristina Marchegiani: PhD-abc@polimi.it, phone number. +39.02.2399 2614.

7.3. Financial aids and benefits

Each year, pending the Ministerial update of the ISEE indicators, of the scholarship amount and the of the list of “Developing Countries”, as well as the update of the Regional regulation for the “Diritto allo studio”, 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, to encourage its attendance also by students without or limited means. The benefits are awarded through a competition based on an online application form, based on specific financial and merit requirements.

In 2015-16, the Politecnico di Milano opened a call for 10 scholarships for students enrolled in the first year of PhD and specialisation programmes and 20 for students enrolled in years subsequent to the first. More details are published, each year, in the call, and usually downloadable from here or other pages in Politecnico’s site.

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 subsidised catering service.

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3 The ISEE, “Indicatore della situazione Economica Equivalente” (Equivalent Financial Situation Indicator), is the official indicator for the economic condition of a family group, in Italy. It takes into account income, assets and household characteristics, in order to give a standard measure of its right for benefits and other social or welfare services intended for “low-income” family groups.
A special care is devoted to:

- **Foreign students coming from “poor 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 his/her stateless situation or status as political refugee as issued by the Italian Ministry of the Interior or by the delegated UN Office.
- **Disabled students**, who may be granted, according to the type and level of disability, of individual merit requirements.

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**.

### 7.3. Quality Box

Candidates are invited to give their constructive comments and suggestions if anything may be empowered, better ruled and managed. The **QUALITY BOX** is a thread in the FORUM available in the BEEP site of the Program that accepts also anonymous messages. We will be happy to get your comments.
8. Internationalisation and other activities

8.1. From visiting periods to joint/double supervision and titles.
Networking with other researchers is always strongly recommended: at a local as well as an international level. Candidates are also invited to carry out study and research activities at other laboratories or institutions (from a minimum of few weeks to a maximum of 12 months), 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 every other Politecnico di Milano student, 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 selection. 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 open to other researchers and experts also the supervision activity and the management and the final evaluation of a PhD Candidate. Other experts may be added to the supervision team and the two universities may organize a joint or a double title (issued by two joint PhD programs or even two separate ones) procedure, with an agreement to be approved by the Board, the PhD School and the others 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 ABCPhD other researchers, from other foreign or italian research Institutions, from other Polimi’s Departments 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”: his/her personal experience as researcher (the efforts, the path, the attained success ...) or the research program of his/her 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.
- Every PhD Candidate will be invited, at the end of the OPENTalk, to expose him/herself to the guest and to tell (in an *elevator-pitch*-mode talk) the topic, the main aims and the first results of his/her 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 Humanities. This policy allows users to make available their own scientific products available, open access through the network and Politecnico di Milano to support these choices through the institutional repository “Re.Public”. The institutional, open access, 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 (the search catalog U - GOV) 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 want contribute to develop a culture of institutional integrity and moral responsibility. PhD Candidates are requested to adhere to the recognised ethical practices and fundamental principles defined in National, Regional and Politecnico’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 made 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 Intellectual Property Rights regulations and joint data ownership in the case of research carried out in collaboration with other researchers. the requirements and conditions of any sponsor or funder, independently of the nature of their contract. Researchers should adhere to such 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.

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4 The text is a short synthesis of Politecnico di Milano’s policy, you cand find here.

5 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 MaxPlanck site (The Max Planck Society is one of the founders of the international Open Access movement) the linked English page.
e.g. by preparing proper back-up strategies. 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 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.

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 equipments 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 can always ask Politecnico di Milano to acquire such rights.

The details of the rights and duties of the parties are defined in the Regulations on industrial property of the University.
<table>
<thead>
<tr>
<th>Name</th>
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<tr>
<td>Aste Niccolò</td>
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<td>Brumana Raffaella</td>
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<td>Castiglioni Carlo</td>
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<td>Ciritibnino Angelo</td>
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<td>Loi Maria Cristina</td>
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<td>Masera Gabriele</td>
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<td>Milan Gabriele</td>
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<td>Protasoni Sara</td>
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<td>Scazzosi Lionella</td>
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<td>Talamo Cinzia</td>
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<td>Torricelli Angelo</td>
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The Advisory Board is consulted 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 first meeting of the Advisory Board is scheduled before the end of the first active ABC-PhD Doctoral cycle (29th), in 2016. The following high referenced experts are part of the ABC-PhD Advisory Board.

<table>
<thead>
<tr>
<th>Name</th>
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<tr>
<td>Wim Bakens</td>
<td>Secretariat General, CIB</td>
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<tr>
<td>Niccolò Baldassini</td>
<td>Directeur, RFR Group</td>
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<tr>
<td>Vladimir Bazjanac</td>
<td>Uni Stanford</td>
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<tr>
<td>Pietro Baratono</td>
<td>provveditore LLPP Liguria, Lombardia e Emilia Romagna</td>
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<td>Lorenzo Bellicini</td>
<td>Direttore del CRESME</td>
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<tr>
<td>Federico Butera</td>
<td>ex docente di Fisica Tecnica Ambientale, Politecnico di Milano</td>
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<tr>
<td>Roberto Canobbio</td>
<td>Amministratore delegato Canobbio spa</td>
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<tr>
<td>Gianluigi Coghi</td>
<td>Vicepresidente, con delega “Tecnologia, Innovazione e Ambiente”, ANCE nazionale, Vicepresidente Conindustria Mantova</td>
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<tr>
<td>Luigi Colombo</td>
<td>Direttore Progettazione Infrastrutture TECHINT spa</td>
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<tr>
<td>Angelo Massimo Deldossi</td>
<td>Presidente della Scuola Edile di Brescia, responsabile “Tecnologia, Innovazione e Ambiente” ANCE Lombardia</td>
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<tr>
<td>Mauro Fasano</td>
<td>Regione Lombardia</td>
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<td>Gian Luca Guerrini</td>
<td>Group Innovation Projects Manager in Italcementi</td>
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<tr>
<td>Francesco Karrer</td>
<td>Ex docente di urbanistica dell’Università la Sapienza, ex presidente del Consiglio Superiore dei lavori Pubblici</td>
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<tr>
<td>Maurizio Mauri</td>
<td>Direttore generale Fondazione CERBA – Centro Europeo di Ricerca Biomedica Avanzata</td>
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<tr>
<td>Marijke Mollaert</td>
<td>Docente di ingegneria strutturale, Head of the Department of Architecture, Vrije Universiteit Brussel</td>
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<tr>
<td>Roberto Palumbo</td>
<td>Ex docente di tecnologia dell’architettura, Università la Sapienza, presidente SITdA</td>
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<tr>
<td>Pietro Petraroia</td>
<td>Eupolis, Regione Lombardia</td>
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<tr>
<td>Maurizio Salvi</td>
<td>Responsabile del Settore Engineering e Direzione Operation di Fiera Milano Spa</td>
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<tr>
<td>Piero Torretta</td>
<td>Presidente UNI</td>
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<tr>
<td>Luca Turri</td>
<td>Vicepresidente di Federcostruzioni</td>
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<tr>
<td>Enrico Zara</td>
<td>Energy Strategies &amp; Building Services Team Leader, Arup Italia</td>
</tr>
<tr>
<td>Sergio Zabot</td>
<td>Ex dirigente Provincia di Milano</td>
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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 perform full time study and research for three years.

2. The Board of Professors of the PhD Programme (the “Board”)
The Board of Professors of ABC-PhD Programme (see attachment A) is composed of 28 members, from ABC Department and from other research Institutions. The Board and its Head are the governing bodies of the Programme:

- The Board define 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, project workshops, laboratories and similars). 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 condivision.
- The Board proposes to the Rector the commissions charged with 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, it appoints, with the consent of the Candidate, the Supervisor of his/her 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.
- Eventually, it 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, and assesses Candidate’s activity, commitment and results, in order to decide whether the he/she may continue on to the next academic year or to the final examination, if the Candidate attended the third year. The Board, if suggested by the Tutor, may nevertheless review and assess the activity of a Candidate and propose in any moment of the year and, if this assessment is not positive, may propose with a motivated request to the Rector of Politecnico di Milano, the expulsion of the Candidate from the PhD Programme.

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 PhD Programme Secretariat. 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 Tutor is chosen among the members of the PhD Programme Board, with the following assignments:

- To help the Candidate to identify his/her Research Topic and to find a Supervisor.
- To oversee the Research and Training Plan of the Candidate and to monitor its execution, in the overall training path.
The **Tutor** operates, together with the **Supervisor**, a periodic review of the Candidate’s plan, work and products, at least during the periodic Milestone meetings, and refers to the Board. The **Tutor** will refer to the **Board** about the attainment of **Candidate**’s objectives and the quality of his/her work, whenever needed. Moreover, the **Tutor** will endorse and comment **Candidate**’s periodical written reports. If requested, needed and opportune, the **PhD Programme Board** may change the **Tutor** and assign tutorship responsibility to another **Member**.

### 5. The Supervisor

The Supervisor is responsible to the **Board** for ensuring that the student’s thesis work is performed, and he/she commits to complying with the directives of the Board of Professors and the PhD Training Programme. **Candidate’s Supervisor** is a specialist in **Candidate’s Research Topic** and may be not a member of the **Board** or from Politecnico di Milano and may belong to other Institutions; he may, nevertheless, coincide with the Tutor. One or more **co-Supervisors** may be appointed, to support the Supervisor with specific competencies and expertises. They commit to complying with the directives of the **Board** and the Regulations of the **PhD Programme**.

The **Supervisor** is expected to act as mentor, imparting wisdom and the best principles and sharing knowledge with the Candidate. He/she supports the Candidate in the development of his/her own personal skill and research expertise, encourages the Candidate to attend specific Courses and take part in selected **Research Activities**. Moreover, he/she pushes the Candidate 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 researchers, at an international level.

Supervisor is also expected to practice a continuous (daily) monitoring activity on his/her work, to understand if such a plan is followed, if it is to be modified, accelerated or slowed, alone or as responsible of a Supervising Team, with other **Co-supervisors**.

### 6. The Examination Committee

The Examination Committee is composed of three experts, two of which, at least, are “external assessors”, i.e. not part of the Board of Professors.

### 7. The PhD Programme Secretariat

The PhD Secretariat, organized by the ABC Department, supports the organization of all the activities of the PhD programme.

### 8. 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. one for each Cycle, in order to discuss teaching problems with and to be consulted by the **Board of Professors**.

### 9. The Research and Training Plan

The Candidate details and plans his/her 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 his/her 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.
10. The Research Project
The Research Project of the Candidate will identify the reasons (why), the drivers (needs) and the hypotheses (constraints) of the Research proposal of the candidate. 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 unsucess risk.

11. 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 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 reference minimum of, about, 30 hours to a reference maximum of 40 hours, in class. These limits nevertheless are not mandatory.

12. 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.

13. The PhD Thesis
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 his/her 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. Arcidiocesi di Ferrara-Comacchio
2. Assimpredil ANCE, the association of construction companies in Milano, Lodi and Monza-Brianza
3. CNR-ITC (Institute for Construction Technologies) a scientific facility of the National Research Council (CNR) operating in the civil engineering sector.
4. 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.
5. eFM srl, an engineering company leader in providing integrated solutions for property management.
6. Equilibrium an Italian manufacturer that develops and produces biocomposites materials for the construction industry
7. European Academy of Bozen/Bolzano (EURAC), an applied research centre organised into four main areas of research: Autonomies, Mountains, Health and Technologies.
8. Federlegno e Arredo, federazione di associazioni di imprese e di artigiani del settore legno e arredo
9. Fondazione Sviluppo Ca’ Granda, the foundation that manages the real estate assets of Ca’ Granda Ospedale Maggiore Policlinico.
10. 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.
11. Garibaldi Costruzioni e Restauri spa, Contractor.
12. Gala Spa, the GALA Group operates in the sector of Electricity, Gas and Energy Efficiency in European and Asian markets.
13. 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.
14. Italcementi spa, the Italian brand in the cement sector, now merging with HeidelbergCement.
15. Lombardini 22 Srl is a group dedicated to architecture and engineering, operating in Italy and the Mediterranean.
16. Qatar University, foreign university.
17. Pontificio Istituto di Archeologia Cristiana, istituto universitario dello Stato del Vaticano
18. Pedone Working, contractor
19. Rigamonti Francesco Spa, contractor
20. Secoval Srl, società di gestione servizi della Comunità Montana di Valle Sabbia
21. Società Agricola Marchesina Srl, a group active, since the early 50s, in the agro-livestock sector, in Italy and in France.
22. Université de Grenoble – École National d’Architecture
23. Valsir Spa, a group of plumbing and heating industries with over 2,600 employees located in Italy (Brescia) and many other foreign countries.
24. Viviani Impianti Srl, Contractor.
25. SUPSI – Scuola Universitaria Professionale della Svizzera Italiana
26. B+G Ingenieure Bollinger und Grohmann GmbH
Other ABC-related (mainly hosting visiting Candidates) institutions

1. Cornell University
2. Durham University
3. Eindhoven University
4. ESPE-Paris, école supérieure du professorat et de l’éducation Académie de Paris
5. Carleton University - Toronto
6. Heriot-Watt University
7. International Association for Shell Structures (IASS).
8. Loughborough University
9. Masdar Institute
10. Massport Boston
11. Mit - MediaLab
12. Moscow State University of Civil Engineering
13. NTU Athen
14. RPBW
15. Singapore-ETH Centre for Global Environmental Sustainability (SEC)
16. Tensinet
17. Tokyo University of the Arts Geidai
18. TUDelft
19. TUBerlin
20. UCBerkeley
21. UFBA-Università Federale di Bahia
22. UK Ministry of Justice
23. Universidade Catolica de Brasilia
24. University of California, San Diego
25. University of Florida
26. Universiteit Hasselt
27. University of Houston
28. University of Lahore
29. University of Liverpool
30. Universidade du Minho
31. University of Minnesota
32. Universität Stuttgart
33. University of Sydney
34. University of British Columbia, Vancouver
35. The Warburg Institute, London
36. Xi’an University of Architecture & Technology
37. VTT - Espoo Finland
Attachment A5 – Communication and Social Media

See our site and our official Facebook group, 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.

The group is closed: this means that everyone can see the group and its members, but only subscribers can see the contributions that are published. Consider this before publishing outside of the group any post you will find in the group (if you have doubts ask the administrator of the group).

Candidates will be strongly encouraged but not forced to join this group or to register to Facebook services. The participants to the group, nevertheless, are expected to have a collaborative and sharing approach, in addition to the common sense and good manners, to avoid unlawful or offensive behaviour, commercial or political advertising.

Administrators shall reserve the right to remove posts that violate these policies.

Communication about ABCPhD activities, in fact, will proceed in the following way:

1. A longer post in the ABCPhD BLOG (if the news is not published elsewhere)
2. A general announcement in the Facebook group, together with news coming from all the other sources and other un-formal information.
3. The information about the event in the PhD School newsletter;
4. Eventually, an e-mail to our dottorandi mailing list: Dottorandi-DABC