PhD School - Politecnico di Milano

Regulations of the PhD Programme in:

Preservation of the Architectural Heritage

Cycle XXXIV
1. General Information

PhD School - Politecnico di Milano

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

Course start: November 2018

Location of the PhD Programme: Milano Leonardo

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

*Scientific Disciplinary Sectors*
- ICAR/19 Architectural Restoration
- ICAR/18 Architectural History
- 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**
PhD Programme Website: **http://www.dottorato.polimi.it/en/phd-programmes/active-phd-programmes/preservation-of-the-architectural-heritage/**

2. General presentation

The Doctorate Course in “Preservation of the Architectural Heritage” was first held at Milan-based Politecnico back in 1983. Today it is about to celebrate the 34th research and education anniversary where overarching attention will be paid to currently crucial themes such as protection, design and intervention over the built heritage and landscape. 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, and, accordingly, foster the development of pioneering themes and innovative research processes, such as the exploration of the territorial fragilities, in abandoned settlements, in archaeological sites, in towns and cities damaged by earthquakes or in conflict areas.

The doctorate course thus becomes 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 and, finally, the visit to conservation work and sites.

The PhD programme, lasting three years, calls for the acquisition of 180 credits overall.

Twenty five credits (minimum) are concentrated in the first year and are divided as follows:
- **15 credits** (minimum) offered and organized by the PhD programme in Preservation of the Architectural Heritage;
- **10 credits** offered by the PhD School (soft and transferable skills courses).

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

Moreover, for each PhD candidate a specific study path will be organized and PhD candidates 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.

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 which provides them with a crucial support to the aim 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 applied to historic traditional buildings, as the ones related to the archaeological sites and remains or to twentieth-century heritage and cultural landscapes.

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).

### 3. Objectives

The program of study leading to the doctoral degree is organized to attain the following objectives:

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.
To reach these objectives, students in the doctoral program work closely with one or more faculty members of the PhD Course. Members of the field and invited experts will also play important roles in student’s academic progress.

The multi-disciplinary nature of the doctoral course benefit from the co-operation with other PhD programmes in the Department DASTU and in the Politecnico di Milano and from the universities that collaborate with the PhD programme activities (University of Genua, Politecnico di Torino, IUAV University Venice, etc.). 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 (ICVBC – CNR, Institute for the Conservation and Valorization of Cultural Heritage of the National Research Council; ISCR, former ICR, Istituto Centrale del Restauro). 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 of the Italian economy and future. Teaching and research activities thereby outline an unprecedented context in the Italian panorama.

Subsequently, there will be coverage of a series of themes which doctorate students might take up in their thesis work:

a) Historical territory and cultural landscapes: history, protection and suitable exploitation.
Cultura Landscapes in countries in transition: history, building traditions, protection and restoration.
Safeguard of “vulnerable territories” through the protection and sustainable management of cultural and environmental heritage.

b) Identification of particular territorial environments in relation to specific architectural themes and/or systems of settlement, 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; building types; specialist know-how; 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 use (or re-use) of pre-20th century architecture; the issue of current exploitation as possibly in conflict with conservation. The restoration site over the past few centuries until today.
Protection, conservation and new exploitation 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 behaviour of walled structures strengthened or partially rebuilt using reinforced concrete.

d) 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.
Inventories of cultural heritage, their history and methodologies.
Wooden and masonry structures (carpentry, floors and ceilings, stone or brick vaults). Historical development and diffusion; traditional construction techniques and conservation problems.
The 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 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 conflict areas.

f) Museums in seismic-risk areas: anti-seismic measures for the protection of museum collections.

g) 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 e il turismo, Mibact, 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, 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. 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 announcement.
5.2 Admission deadlines and number of vacancies
The number of positions is indicated in the Call for admission to the 34th 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.

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 organisations.
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 2018-2019 Academic Year are summarized in the following table

<table>
<thead>
<tr>
<th>Insegnamento</th>
<th>Docente</th>
</tr>
</thead>
<tbody>
<tr>
<td>A - Innovative Teaching Skills</td>
<td>Magli</td>
</tr>
<tr>
<td>A - Research Skills</td>
<td>Sciuto</td>
</tr>
<tr>
<td>A - Scientific Models: Conceptual Foundations and Philosophical Issues</td>
<td>Valente</td>
</tr>
<tr>
<td>A - The Process of Research</td>
<td>Volontè</td>
</tr>
<tr>
<td>C - Advanced Interaction Skills for Academic Professionals</td>
<td>Arnaboldi</td>
</tr>
<tr>
<td>C - Issue Mapping</td>
<td>Ciuccarelli</td>
</tr>
<tr>
<td>C - La diffusione della Ricerca</td>
<td>Paganoni</td>
</tr>
<tr>
<td>C - Professional Communication</td>
<td>Di Blas</td>
</tr>
<tr>
<td>C - Science, Technology, Society, and Wikipedia</td>
<td>Raos</td>
</tr>
<tr>
<td>C - Scientific Communication in English</td>
<td>Biscari</td>
</tr>
<tr>
<td>E - Ethical Aspects of Research on Dual-Use Products</td>
<td>Masarati</td>
</tr>
<tr>
<td>E - Ethics in Research</td>
<td>Aliverti</td>
</tr>
<tr>
<td>E - Sulla Responsabilità della Tecnica</td>
<td>Ossi</td>
</tr>
<tr>
<td>E - Technology and Society</td>
<td>Crabu</td>
</tr>
<tr>
<td>E - The ageing society: a challenge for technological and social innovation</td>
<td>Ranci, Sabatinelli</td>
</tr>
<tr>
<td>I - Industrial Skills</td>
<td>Biscari</td>
</tr>
<tr>
<td>I - Project Management (in Action)</td>
<td>Mancini</td>
</tr>
</tbody>
</table>
At least 10 of the 25 courses that each candidate is required to earn shall be obtained through soft and transferable skills courses organized by the PhD School.

Characterizing Courses

**HERITAGE AND LANDSCAPES PRESERVATION: CULTURE AND PRACTICE**

*Carolina Di Biase* (Politecnico di Milano) – 1 credit  
*Maria Cristina Giambruno* (Politecnico di Milano) – 2 credits, in collaboration with *Maurizio Boriani*  
*Andrea Pane* (University of Naples) – 2 credits

The culture of preservation, in its own right a most important asset in the Italian panorama, evokes the stratification of theoretical directions and practices and mirrors the relationship which institutions, companies and single individuals have gradually built with past architecture and the built environment. Based on the contribution from Italian and foreign scholars, the course is designed to offer significant examples of Italian and international research and experiences while investigating into present topics by focusing on innovative elements, recurring events, headways in methodology, experimentation and technical breakthroughs targeted to dealing with knowledge and the amelioration of the preservation practice.

The next course will cover the following theme:  
**The Territories of Archaeology. Histories of Lands, Seas, Settlements and Cities**

The course is scheduled to take place between late November 2018- February 2019 (1st part);  
February – April 2019 (2nd part)

Exam- Professors in charge of PhD course will prepare a series of questions related to the topics that invited experts will propose in their contributions. PhD candidates will answer writing their responses; their papers will be discussed by professors and PhD students and finally evaluated by the professors.

**METHODS AND THEMES OF HISTORICAL RESEARCH. CONSTRUCTION HISTORY**

*Marica Forni* (Politecnico di Milano) – 3 credits, in collaboration with *Wilma Fasoli* (Politecnico di Torino)  
*Alberto Grimoldi* (Politecnico di Milano) – 2 credits

PhD candidates will deal with historical fields and disciplinary tools – not only architectural, but social and cultural - in order to understand the contributions to building, urban site and landscape knowledge. The cultural heritage – both remote and recent – is strictly connected to the context in which it was produced. The materials and their origins, the techniques to build the individual constructive elements are an essential key for interpreting the same, both as a historical source and in order to identify points of strength and weakness. This point of view is compulsory for those working in preservation of the cultural heritage. The title itself refers to multiple points of view of archaeology of architecture, from the production to the “construction history”, from the material culture to the investigation of buildings, from the movement of practices and people to the diffusion – not yet sufficiently studied – of books and
manuscripts. Also in this case a series of lectures is organized around a monographic theme, by researchers of different linguistic areas, which can introduce PhD candidates to a vast, multicultural history. This history – seen as a path through time and not the research of a supposed progress – is also the concrete tool for the architect over time.

The course will cover the theme:

**Archaeology and History: Issues and Methods over Time**

The course is scheduled to take place between March and May 2019

Exam: PhD students will have to write a short report on a topic related to the content of the course and established in agreement with the professors responsible of the course.

**SCIENCE AND INNOVATION IN DIAGNOSTICS OF MATERIALS AND STRUCTURES. REHABILITATION OF HISTORICAL BUILDINGS**

_Claudio Chesi_ (Politecnico di Milano) – 3 credits

_Antonio Sansonetti_ (CNR ICVBC) – 2 credits, in collaboration with _Marco Realini_ (CNR ICVBC)

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 inspected for the effects of seismic events, in addition to the static effects deriving from long-term loads. To the purpose of safety verifications, a variety of analysis tools have been developed and codified through time, involving different complexity levels. A critical view of the different procedures is given in the course.

Studies and investigations 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. Problems dealing with the evaluation of effectiveness and harmfulness of conservation works and their performance monitoring, are also presented.

The next edition will address the following theme:

**Conservation and Safeguard of the Archaeological Built Heritage**

The course is scheduled to take place between February and April 2019

Exam: Selection and in-depth analysis of one of the topics discussed in the course with reference to a case study; preparation 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>
</tr>
</thead>
<tbody>
<tr>
<td>PhD School Courses</td>
<td>2 courses among the ones at table B</td>
<td>each course 5- max</td>
<td></td>
</tr>
<tr>
<td>Courses characterising the PhD</td>
<td>Heritage and landscape preservation: culture and practice</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>
Programme

<table>
<thead>
<tr>
<th>Courses characterising the PhD Programme</th>
<th>Characterising Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methods and themes of historical research. Construction History</td>
<td>5</td>
</tr>
<tr>
<td>Courses characterising the PhD Programme</td>
<td>Science and innovation in diagnostics of materials and structures. Rehabilitation of historical buildings</td>
</tr>
</tbody>
</table>

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.

PhD Course List

A) The PhD Programme in Preservation of the 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 (chosen among the activated courses at the Politecnico di Milano) 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.

SPECIALISTIC COURSES, LONG-TRAINING SEMINARS
The attendance of Specialist Courses, Workshops, Schools, 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 2018-2019 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 (optional, one or more)</th>
<th>Name of the Course</th>
<th>Professor (optional)</th>
<th>A.A./Semester</th>
<th>Language</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICAR/19</td>
<td>Heritage and landscape preservation: culture and practice</td>
<td>Carolina Di Biase (Politecnico di Milano) coordination Maria Cristina Giambruno (Politecnico di Milano) Andrea Pane (Università degli Studi di Napoli Federico II)</td>
<td>1st and 2nd</td>
<td>English</td>
<td>5 (1+2+2)</td>
</tr>
<tr>
<td>ICAR/19 ICAR/18</td>
<td>Methods and themes of historical research. Construction History</td>
<td>Marica Forni (Politecnico di Milano) coordination Alberto Grimoldi (Politecnico di Milano)</td>
<td>2nd</td>
<td>English</td>
<td>5 (3+2)</td>
</tr>
<tr>
<td>ICARA/09 ICAR/08 CHIM/12</td>
<td>Science and innovation in diagnostics of materials and structures. Rehabilitation of historical buildings</td>
<td>Claudio Chesi (Politecnico di Milano) coordination Antonio Sansonetti (ICVBC-CNR)</td>
<td>2nd</td>
<td>English</td>
<td>5 (3+2)</td>
</tr>
</tbody>
</table>

**Table B SUGGESTED CROSS –SECTORAL COURSES**

<table>
<thead>
<tr>
<th>SSD (optional, one or more)</th>
<th>Name of the Course</th>
<th>Professor (optional)</th>
<th>Semester</th>
<th>Language</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course</td>
<td>Instructor</td>
<td>Credits</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------------------------------------</td>
<td>-------------------</td>
<td>---------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A - Research Skills</td>
<td>Sciuto</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C - Advanced Interaction Skills for Academic Professionals</td>
<td>Arnaboldi</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C - Scientific Communication in English</td>
<td>Biscari</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E - Ethics in Research</td>
<td>Aliverti</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I - Strategic Decision Making</td>
<td>Ferretti</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P - Empowering Imagination</td>
<td>Chiodo,Schiaffonati</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S - Resource Planning and Management within Sustainable Development:</td>
<td>Colombo</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X - Complementary doctoral skills</td>
<td>Biscari</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**6.4 Presentation of the study plan**
PhD candidates must submit a study plan, which may be revised periodically 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. The third year evaluation establishes the candidate's admission to the final PhD defense. As a result of each successful annual evaluation, the candidates receive an evaluation (A/B/C/D). Candidates who do not pass the exam will be qualified as “Repeating candidate” (Er) or “not able to carry on with the PhD (Ei)”. After the final year, candidates who have achieved sufficient results but need more time to draw up their theses, may obtain a prorogation of up to 12 months. In addition to the year-end review, PhD candidates can submit the thesis to the School Board 2 times a 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 (or 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

Politecnico di Milano
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 connection).

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:
Material Test Laboratory – Diagnostics Laboratory section, monitoring and surveys of construction materials and Cultural Heritage
LADC Laboratory – Construction Analysis and Diagnostics Laboratory
Laboratory of Diagnostics for the Preservation and Reuse of Constructions
Interdepartmental Laboratory ‘Climate and Energy for Cultural Heritage’ (CECH).

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
Library of the History of Architecture, Biblioteca Centrale di Ateneo, Tolentini, CIRCE Library and map library
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:**

Dott.ssa Marina Bonaventura  
Architecture and Urban Studies Department  
Tel.: 02-2399.5165 - Fax: 02-2399.5435  
e-mail: marina.bonaventura@polimi.it

Marilena Mastalli  
Architecture and Urban Studies Department  
Tel.: 02-2399.5405 - Fax: 02-2399.5435  
e-mail: marilena.mastalli@polimi.it

**Doctoral program – administrative services:**

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

8. Internationalisation and inter-sectoriality

Carrying out study and research activities at external laboratories is 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 VALÈNCIA** – Double Doctorate
- **NATIONAL TECHNICAL UNIVERSITY OF ATHENS - N.T.U.A.** – stage, co-supervised theses
- **ECOLE NATIONALE SUPERIEURE D'ARCHITECTURE DE PARIS LA VILLETTE – ENSAPLV** - Erasmus
- **UNIVERSIDAD DE CASTILLA-LA MANCHA** - cotutelle agreement
- UNIVERSITE PARIS I - PANTHEON SORBONNE – stage, co-supervised theses
- FACULDADE DE ARQUITECTURA DA UNIVERSIDADE DO PORTO – teaching activities exchange
- TU DELFT – IDEA League Student Grants, 2017-18

Other International agreements:
CSC - Chinese Government: (30th cycle, 32nd cycle)
VIED - Viet Nam Goverment: (31st cycle)
MAECI – Ministero Affari Esteri (33rd 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 knowledge. In particular, the PhD programme in Preservation of the architectural Heritages collaborates with the following Research Agencies:

CNR - Cultural Heritage – co-supervised theses
ISCR, Istituto Superiore per la Conservazione e il Restauro, ex ICR – teaching activities.
Attachment A1 – PhD Programme Coordinator

Short CV of Programme Coordinator
Carolina di Biase.
She sits in the Board of the Doctorate School and in the Scientific Board of DASTU.
Head of the Ph.D. course “Preservation of the Architectural Heritage” since 2010, on behalf of the Doctorate School of the Politecnico di Milano, she has organized inter-doctorate courses contributed by internationally acclaimed scholars (2011 – 2014). She has also organized the International Conference “European Schools in the Teaching of Restoration. The 150th Anniversary of the Foundation of School of Applied Civil Architecture at the Politecnico di Milano”, Milano 27-28 November 2014.
She is member of a number International scientific committees organizing Conferences (ReUSO, Valencia, Granada 2017; AID Monuments, Perugia 2014, 2016; ACI Italy Chapter, Bologna 2015, Moscow 2018, etc.) and many others.
Professor at several Italian School of Architecture (courses held at IUAV, Venice; Naples “Federico II”), she has held lectures and seminars in the frame of Ph.D. and other specialized courses in Italy and abroad (Spain, Portugal, Switzerland, China).
Has designed and headed restoration projects of historic public buildings.
She is the series editor of “Ricerche sul restauro e la conservazione”, published by Maggioli (Sant’Arcangelo di Romagna), member of the editorial board of «Loggia, Arquitectura & Restauración», and member of different series of books. She is author of a great many articles, papers and essays in volumes of national and international resonance.

Attachment A2 – PhD Faculty Board

Description of the composition of the Faculty Board

<table>
<thead>
<tr>
<th>Name</th>
<th>Affiliation</th>
<th>Scientific Sector</th>
<th>Disciplinary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carolina DI BIASE (head)</td>
<td>Politecnico di Milano,</td>
<td>ICAR / 19</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Full professor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Claudio CHESI (vice head)</td>
<td>Politecnico di Milano,</td>
<td>ICAR / 09</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Full professor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Susanna CACCIA GHERARDINI</td>
<td>Università di Firenze,</td>
<td>ICAR / 19</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Full professor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Name</td>
<td>Institution</td>
<td>Role</td>
<td>ICAR Code</td>
</tr>
<tr>
<td>-------------------------</td>
<td>--------------------------------------</td>
<td>-----------------------------</td>
<td>-----------</td>
</tr>
<tr>
<td>Vilma FASOLI</td>
<td>Politecnico di Torino, Full professore</td>
<td></td>
<td>ICAR / 18</td>
</tr>
<tr>
<td>Giovanna FRANCO</td>
<td>Università di Genova, Full professor</td>
<td></td>
<td>ICAR / 12</td>
</tr>
<tr>
<td>Alberto GRIMOLDI</td>
<td>Politecnico di Milano, Full professor</td>
<td></td>
<td>ICAR / 19</td>
</tr>
<tr>
<td>Giulio MIRABELLA ROBERTI</td>
<td>Università di Bergamo, Full Professor</td>
<td></td>
<td>ICAR/19</td>
</tr>
<tr>
<td>Stefano F. MUSSO</td>
<td>Università di Genova, Full professor</td>
<td></td>
<td>ICAR / 19</td>
</tr>
<tr>
<td>Alessandra OPPIO</td>
<td>Politecnico di Milano, Full professor</td>
<td></td>
<td>ICAR / 22</td>
</tr>
<tr>
<td>Marco Andrea PISANI</td>
<td>Politecnico di Milano, Full professor</td>
<td></td>
<td>ICAR/.09</td>
</tr>
<tr>
<td>Francesca ALBANI</td>
<td>Politecnico di Milano, Associate professor</td>
<td></td>
<td>ICAR / 19</td>
</tr>
<tr>
<td>Massimo BOCCIARELLI</td>
<td>Politecnico di Milano, Associate professor</td>
<td></td>
<td>ICAR / 08</td>
</tr>
<tr>
<td>Alberta CAZZANI</td>
<td>Politecnico di Milano, Associate professor</td>
<td></td>
<td>ICAR / 19</td>
</tr>
<tr>
<td>Paolo FACCIO</td>
<td>Università IUAV Venezia, Associate professor</td>
<td></td>
<td>ICAR / 19</td>
</tr>
<tr>
<td>Marica FORNI</td>
<td>Politecnico di Milano, Associate professor</td>
<td></td>
<td>ICAR / 18</td>
</tr>
<tr>
<td>Andrea PANÉ</td>
<td>Università degli Studi di Napoli Federico II, Associate professor</td>
<td></td>
<td>ICAR / 19</td>
</tr>
<tr>
<td>Serena PESENTI</td>
<td>Politecnico di Milano, Associate professor</td>
<td></td>
<td>ICAR / 19</td>
</tr>
</tbody>
</table>
### Members of the Board of Professors (non-academic staff)

<table>
<thead>
<tr>
<th>Name</th>
<th>Affiliation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maurizio BORIANI</td>
<td>Expert (art. 6, c. 4)</td>
</tr>
<tr>
<td>Maria Antonietta CRIPPA</td>
<td>Expert (art. 6, c. 4)</td>
</tr>
<tr>
<td>Barbara DAVIDDE</td>
<td>Research director ISCR (ex ICR)</td>
</tr>
<tr>
<td>Marco REALINI</td>
<td>Lead researcher ICVBC-CNR</td>
</tr>
<tr>
<td>Antonio SANSONETTI</td>
<td>Researcher ICVBC-CNR</td>
</tr>
<tr>
<td>Ornella SELVAFOLTA</td>
<td>Expert (art. 6, c. 4)</td>
</tr>
</tbody>
</table>

### Attachment A3 – PhD Advisory Board

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. Francisco BARATA FERNANDES</td>
<td>Professor in charge of the Curso de Estudos Avançados em Património Arquitectónico - FAUP - Universidade do Porto</td>
</tr>
<tr>
<td>3. Amedeo BELLINI</td>
<td>Professor Emeritus (Theories and History of Restoration, Politecnico di Milano)</td>
</tr>
<tr>
<td>4. Caterina BON VALSASSINA</td>
<td>Direttore Generale MIBACT (Ministry of Cultural Heritage)</td>
</tr>
<tr>
<td>5. Vassilios COLONAS</td>
<td>Professor of History of Modern Architecture, University of Thessaly (Greece)</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</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>----------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>8.</td>
<td>Hans-Rudolf MEIER</td>
</tr>
<tr>
<td></td>
<td>Professur fuer Denkmalpflege und Baugeschichte, Bauhaus-Universitaet Weimar (Germany)</td>
</tr>
<tr>
<td>9.</td>
<td>Antonella Ranaldi</td>
</tr>
<tr>
<td></td>
<td>Superintendent, Archaeology, Fine Arts and Landscape for the Metropolitan City of Milan</td>
</tr>
<tr>
<td>10.</td>
<td>Bruno REICHLIN</td>
</tr>
<tr>
<td></td>
<td>Honorary Professor at University of Geneva where he has been responsible of the Third Cycle Degree (post-</td>
</tr>
<tr>
<td></td>
<td>graduate studies) entitled <em>Sauvegarde du patrimoine bâti</em> (Preservation of the Built Heritage), member</td>
</tr>
<tr>
<td></td>
<td>of the Comité des experts pour l’oeuvre architecturale, Fondation Le Corbusier, member of the Commission</td>
</tr>
<tr>
<td></td>
<td>Nationale des Monuments Historiques (France)</td>
</tr>
</tbody>
</table>