PhD School - Politecnico di Milano

Regulations of the PhD Programme in:

Preservation of the Architectural Heritage

Cycle XXXV
1. General Information

PhD School - Politecnico di Milano

PhD Programme: **Preservation of the Architectural Heritage**

Course start: November 2019

Location of the PhD Programme: Milano Leonardo

Promoter Department: **Department of Architecture and Urban Studies** (DAStU)

**Scientific Disciplinary Sectors**
- ICAR/19 Conservation and Restoration of Architecture
- ICAR/18 History of Architecture
- ICAR/09 Structural Engineering
- ICAR/08 Structural Mechanics
- ICAR/12 Architectural Technology
- ICAR/22 Real Estate Appraisal
- CHIM/12 Chemistry for Environment and Cultural Heritage
- L-ANT/10 Methods of Archaeological Research

**ERC Sectors**
- SH5_11 Cultural heritage, cultural memory; SH6_12 Historiography, theory and methods of history;
- SH6_1 Archaeology, archaeometry, landscape archaeology; PE8_3 Civil engineering; PE4_17 Characterization methods of materials; PE4_18 Environment Chemistry

PhD School Website: [http://www.polimi.it/phd](http://www.polimi.it/phd)

2. General presentation

The Doctorate Course in “Preservation of the Architectural Heritage” was first held at Milan-based Politecnico back in 1983.

The PhD program focuses the attention to currently crucial themes such as preservation, design and intervention over the built heritage and landscape, developing sustainable uses of natural and man-made resources in different areas of the world. The conservation of Architectural Heritage is, in fact, a strategic field as well as one of the chief resources for worldwide economy and a sustainable future.

The Course reflects one of the main research line carried out within the Department of Architecture and Urban Studies, regarded as excellent in research assessment by Italian Ministry of Education, University and Research (MIUR) for the quality of its research programmes.

The team of professors promoting and participating in the debate underway on a national and international scale will deal with a broad range of issues requiring multi-disciplinary knowledge and
competence. On the strength of a solid, long-standing research tradition, the themes addressed and the methodologies adopted are meant to update contents and tools, the approach to the modern contemporary themes of cultural heritage protection and enhancement. Therefore, the development of pioneering themes and innovative research processes will be encouraged, such as the investigation of the *territorial fragilities*, in abandoned settlements, in archaeological sites, in towns and cities damaged by earthquakes or in conflict areas.

The PhD programme is meant as the place where theorization, methodology, investigation into the most significant chapters of the protection of historic architectural and cultural heritage are connected to complex, challenging operating research themes, on-site and lab experimentation of analytical and diagnostic stages.

The PhD programme, lasting three years, calls for the acquisition of 180 credits overall. Twenty-five credits are acquired through the attendance of courses and the passing of the relative exams, concentrated in the first year of PhD programme.

In particular:
- 15 credits are offered and organized by the PhD programme in Preservation of the Architectural Heritage;
- 10 credits by the PhD School (soft and transferable skills courses).

Further additional credits are aimed at personal study and research for the PhD thesis.

The activities undertaken during the second and third year also include attendance of workshops, seminars, national and international conferences related to individual research, with great attention to conferences wherein PhD candidates present the results, even partial, of their research theses.

To the aim of their thesis research, PhD candidates have the opportunity to rely on facilities and laboratories, both inside and outside the University. The breadth and width of those provides them with a crucial support to the purpose of acquiring “competence for highly qualified research activities” in the domain of cultural heritage protection, such as advanced methods of investigation; knowledge management and preservation processes.

The PhD course is run by a Coordinator and a Faculty Board. The Coordinator chairs the Faculty Board, coordinates the preparation of the annual Educational Programme and organises the general educational activities of the PhD course (see Attachment A1).

The Faculty Board is responsible for the Educational programme and for teaching and administrative activities related to the PhD course (see Attachment A2).

In addition to the professors of the Politecnico di Milano, the Faculty Board includes representatives from other well-known universities and Research Institutes (Università IUAV, Venezia; Università di Genova; Università Napoli Federico II; Università degli Studi di Bergamo; Istituto Superiore per il Restauro e la Conservazione ISCR; ICVBC-CNR, Milano); they actively collaborate in the teaching and research activities.

### 3. Objectives

Aim of PhD course is providing the PhD candidates with a unique training experience in the Italian panorama, so far unparalleled also in domains other than the preservation of the cultural heritage.

In particular, the program of study leading to the doctoral degree is organized to achieve the following aims: to enable students to engage in advanced study and research; to foster original and scholarly research that contributes to enhance knowledge in the field of Preservation of the Built Heritage,
Cultural Patrimony and Landscape; to enable graduates to integrate their professional education and experience with the larger problems of the professions around the field.

The multi-disciplinary nature of the doctoral course benefits from the co-operation with other PhD programmes in the Department DASTU, (this year in particular through the organization of a common workshop on the topic of territorial fragility), in the Politecnico di Milano and with the universities that collaborate with the PhD programme activities.

The tutorial activities will be contributed by professors from prestigious schools of architecture and engineering as well as cultural heritage experts from foremost Italian Institutes. This aspect increases the technical characteristics and makes PhD immediately competitive at the European level. The Faculty Board organization allows to investigate and share extremely relevant topics that describe the broad domain of preservation, a strategic field and, at the same time, one of the chief resources for the future and economy of a Country.

The multi-disciplinarity and the skills of the Faculty Board coverage a series of themes which doctorate students might take up in their thesis work:

a. Historical territory and cultural landscapes: history, protection and suitable use;
   Cultural Heritage in countries in transition: history, landscape and building traditions, protection and restoration;
   Safeguard of “vulnerable territories” through the protection and sustainable management of cultural and environmental heritage;
   Historic centers in the present time: role in the territory, fragility and potentiality;
   Inner Areas: census, conservation and re-use of Architectural Heritage; strategic approaches for the preservation.

b. Identification of particular territorial environments in relation to specific architectural themes and/or settlement systems, from the 18th to the 20th century (for example, holiday resorts and tourism; infrastructures; hydroelectric facilities, etc);
   Relationship between architecture and types of territorial use from the 18th to the 20th century: theoretical reflections;
   The practice and technology of building in modern settlements;
   Building materials from the 18th to the 20th century;
   Architecture and methods of construction: different languages, technologies and products.

c. Preservation, conservation and re-use of pre-20th century architecture. The issue of current re-use as a possible conflict with conservation;
   The restoration site over the past few centuries until today;
   Protection, conservation and re-use of works of twentieth-century architecture;
   Twentieth-century building techniques and techniques of the restoration for such structures;
   The New in the Old: a. the cultural landscapes of the 21st century; b. the history, use and subsequent behavior of walled structures strengthened or partially rebuilt using reinforced concrete.

d. Inventories of cultural heritage, their history and methodologies;
   Energy and historic buildings: the concept of historic climate and cultural heritage;
   Historical systems of heating, lighting, water supply and drainage/waste evacuation in individual buildings and on an urban scale;
   Wooden and masonry structures (carpentry, floors and ceilings, stone or brick vaults);
   Traditional construction techniques and conservation problems;
Materials and finishing of historic buildings: characteristics, production techniques and use as identified in technical literature and by material analysis;
Technical literature on construction: texts and their transmission, treatises, early technical and scientific journals, architectural manuals and journals;
The Archaeology of Buildings: practical issues in archaeological research.

e. Diagnostics and Structural Issues.
Innovative materials and methods for the conservation of architectural surfaces;
Protocols for monitoring the state of preservation of architectural materials;
Innovative methods for the dynamic monitoring of resisting structures (under the effect of environmental noise or specific stimuli);
Critical evaluation of empirical construction technologies developed in the pre-scientific age to meet special needs (in particular, resistance to earthquakes);
Mitigation of the risk of inappropriate and irreversible physical transformations of the built and cultural heritage in seismic or in conflict areas.

f. Cultural Heritage and Economic Evaluation: the economic perspective on Cultural Heritage; the notion of Total Economic Value;
Stated preferences and Revealed preferences methods. How to support decisions about preservation, exploitation and re-use of Cultural Heritage.

4. Professional opportunities and job market
Graduates of the PhD programme have often found employment in public sector and conservation institutions at progressively higher levels, as well as in professional practices and in the business world, in specific specialized fields. PhD candidates from abroad find job in their native countries at University or in Cultural Heritage Institutions.
As regards Italy, the relationship with Italian Ministero per i Beni e le attività culturali, MiBAC, has been definitely fruitful, especially when we consider that many among the best PhDs in Preservation of Architectural Heritage have been hired as officers and executives to the above ministry.
Recently (February 2018) twelve PhD in Preservation of the Architectural Heritage won the competition to become public officers in prestigious seats of the Ministry of Cultural Heritage.

5. Enrolment

5.1 Admission requirements
Italian and International citizens can apply. 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. These titles must be equivalent for duration and content to the Italian one, with an overall duration of university studies of at least five years.
The certified knowledge of the English language is a requirement for admission. Please refer to the PhD School website for details.
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 contextually with their application to the admission
5.2 Admission deadlines and number of vacancies
The number of positions is indicated in the Call for admission to the 35th PhD cycle Programmes: http://www.polimi.it/phd
Scholarships both on general and on specific themes are available, in accordance with what is specified in the call for admission.

6. Contents

6.1 Requirements for the PhD title achievement
The achievement of the PhD title in Preservation of the Architectural Heritage requires a study and research activity of at least three years equivalent of full time study, research and development of PhD thesis.
PhD candidates in Preservation of the Architectural Heritage must earn a minimum of 25 course credits (see paragraph 6.3 below), and to continuously conduct studies and research.
At the beginning of the course, the Faculty Board assigns a tutor to each PhD candidate to supervise and assist him/her in the overall training programme.
The tutor shall be a professor belonging to the Faculty Board. The tutors assist the candidates in the choice of courses to be included in the study plan, which is eventually submitted for approval to the Coordinator of the PhD Programme (see also section 6.4 below).
The Faculty Board may assign extra course credits to one or more candidates, in case they need to complete their preparation in specific topics, relevant for their research projects. Similarly, it may require the PhD student to modify topics and contents in relation to the research project presented in the phase of admission to the PhD programme.

6.2 Research development
The main aim of all Politecnico di Milano PhD programmes is the development in the candidates of a research-oriented mind-set, with expertise and skills in a specific research topic. To this end, candidates develop a problem-solving capability in complex contexts, including the capacity of performing deep problem analysis, identifying original solutions, and evaluating their applicability in practical contexts. These skills provide the PhD candidates with major opportunities of development in their research both in the academic field, and in public and private organizations.
PhD candidates are requested to develop an original research contribution. The PhD thesis must thus contribute to increase the knowledge in the candidate's research field. Besides, it has to be coherent with the research topics developed in the Department where the PhD Programme is carried out.
The original research results are collected in the PhD thesis, where the candidate's contribution is put in perspective with respect to the research state of the art in the specific research field.
The PhD research is developed under the guidance of a supervisor, who supports the candidate in the setting-out and in the everyday activities related to the thesis development. The supervisor is not necessarily a member of the Faculty Board, and may also belong to an institution different from Politecnico di Milano. The supervisor can be supported by one or more co-supervisors.
Further activities intended to develop the candidate's personal skills and research expertise are
encouraged during the PhD path. Candidates must acquire the capability to present and discuss their work in their research community. Consequently, both the participation to international conferences and the publication of the research results in peer-reviewed journals are encouraged. The PhD programme favors the candidates' research interactions with other groups in their research field, preferably abroad. Research visits of at least three months are strongly encouraged, as through them the candidates may acquire further skills to develop their research work and thesis. The duration of the programme is normally three years.

6.3 Objectives and general framework of the teaching activities

The PhD Programmes and the PhD School activate teaching forms of different kind and credit value, including courses, seminars, project workshops, laboratories. Teaching activities both cover the basic research issues (problems, theories, methods), which represent the founding element of the PhD Programme and identify clearly its cultural position, and deepening in a specialist way some research issues connected with the problems developed in the theses. Lessons are usually held in English, except when indicated otherwise. The PhD programme includes at least one complete path delivered in English language. Structured teaching activities allow to earn ECTS credits. Other activities typically specialised and for which it is difficult to evaluate the learning and its quantification, fall within the scientific activities of which the Faculty Board takes into account in the overall evaluation, but they do not allow to earn ECTS.

The PhD School of Politecnico di Milano proposes a set of courses aiming to train the PhD candidates in soft and transferable skills. The skills and abilities provided by these courses are expected to help candidates across different areas of their careers in order to respond to the rapidly evolving needs of the global economy and society at large. The PhD School courses activated for the 2019-2020 Academic Year are summarized in the following link: http://www.dottorato.polimi.it/en/during-your-phd/phd-school-courses

At least 10 of the 25 course credits that each candidate is required to earn shall be obtained through soft and transferable skills courses organized by the PhD School.

Characterizing Courses

In the academic year 2019-2020 the three thematic fields (1. Heritage and landscapes preservation: culture and practice, 2. Methods and themes of historical research; construction history, 3. Science and innovation in diagnostics of materials and structures; rehabilitation of historical buildings) will be organized in the following way:

*Heritage and landscapes preservation: culture and practice. Workshop ‘territorial fragilities’*

Annunziata Maria Oteri (Politecnico di Milano) – 2 credits
Maria Cristina Giambruno (Politecnico di Milano) – 2 credits
Giulio Mirabella Roberti (Università degli Studi di Bergamo) – 1 credit

The course, this year focused on the topic of ‘territorial fragilities’, is oriented to improve students skills in identifying problems and necessary strategies to safeguard the widespread architectural heritage in marginal areas and / or in territories at risk. The organization of the course includes a preliminary investigation on topics and problems proposed
by the teachers as well as a period of preparation of study materials common to the three departmental PhD programmes, which include also ex cathedra lectures by national and international professors and experts.

At the end of the preliminary stages, an intensive design workshop is planned. The course/workshop is scheduled between November 2019-June 2020. In the first part of the course, the students will carry out a preliminary common activity.

Exam - The exam is based on the discussion and evaluation of the material produced during the workshop. The PhD students will be called upon to critically expose the results of the common work, highlighting criticalities and possible developments.

Methods and themes of historical research; construction history. Resilient construction in the XVIIIth and XIXth architectural literature and in the architecture. Critically rethinking the “alternative” building
Alberto Grimoldi (Politecnico di Milano) – 3 credits
Marica Forni (Politecnico di Milano) – 1 credit
Vilma Fasoli (Politecnico di Torino) – 1 credit

The revision, from an experimental scientific standpoint, parallel to the evolution of the sciences, is currently connected to the Encyclopédie of Diderot and d'Alembert, but in reality, it occurs in a large number of publications in almost all European linguistic spaces. The result is also a new treatise, animated by well-known and certainly unique figures but in reality much larger and dedicated to the most consolidated areas of institutions, from engineering schools to military academies. The world of the earth or of wooden construction, and more generally, the understanding of local construction techniques at low cost, include both civil construction ( rural buildings, but also public buildings) and road construction (bridges, roads), which anticipate the "naturalistic engineering" of the nineteenth century.

The course will focus on the lesser known literature and centers of this particular building geography. The course is scheduled between March and May 2020.

Exam: PhD students are asked to write a short report on a topic related to the contents of the course and agreed with the professors responsible of the course.

Science and innovation in diagnostics of materials and structures; rehabilitation of historical buildings.
Masonry quality in the conservation and safeguard of the built heritage
Claudio Chesi (Politecnico di Milano) – 2 credits
Antonio Sansonetti (CNR ICVBC) – 1 credit
Massimiliano Bocciarelli (Politecnico di Milano) – 1 credit
Cristina Tedeschi (Politecnico di Milano) – 1 credit

The need to preserve the architectural heritage is strictly connected to the need to inspect the structural safety standards while identifying, when deemed necessary, suitable upgrade interventions. Due to the peculiarity of the national territory, today's Italian regulations prescribe that global safety be also investigated in relation to seismic events, in addition to the static effects deriving from long-term loads. A variety of analysis tools have been developed and codified through time to the purpose of safety verifications, involving different complexity levels. The course provides a critical view of the different procedures. Studies and analysis have to be extended to materials and methods for conservation works on architectural surfaces: cleaning, surface consolidation and water repellents treatments. Decay mechanisms decrease the surface cohesion; both inorganic and organic products used with the aim to reinforce the surface and near-surface region microstructure, are overviewed. The
course also treats problems dealing with the evaluation of effectiveness and harmfullness of conservation works and their performance monitoring. The course is scheduled between February and April 2020.

Exam: Selection and in-depth analysis of a topic discussed in the course with reference to a case study. The final output will consist of a written report.

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

**First Year**

<table>
<thead>
<tr>
<th>Courses</th>
<th>Possible details or reference to following tables</th>
<th>Number of credits (min-max)</th>
<th>Note</th>
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</thead>
<tbody>
<tr>
<td>PhD School Courses</td>
<td>2 courses among the ones at table B</td>
<td>each course 5 credits</td>
<td></td>
</tr>
<tr>
<td>Courses characterizing the PhD</td>
<td>Heritage and landscapes preservation: culture and practice. <em>Workshop 'territorial fragilities'</em></td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Courses characterizing the PhD</td>
<td>Methods and themes of historical research; construction history. <em>Resilient construction in the XVIIIth and XIXth architectural literature and in the architecture. Critically rethinking the “alternative” building</em></td>
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</table>

In the first year of the course, the PhD students will be required to carry out a **research activity on common themes** within one of the characterizing courses.

**Second and Third year**

In the second and third year, the candidate should be devoted entirely to the research and to the development of the PhD thesis. During the second year, a **period of study abroad** in qualified Research Institutions, chosen in relation with the individual research topic, is **strongly recommended**.
PhD Course List

A) The PhD Programme in Preservation of Architectural Heritage organises the Characterising Courses listed in table A. For the admission to the final exam the acquisition of at least 15 credits in this list is mandatory.

B) The PhD School organises every year general and Interdoctoral courses. The acquisition of at least 10 credits is mandatory among the courses of B type. The list of PhD courses organized by the PhD School is available at the website http://www.dottorato.polimi.it/en/during-your-phd/phd-school-courses

C) Other PhD courses
A maximum of 5 mandatory credits can be obtained by choosing among courses provided by other PhD programmes at Politecnico di Milano and/or external Institutions (in this case the previous approval of the tutor and the coordinator is mandatory).

PREPARATORY COURSES
If the supervisor and the tutor find it useful or necessary that the candidate attends preparatory courses, the Faculty Board of the PhD programme may assign some extra-credits to be acquired to complete the training path. The credits acquired in this way will be considered as additional, in relation to the mandatory credits to be acquired with the PhD courses.
A specific study path will be organized for each PhD candidate that may also attend courses offered by the Scuola di Specializzazione in Beni Architettonici e del Paesaggio, SSBAP [Graduate School in Architectural and Landscape Heritage] in Milan and in Genoa, and, in relation to the various topics of their thesis or courses, from Master degree programs.

SPECIALISTIC COURSES, LONG-TRAINING SEMINARS
The attendance of Specialist Courses, Workshops, Schools and Seminars cycles is strongly encouraged and (if these seminars, workshops are certified and evaluated) may permit to acquire credits according the modalities established by the Faculty Board and previous approval of the study plan submitted by the candidate. These courses and workshops can be inserted in the study plan, even if they are not evaluated (and therefore not qualified as credits), as optional “additional teaching”.

The scheduled course planning for the academic year 2019-2020 follows. Other courses may be activated during the year. In this case, the candidates will be promptly informed and will be allowed to insert these new courses in their study plan.
Table A: PHD COURSES CHARACTERISING THE PHD PROGRAMME

<table>
<thead>
<tr>
<th>SSD</th>
<th>Name of the Course</th>
<th>Professor</th>
<th>A.A./Semester</th>
<th>Language</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICAR/19 ICAR/18</td>
<td>Methods and themes of historical research; construction history. <em>Resilient construction in the XVIIIth and XIXth architectural literature and in the architecture. Critically rethinking the “alternative” building</em></td>
<td>Alberto Grimoldi Marica Forni Vilma Fasoli</td>
<td>2nd</td>
<td>English</td>
<td>5</td>
</tr>
<tr>
<td>ICAR/09 ICAR/08 ICAR/19 CHIM/12</td>
<td>Science and innovation in diagnostics of materials and structures; rehabilitation of historical buildings. <em>Masonry quality in the conservation and safeguard of the built heritage</em></td>
<td>Claudio Chesi Massimiliano Bocciarelli Cristina Tedeschi Antonio Sansonetti</td>
<td>2nd</td>
<td>English</td>
<td>5</td>
</tr>
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Table B SUGGESTED CROSS-SECTORAL COURSES

<table>
<thead>
<tr>
<th>SSD</th>
<th>Name of the Course</th>
<th>Professor</th>
<th>Semester</th>
<th>Language</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Research Skills</td>
<td>D. Sciuto</td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Advanced Interaction Skills for Academic Professional</td>
<td>M. Arnaboldi</td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Scientific Communication in English</td>
<td>P. Biscari</td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Ethics in Research</td>
<td>A. Aliverti</td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Strategic Decision Making</td>
<td>V. Ferretti</td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Epistemology of scientific and technological research “Guido Nardi”.Technology of the future: opportunities and risk</td>
<td>S. Chiodo, A. Campioli. A. Zanelli</td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Resource Planning and Management within Sustainable Development</td>
<td>E. Colombo</td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>English for Academic Communication</td>
<td>P. Biscari</td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Complementary doctoral skills</td>
<td>P. Biscari</td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Approaches to Resilience: Social, Economic, Environmental and Technological Challenges of Contemporary Human Settlements</td>
<td>A. Balducci</td>
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<td></td>
<td>5</td>
</tr>
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</table>
6.4 Presentation of the study plan
PhD candidates must submit a study plan, which may be revised periodically (approximately every three months), in order to adequate them to possible changes in the course list, or to needs motivated by the development of their PhD career. The study plans must be approved by the PhD programme Coordinator, according to the modalities established by the Faculty Board of the PhD Programme itself.

6.5 Yearly evaluations
Candidates present their work to the Faculty Board at least once a year. In particular, the candidates must pass an annual evaluation in order to be admitted to the following PhD year. In addition to the year-end review, PhD candidates can submit the thesis to the Faculty Board 2 times a year. The third year evaluation establishes the candidate's admission to the final PhD defense.

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

In case the Faculty Board holds appropriate to assign directly an exclusion evaluation (Ei) without a previous repetition year, the request must be properly motivated, and validated by the PhD School.

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

6.6 PhD thesis preparation
The main objective of the PhD career is the development of an original research contribute. The PhD thesis is expected to contribute to the advance of the knowledge in the candidate's research field. The PhD study and research work is carried out, full time, during the three years of the PhD course. Stages or study periods in (Italian or International) companies or external Institutions may complete the candidate's preparation.

The resulting theses need to be coherent with the research issues developed in the Department where the PhD programme is developed. The candidate must present an original thesis, discuss its contribution to the state of the art in the research field in the research community.

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

At the conclusion of the PhD studies, the Faculty Board evaluates the candidates. Candidates who receive a positive evaluation submit their theses to two external reviewers for refereeing. If the evaluation provided by the reviewers is positive (o after the revisions required by the external reviewers), the candidates defend their thesis in a final exam, in front of a Committee composed of three members (at least two of which must be external experts).

7. Laboratories, PhD Secretary Services
The Department of Architecture and Urban Studies, provides the PhD students of the Architectural Heritage Preservation Programme with classrooms, at DAStU (PC workstations, desks and wi-fi
Libraries and archives: The PhD candidates can reference publications from the collection “restoration and preservation” available at the DAStU Library: the current DAStU Library originates from gathering the books and reviews coming from the former Library of Architecture and Planning, from the ex Library of Preservation and History and from the collection “Liliana Grassi”.

Scientific laboratories:
- Diagnostics and Investigations on Building Materials Laboratory (DICA);
- LADC Laboratory – Construction Analysis and Diagnostics Laboratory (DAStU);
- TeCMARcH – Techniques for the Conservation and Management of Architectural Heritage (DAStU);
- Interdepartmental Laboratory ‘Climate and Energy for Cultural Heritage’ (CECH);
- Interdepartmental Laboratory Characterization of materials for architecture (MatArch)

In relation to PhD thesis and topics with the agreement of the competent structures, PhD candidates will have access to the following laboratories and libraries:

Università degli Studi in Genoa
Libraries
- Library of the MARS Laboratory – Division of Archaeology of Architecture
- Library Service Centre “Nino Carboneri” of the Faculty of Architecture
- Library of the Institute of History of Material Culture (ISCUM)
Laboratory
- Analytical Methodologies of Restoration and Construction History, MARSC, in the Specialization School of Architectural and Landscape Heritage

Università IUAV in Venice
Libraries
- Library of the History of Architecture
- CIRCE Library and map library
Laboratory
- Seismic hazard laboratory (LARS)
- Ancient materials analysis laboratory (LAMA)

ISCR, Roma
- Libraries and Archives
The PhD candidates have the possibility to access the Library “Adolfo Venturi”, stocked with reference material addressing everyone taking interest in preservation and restoration of the cultural heritage. PhD candidates will also have the opportunity to avail themselves of the Photographic archive of restoration documents, which gathers all the restoration works performed by the Institute.

Scientific laboratories
The PhD candidates will have the opportunity to carry out research by relying on the experimental facilities of four scientific laboratories (chemistry, material tests, biological studies, physics), as well as of the restoration laboratories.

ICVBC-CNR, Milan, Florence, Rome
The candidates can also access to laboratories of ICVBC-CNR to develop research dealing with:
– Characterization of constituent materials in works of art and their forms of alteration/deterioration;
– Experimentation of new technologies and materials for the conservation of cultural heritage;
– Development of innovative criteria for planning and carrying out conservation treatments;
– Development of diagnostic methods for monitoring in order to identify the significant environmental parameters for the protection of Cultural Heritage.

**Doctoral program – secretarial services:**

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*Marilena Mastalli*
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**Doctoral program – administrative services:**

*Arch. Gloria Paoluzzi*
Department of Architecture and Urban Studies
Tel.: 02-2399.5550
e-mail: gloria.paoluzzi@polimi.it

### 8. Internationalisation and inter-sectoriality

Study and research activities in external laboratories are strongly recommended. Politecnico di Milano supports joint PhD paths with International Institutions, as well as Joint and Double PhD programmes. Further information is available on the PhD School website and on the PhD programme website.

More specifically, the PhD programme in Preservation of the Architectural Heritage collaborates with:

- UNIVERSITAT DE VALENCIA – Double Doctorate
- UNIVERSIDAD DE CASTILLA-LA MANCHA - cotutelle agreement;
- UNIVERSITE' PARIS I - PANthéON SORBONNE – stage, co-supervised theses;
- ETS DE ARQUITECTURA DE GRANADA, teaching activities, exchange;
- SCOTTISH CENTRE FOR CONSERVATION STUDIES, UNIVERSITY OF EDINBURGH, stage, co-supervised theses;
- XI’AN JIOTONG UNIVERSITY, exchange for teaching activities;
- ETHZ, Zurich, Switzerland, exchange for teaching activities.

*Other international agreements*

- VIED - Viet Nam Government (31th cycle);
- CSC – Chinese Government (32th cycle, 34th cycle)
- MAECI - Ministero degli Affari Esteri (33th cycle)
Interaction with and exposure to non-academic sectors provides significant benefits to doctoral candidates as well as to research and innovation intensive employment sectors. Direct exposure to the challenges and opportunities in non-academic sectors of the economy and society at large is fostered by networking, connectivity, inter-sectoral mobility and wide access to the knowledge. In particular, the PhD programme in Preservation of the Architectural Heritage collaborates with the following Research Agencies:

CNR – ICVBC, Institute for the Conservation and Valorization of Cultural Heritage; (co-supervised theses, Laboratories;
ISCR, Istituto Superiore per la conservazione e il restauro, Teaching activities.
Attachment A1 – PhD Programme Coordinator

Short CV of Programme Coordinator  
*Mariacristina Giambruno*

architect, PhD in Preservation of Architectural Heritage and graduated in Restoration of Monuments, she teaches at School of Architecture, urban planning, construction engineering and Graduate School in Architectural and Landscape Heritage (Politecnico di Milano).

Member of Faculty board of PhD programme in Architecture, Urban design, Conservation of Housing and Landscape, she is Head of PhD programme in Preservation of Architectural Heritage (Politecnico di Milano) from 2019.

Her teaching and research activity is oriented on history and theory of architectural heritage, conservation of historical heritage, historical centers conservation and management, together with guidelines and management plans to preserve and valorize cultural heritage.

In recent years, she has focused part of her activity in emerging and transition countries, working and directing international projects in collaboration with organizations such as UNESCO, World Bank, AICS in Albania, Iran, Armenia, China, Pakistan, Vietnam. In these countries, she has investigated the role of cultural heritage as “trigger” for sustainable development.

Speaker at conferences in Italy and abroad, she held courses and workshop in Armenia, Vietnam, Iran, Portugal, where she is part of a research unit coordinated by the Lusíada University of Lisbon. She authored about 130 publications on preservation of historic centers and architectural heritage.

Attachment A2 – PhD Faculty Board

Description of the composition of the Faculty Board

<table>
<thead>
<tr>
<th>Name</th>
<th>Affiliation</th>
<th>Scientific Disciplinary Sector</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mariacristina GIAMBRUNO</strong> (coordinator)</td>
<td>Politecnico di Milano, Full professor</td>
<td>ICAR/19</td>
</tr>
<tr>
<td>Carolina DI BIASE</td>
<td>Politecnico di Milano, Full professor</td>
<td>ICAR/19</td>
</tr>
<tr>
<td>Alberto GRIMOLDI</td>
<td>Politecnico di Milano, Full professor</td>
<td>ICAR/19</td>
</tr>
<tr>
<td>Alessandra OPPIO</td>
<td>Politecnico di Milano, Full professor</td>
<td>ICAR/22</td>
</tr>
<tr>
<td>Annunziata Maria OTERI</td>
<td>Politecnico di Milano, Full professor</td>
<td>ICAR/19</td>
</tr>
<tr>
<td>Marco Andrea PISANI</td>
<td>Politecnico di Milano, Full professor</td>
<td>ICAR/09</td>
</tr>
<tr>
<td>Giovanna FRANCO</td>
<td>Università degli studi di Genova, Full professor</td>
<td>ICAR/12</td>
</tr>
<tr>
<td>Giulio MIRABELLA ROBERTI</td>
<td>Università degli studi di Bergamo, Full professor</td>
<td>ICAR/19</td>
</tr>
<tr>
<td>Name</td>
<td>Institution</td>
<td>Title</td>
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</tr>
<tr>
<td>Stefano MUSSO</td>
<td>Università degli studi di Genova,</td>
<td>Full professor</td>
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<tr>
<td>Francesca Lucia Maria ALBANI</td>
<td>Politecnico di Milano,</td>
<td>Associate professor</td>
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<tr>
<td>Alberta CAZZANI</td>
<td>Politecnico di Milano,</td>
<td>Associate professor</td>
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<tr>
<td>Marica FORNI</td>
<td>Politecnico di Milano,</td>
<td>Associate professor</td>
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<tr>
<td>Gianfranco PERTOT</td>
<td>Politecnico di Milano,</td>
<td>Associate professor</td>
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<tr>
<td>Serena PESENTI</td>
<td>Politecnico di Milano,</td>
<td>Associate professor</td>
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<tr>
<td>Massimiliano BOCCIARELLI</td>
<td>Politecnico di Milano,</td>
<td>Associate professor</td>
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<tr>
<td>Cristina T EDESCHI</td>
<td>Politecnico di Milano,</td>
<td>Associate professor</td>
</tr>
<tr>
<td>Paolo FACCIO</td>
<td>Università IUAV di Venezia,</td>
<td>Associate professor</td>
</tr>
<tr>
<td>Giovanni MENNA</td>
<td>Università degli studi di Napoli Federico II,</td>
<td>Associate professor</td>
</tr>
<tr>
<td>Andrea PANI</td>
<td>Università degli studi di Napoli Federico II,</td>
<td>Associate professor</td>
</tr>
<tr>
<td>Antonella E. SAISI</td>
<td>Politecnico di Milano, DABC,</td>
<td>Assistant professor</td>
</tr>
<tr>
<td><strong>non-academic staff</strong></td>
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<tr>
<td>Maurizio BORIANI</td>
<td>Expert (art. 6, c. 4)</td>
<td></td>
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<tr>
<td>Maria Antonietta CRIPPA</td>
<td>Expert (art. 6, c. 4)</td>
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<tr>
<td>Barbara DAVIDDE</td>
<td>Research director ISCR (ex ICR)</td>
<td></td>
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<tr>
<td>Marco REALINI</td>
<td>Lead Researcher ICVBC-CNR</td>
<td></td>
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<tr>
<td>Antonio SANSONETTI</td>
<td>Researcher ICVBC-CNR</td>
<td></td>
</tr>
<tr>
<td>Ornella SELVAFOLTA</td>
<td>Expert (art. 6, c. 4)</td>
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</tbody>
</table>
### Description of the composition of the Advisory Board

<table>
<thead>
<tr>
<th>Name</th>
<th>Affiliation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Giovanna ALESSANDRINI</td>
<td>past Director of Research Centre ICVBC – CNR Unità di Milano “Gino Bozza”</td>
</tr>
<tr>
<td>2. Amedeo BELLINI</td>
<td>Professor Emeritus (Theories and History of Restoration, Politecnico di Milano)</td>
</tr>
<tr>
<td>3. Roberto CAMAGNI</td>
<td>Professor Emeritus (Urban Economy, Politecnico di Milano)</td>
</tr>
<tr>
<td>4. Vassilios COLONAS</td>
<td>Professor of History of Modern Architecture, University of Thessaly (Greece)</td>
</tr>
<tr>
<td>5. Carla DI FRANCESCO</td>
<td>Director Scuola dei beni e delle attività culturali</td>
</tr>
<tr>
<td>6. Javier GALLEGO ROCA</td>
<td>Catedrático de Restauración Arquitectónica, ETSA, Universidad de Granada (Spain)</td>
</tr>
<tr>
<td>7. Franz GRAF</td>
<td>Professor of Construction and Technologies of twentieth-century architecture - Laboratoire Techniques et Sauvegarde de l’Architecture Moderne - TSAM, EPFL Lausanne (Swisse)</td>
</tr>
<tr>
<td>8. Jean Michel LENIAUD</td>
<td>past Director of École nationale des Chartes</td>
</tr>
<tr>
<td>9. Hans-Rudolf MEIER</td>
<td>Professur Denkmalpflege und Baugeschichte, Bauhaus, Weimar</td>
</tr>
<tr>
<td>10. Antonella RANALDI</td>
<td>Soprintendente Archeologia, Belle arti e paesaggio per la città metropolitana di Milano</td>
</tr>
<tr>
<td>11. Bruno REICHLIN</td>
<td>Honorary Professor at University of Geneva; member of the Comité des experts pour l’œuvre architecturale, Fondation Le Corbusier, member of the Commission Nationale des Monuments Historiques (France)</td>
</tr>
<tr>
<td>12. Elizabeth VINTZILEOU</td>
<td>Professor of Mechanics of mansonry, Preservation of historic structures; Techniques for preservation of Historic structures; National Technical University of Athens</td>
</tr>
</tbody>
</table>