



POLITECNICO
MILANO 1863

SCHOOL OF ARCHITECTURE URBAN PLANNING CONSTRUCTION ENGINEERING

DEGREE PROGRAMMES

2016-2021

School of Architecture, Urban Planning, Construction Engineering
Politecnico di Milano
via Ampère 2 - 20123 Milano
www.auic.polimi.it

**DEGREE PROGRAMMES
2016-2021**

È stato fatto ogni sforzo per risalire ai titolari dei diritti d'autore e per ottenere il loro permesso per l'uso di materiale protetto da diritti d'autore inclusi estratti antologici, citazioni e riproduzioni grafiche, cartografiche e fotografiche utilizzate in questo volume. L'editore è a disposizione degli aventi diritto ai quali non è stato possibile risalire oltre che per eventuali omissioni e/o errori di attribuzione indesiderati nei riferimenti.

L'opera, in ogni sua parte, è tutelata dalla legge sui diritti d'autore. Sono vietate e sanzionate (se non espressamente autorizzate) la riproduzione in ogni modo e forma e la comunicazione anche a mezzo di canali digitali interattivi e con qualsiasi modalità attualmente nota o in futuro sviluppata.



POLITECNICO
MILANO 1863

SCHOOL OF ARCHITECTURE URBAN PLANNING CONSTRUCTION ENGINEERING

DEGREE PROGRAMMES

2016-2021

TABLE OF CONTENTS

The auic school: the consolidation of a cultural and educational project - Ilaria Valente	06
Prospects for training new architects, urban planners, landscape architects and construction engineers - Andrea Campioli	08
Building and construction engineering	14
Architectural design	28
Urban planning: cities, environments & landscapes	44
Architectural Design and History Progettazione Architettonica e Storia	60
Architettura - Ambiente Costruito - Interni Architecture - Built Environment - Interiors	72
Architecture - Building architecture	84
Architettura e Disegno Urbano Architecture and Urban Design	96
Building and Architectural Engineering	108
Building systems engineering	120
Building engineering/architecture	132
Landscape Architecture. Land Landscape Heritage	144
Management of Built Environment Gestione del Costruito	156
Sustainable Architecture and Landscape Design Architettura Sostenibile e Progetto del Paesaggio	168
Urban Planning and Policy Design Pianificazione Urbana e Politiche Territoriali	180
Exhibitions and events	192

THE AUIC SCHOOL: THE CONSOLIDATION OF A CULTURAL AND EDUCATIONAL PROJECT

*Ilaria Valente,
Dean of the AUIC School from 2016 to 2021*

The cultural project offered by the School of Architecture Urban Planning Construction Engineering (AUIC) is an important opportunity for comparison and growth in teaching in the fields of architecture, urban planning and construction engineering.

In 2016, the AUIC School was re-established based on previous teaching experiences gained within the School of Architecture and Society, the School of Civil Architecture and the School of Building Engineering-Architecture at the Politecnico di Milano.

The re-establishment project was based on the tradition of the Milanese School of Architecture, which opened in 1865 as a 'section for civil architects' at the Royal High Technical Institute of Milan, and combined the artistic disciplines of the Brera Academy with the technical-scientific disciplines of the Royal Institute. The polytechnic tradition, the rich heritage of the masters and strong roots in the Milanese and international context form the basis on which the School of Architecture Urban Planning Construction Engineering paved the way for its renewal.

The School of Architecture Urban Planning Construction Engineering's cultural and educational project pursues the primary objective of training 'graduates competent in the specific field of design and construction, capable of dealing responsibly with the problems that reality poses at various levels and on different themes: from buildings to internal spaces, from the city to the region, landscape, and cultural heritage'; secondly, it aims to nurture the centrality of the project, 'understood, in its entirety, as a synthesis of multiple areas of expertise' and its relationship between this practice and the founding principles of polytechnic culture, to 'train graduates capable of bringing unity to the various disciplines, who responsibly take part in projects for the transformation of the physical environment'; thirdly, it aims to revitalise the School as a 'place for the production and transfer of knowledge, in line with the cultural advancement development role that belong to the University [...] as point of reference for a process of profound change which requires important contributions both in terms of defining new professional roles and in terms of innovative processes capable of restoring competitiveness, while also marking a turning point for the quality of the future habitat'.

The underlying objective is to give the AUIC School a precise place and character within the country's university system, combining the solid tradition

of Italian schools of architecture with profoundly innovative experiences, identifying a precise and particular space between European and international polytechnic schools.

Today, this project takes the form of three laurea (equivalent to Bachelor of Science) programmes: Architectural Design (Milan, Mantua, Piacenza), Urban Planning: Cities, Environment & Landscapes (Milan) and Building and Construction Engineering (Milan); a five-year single-cycle degree programme in Building Engineering / Architecture (Lecco); and a wider range of laurea magistrale (equivalent to Master of Science) programmes that offer an initial thematic development of the educational experience gained in the three-year courses, providing opportunities for in-depth study that can also be recognised by students from other universities: Architettura e Disegno Urbano/Architecture and Urban Design (Milan); Architettura - Ambiente Costruito - Interni/Architecture - Built Environment - Interiors (Milan); Architettura- Architettura delle Costruzioni/Architecture - Building Architecture (Milan), Management of Built Environment (Milan); Sustainable Architecture and Landscape Design (Piacenza), Architectural Design and History (Mantua), Urban Planning and Policy Design (Milan), Landscape Architecture - Land Landscape Heritage (Milan), Building Systems Engineering (Milan), Building and Architectural Engineering (Milan, Lecco).

Within this framework, it is necessary to continue to nurture an in-depth reflection on the role and revitalisation of the architect, the urban planner, the construction engineer and the landscape architect as designers who will be called upon to deal with the current highly-accelerated dynamics of change in the profession and the labour market, both nationally and internationally.

We are facing a high level of fragmentation and specialisation of skills and the progressive modification of work tools due to digitalisation and acceleration characterised by the development of intangible communication networks, which also has important consequences for the spatial reorganisation of cities and regions. The School has a duty to continuously review its training courses, so that the degree programmes are able to train young architects, urban planners, engineers and technicians in the construction sector and landscape architects who have a solid grounding in the principles and tools acquired, are open and creative, capable of facing the challenges of the future in terms of design and endowed with a strong capacity to critique, enabling them to face the profession with critical thinking, ethics and responsibility in a rapidly changing world. This appears all the more urgent in the light of the global crises we are going through: the emergency brought about by the pandemic has confronted us with new ways of approaching teaching through digital tools, but above all, with challenges to be overcome in terms of how we live and organise urban spaces and settlements. The climate emergency is necessitating a search for solutions and a refinement of skills for the protection and sustainability of the built environment.

In a country like Italy, which now appears to be entirely and widely built-up, where situations of environmental and hydrogeological risk are multiplying, where the limiting of land consumption and the protection of the architectural, artistic and landscape heritage are priorities, only the reconstruction of a design culture and an educated and conscious professional class can make a positive contribution to the qualitative development of our regions.

PROSPECTS FOR TRAINING NEW ARCHITECTS, URBAN PLANNERS, LANDSCAPE ARCHITECTS AND CONSTRUCTION ENGINEERS

*Andrea Campioli,
Dean of the AUIC School since 2022*

The first six years of the School of Architecture Urban Planning Construction Engineering were marked by the consolidation of an ambitious cultural project, unique in the country, based on an attempt to integrate areas of training that traditionally fall within the separate fields of architecture, urban planning, landscaping and construction engineering. It was a reform project developed within a context which, in terms of knowledge, was beginning to understand the centrality of environmental sustainability and digitisation, already widely practised elsewhere, while the labour market in the construction and public administration sectors was suffering a widespread, profound and prolonged crisis and the relative training opportunities were experiencing a progressive decline in terms of the attractiveness of what these sectors – the natural employment opportunities for graduates of the School – could offer.

In that context, we were able to build a visionary project, deeply rooted in the polytechnic culture, based on the pursuit a careful balance between the technical and cultural dimension of design practice and the processes of transforming the built environment, in which the different working traditions of the Schools of Architecture and the School of Building Engineering and Architecture have found fertile ground for useful comparison and collaboration.

Today, by confirming the strength of the cultural project, the surrounding conditions allow us to look with renewed optimism at the usefulness of our training whilst also endeavouring to proactively adapt to the challenges that must be faced.

Training in the field of construction is now called upon to deal with a reference scenario in which certain imperatives, precisely in the context of the transformation processes of the built environment, take on decisive importance: mitigating anthropic impacts on the planet, adapting to contexts strongly affected by climate change, and digitalisation. These are imperatives that have long been present on political agendas at all levels but which today, when actions capable of producing effective responses are urgently required, are leading to a general revival of the sector and a widespread demand for skills that have long been neglected.

Ecological transition and digitisation are therefore the starting point for defining the School's cultural and educational project, where these issues require very

specific technical expertise and a continuous updating of tools that are not always at the core of university training courses.

At the same time, in the transformation processes of the built environment, those medium and large design and management structures, able to offer clients a wide range of skills that are appropriate for the complexity and growing size of operations, are particularly competitive. Within these structures, the required skills and abilities are different from those acquired through traditional teaching, and great effort must be made to update this, not so much, nor only, in the disciplinary design of the study programmes but also, and above all, in the content and teaching methods of the individual courses.

With regard to ecological transition, an attitude that frees the discussion of environmental sustainability from the ambiguity and indeterminacy that has characterised it thus far is necessary. The Milan School of Architecture was a forerunner in terms of introducing environmental issues into teaching with its establishing of the degree programme in Environmental Architecture in 2001. This focus was promptly taken up in the AUIC School's founding cultural and educational project, and now must be further strengthened as a defining element of our students' educational experience. It is therefore necessary to return to this topic and clarify it, with the aim of training students capable of addressing environmental sustainability from a broad perspective, while also understanding the social and economic dimension, using innovative techniques and tools, and managing appropriate metrics to ensure the effectiveness of the proposed solutions.

In terms of digitisation, we need to be aware of the specific nature of the transformations taking place in our area. The built environment is a very special, complex and multifaceted kind of artefact. It is the product of cultural stratification and the bearer of an extraordinary physicality, aimed at creating habitats capable of meeting the physical and other needs of those who live there. The digital hybridisation of the physicality of the built environment and the related transformation processes cannot therefore be geared towards a simple virtualisation and dematerialisation of things, spaces and organisational structures, but rather must be aimed at redesigning and enhancing reality in order to give it characteristics that better respond to the specific needs of all those concerned. The issue of digitisation must be addressed by going beyond the simple enhancement of software skills and the use of databases, by setting the coordinates for a cultural change.

The vision is clear, perhaps it has been for some time. Now is the time to pursue it with decisiveness and clarity, where design is considered the centre of gravity of the entire training course. Design understood as a place of confrontation between the sense of possibility and the sense of reality. Design that, against the dictatorship of the present, is able to place an idea of the future at the centre of its theoretical reflection and practical action. Design capable of focusing on the ends, increasingly attached to the condition of necessity and inevitability, and not just the means. Design based on knowledge and technical expertise, but at the same time on cultural awareness, understood as the ability to place design work in a specific context of social, economic and productive reference. Design that, in the face of the increasingly marked tendency towards specialisation, is able to act within a broad perspective and with a critical evaluation with the pressing needs of society, economic interference and the reasons behind production.

PROGETTAZIONE DELL'ARCHITETTURA (PDA)

ITA | ING
MILANO LEONARDO
MANTOVA
PIACENZA

Il Corso di Laurea triennale mira a fornire i fondamenti conoscitivi e gli strumenti operativi per elaborare il progetto di architettura alle diverse scale, con attenzione per le condizioni poste dalla complessità dei processi di trasformazione dell'ambiente costruito.

Il percorso formativo prevede un articolato quadro di discipline scientifiche, umanistiche e artistiche che connotano il sapere e le competenze richiesti oggi all'architetto per affrontare le sfide che lo vedono impegnato anche a livello internazionale. L'attività didattica è organizzata in laboratori e corsi disciplinari ai quali si affiancano seminari, conferenze, workshop, mostre e viaggi di studio. Al termine del triennio, il laureato in Progettazione dell'Architettura può accedere, dopo l'esame di Stato, all'Albo professionale, sez. B, o proseguire gli studi nelle Lauree Magistrali.

URBANISTICA: CITTÀ AMBIENTE PAESAGGIO (URB)

ITA | MILANO LEONARDO

L'urbanista è un progettista che affronta sfide centrali del nostro tempo: la città e i fenomeni affascinanti e drammatici che la attraversano, la qualità dell'ambiente e la sostenibilità dei territori insediati, il degrado dei paesaggi e l'urgenza della loro cura. Questo Corso di Laurea triennale forma una figura professionale capace di interpretare, valutare, gestire le trasformazioni e impegnata nel progetto della città e del territorio.

I saperi umanistici si coniugano a una solida base tecnico-scientifica, per sviluppare competenze aggiornate e innovative per la pianificazione e per la costruzione di politiche urbane, territoriali e di settore. Il Laureato in Urbanistica può iscriversi agli Ordini Professionali, sez. B, previo superamento dell'Esame di Stato o proseguire gli studi nelle Lauree Magistrali.

Architettura Ambiente Costruito Interni (ACI)

ITA | ING

Il Corso forma un architetto capace di confrontarsi con la modificazione e rigenerazione dei tessuti urbani e insediati consolidati, con gli interventi di innesto, trasformazione e valorizzazione del costruito, ponendo attenzione alla realizzabilità e sostenibilità ambientale, economica e sociale del progetto.

MILANO LEONARDO

Architectural Design and History (ADH)

ING

Il Corso articola l'offerta formativa sul progetto di architettura, del nuovo e del costruito storico, secondo un approccio che pone al centro il patrimonio edilizio, architettonico e del paesaggio, come risorse da salvaguardare e a cui assegnare nuova centralità.

MANTOVA

Landscape Architecture Land Landscape Heritage (LHA)

ING

Il Corso forma un paesaggista competente nel disegno di parchi e spazi aperti, masterplan paesaggistici, nella conservazione e valorizzazione di paesaggi storici, nei progetti di green infrastructures e territori rurali, servizi per il turismo sostenibile e per la prevenzione dei rischi idrogeologici.

MILANO LEONARDO

Urban Planning and Policy Design (UPPD)

ING

Il Corso integra progettazione, pianificazione, politiche urbane, studi urbani e scienze sociali. Forma competenze nel campo del progetto urbanistico e della costruzione delle politiche per affrontare i temi complessi posti dalle agende urbane e territoriali contemporanee.

MILANO LEONARDO

Architettura e Disegno Urbano (ADU)

ITA | ING

Il Corso pone al centro il progetto di architettura, alle diverse scale, formando un architetto capace di coniugare gli apporti della tradizione progettuale, umanistica, artistica italiana con le forme e gli spazi della città contemporanea e con i fenomeni insediativi dei Paesi emergenti.

MILANO LEONARDO

Sustainable Architecture and Landscape Design (SAL)

ING

Il Corso integra le competenze dell'architettura con quelle del paesaggio e delle scienze agrarie, formando un architetto in grado di affrontare la progettazione architettonica, urbana e ambientale alle diverse scale, orientata alla valorizzazione delle risorse ecologiche e ambientali.

PIACENZA

Architettura delle Costruzioni (COS)

ITA | ING

Il Corso forma un architetto che risponda in modo innovativo alla complessità della progettazione di grandi opere e di costruzioni complesse. Al centro del progetto è posto l'edificio "come sistema" con l'obiettivo di educare alla realizzazione e al recupero in sintonia con l'ambiente.

MILANO LEONARDO

Management of Built Environment (MBE)

ING

Il Corso forma un professionista in grado di gestire il patrimonio immobiliare esistente: esperti nella gestione e del mantenimento degli elementi fisici che compongono gli edifici (Technical Curriculum) e del valore economico del patrimonio immobiliare (Economic Curriculum).

MILANO LEONARDO

Ingegneria dei Sistemi Edilizi (ISE)

ITA

Il Corso forma un tecnico in grado di ingegnerizzare il progetto, di sovrintendere all'integrazione delle componenti tecnologiche, tecniche, edilizie, strutturali, impiantistiche; di sovrintendere al processo costruttivo, manutentivo e al ciclo produttivo e di vita degli edifici.

MILANO LEONARDO

Building and Architectural Engineering (BAE)

ING

Il Corso forma ingegneri in grado di rispondere alle sfide della sostenibilità, del risparmio energetico e di operare nel settore degli edifici ad elevate prestazioni, alta efficienza energetica e basso impatto ambientale.

MILANO LEONARDO | LECCO

INGEGNERIA EDILE E DELLE COSTRUZIONI (IEC)

ITA | MILANO LEONARDO

Il Corso di Laurea forma ingegneri di alto profilo in grado di affrontare le sfide del settore delle costruzioni e capaci di gestire la complessità che caratterizza gli edifici (dal punto di vista prestazionale, tecnologico, impiantistico e strutturale) e i relativi processi di progettazione, costruzione, gestione, manutenzione, trasformazione o dismissione, al termine del ciclo di vita.

Il Corso, propedeutico ai corsi di Laurea Magistrale, si arricchisce al terzo anno di insegnamenti tecnico-applicativi che consentono un immediato inserimento nel mondo del lavoro come progettista tecnologico, gestore di progetti e di processi di costruzione e come ingegnere della sicurezza.

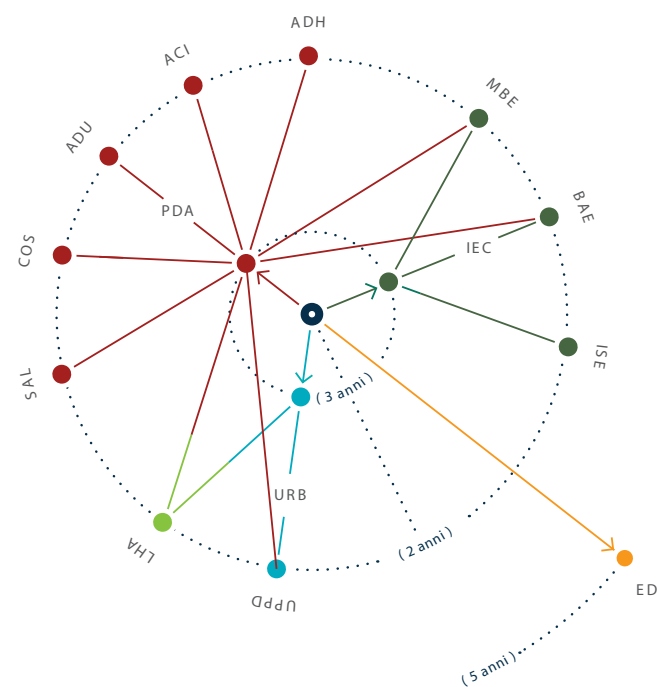
Il laureato IEC, previo superamento dell'Esame di Stato, può iscriversi all'Albo dell'Ordine degli Ingegneri Settore Civile-Ambientale junior.

INGEGNERIA EDILE-ARCHITETTURA (EDA)

ITA | LECCO

L'Ingegnere Edile-Architetto, in linea con le direttive UE, ha competenze approfondite sia nell'ambito dell'architettura, sia in quello dell'ingegneria delle costruzioni ed è in grado di progettare un'opera di architettura come responsabile dell'intero processo edilizio, dal punto di vista architettonico, tecnologico, strutturale ed energetico.

I laureati acquisiscono competenze nelle più innovative tecnologie costruttive sia per la nuova edificazione, sia per il recupero dell'esistente. Al termine del Corso di Laurea, che ha durata quinquennale, dopo l'Esame di Stato, è possibile accedere alla professione sia di architetto sia di ingegnere, iscrivendosi ai rispettivi Albi.



technological transition is still an ongoing process in the construction sector, which is traditionally more resistant to innovation than others. Despite this, individualised interaction between man and machine, biologically inspired technologies, digital twins and systems simulation, data flow and analysis platforms, artificial intelligence and energy efficiency – i.e. the driving principles of the fourth industrial revolution – have also begun to make their way into the construction sector. To face this revolution, engineers must have a solid scientific background, specialist technical knowledge and transversal skills essential for solving complex problems. We need young and dynamic engineers, capable of following and, more importantly, guiding transformations in the construction sector.

A rapidly evolving/changing scenario requires different buildings and more advanced design, construction and management processes, with the need to integrate new user-centred technologies designed to improve living conditions.

The degree programme in Building and Construction Engineering aims to train engineers who are able to manage the general process of transformation and change that is taking place in the construction sector and the complexity that characterises buildings and, specifically, govern the processes of design, construction, testing, management, maintenance, transformation or decommissioning of buildings at the end of their useful life cycle.

In detail, the course uses innovative teaching techniques to provide its students with a solid background in:

- project engineering, in terms of technological, performance, operational and site aspects;
- engineering of the building process that, starting with the design, develops through the contracting, construction, testing, management, maintenance and decommissioning phases;
- safety engineering in the design and construction phase;
- project validation, construction management and control of technical-administrative processes;
- management of digital information flows in the building process (BIM);
- design of innovative building materials and components and the related control of the production process according to Industry 4.0 principles;

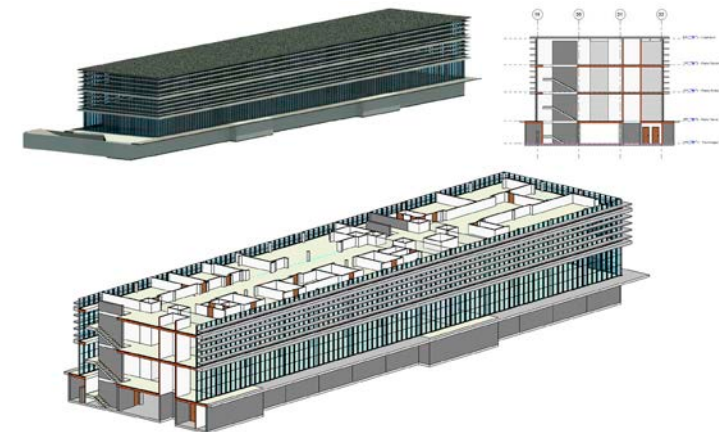
In particular, the programme’s main objective is to train professionals with profiles that are in line with those now well established in international circles, under the name of Building Engineer or, in some contexts, Architectural Engineer.

THE KNOWLEDGE AND SKILLS OF THE BUILDING AND CONSTRUCTION ENGINEER

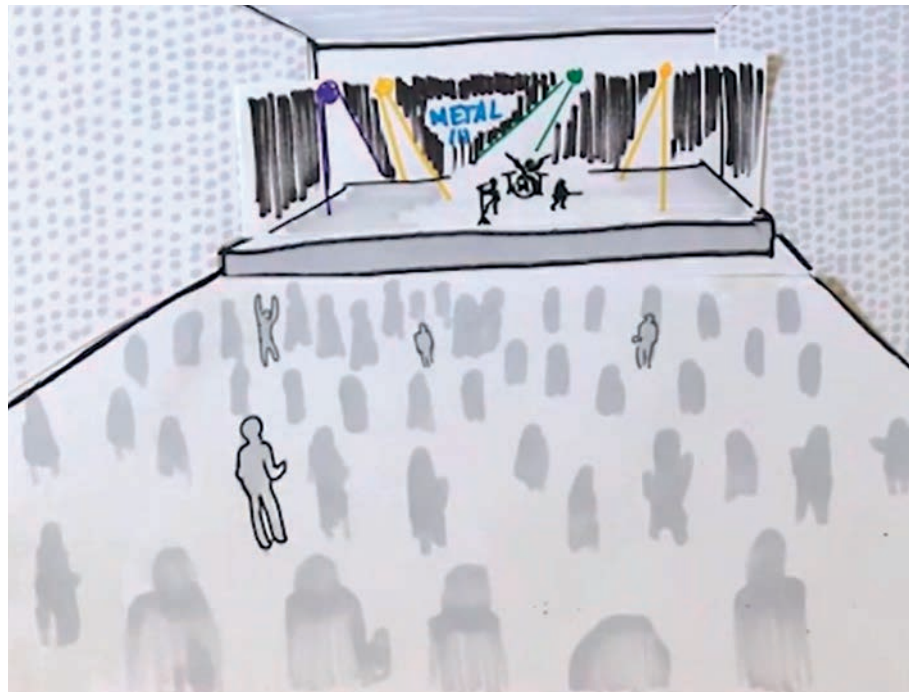
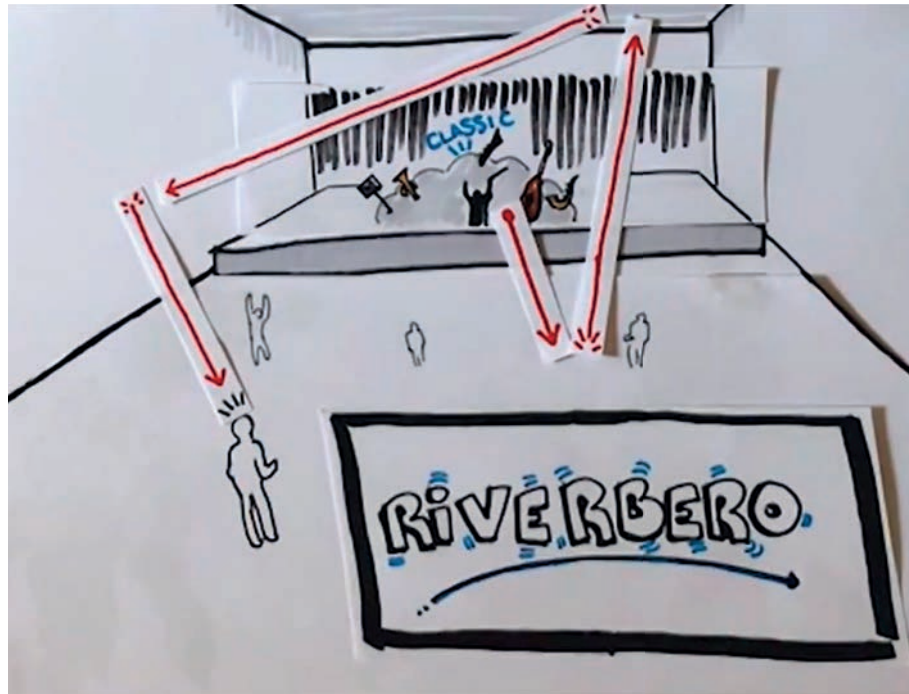
The Building and Construction Engineer carries out professional activities in various fields, contributing to the planning, design, construction and control of works, management of new construction and transformation of the built environment. The skills and expertise attained enable the BCE Engineer to adapt to scenarios that are evolving in terms of the methods, techniques, tools and technologies used in the relevant sector and beyond. The Building and Construction Engineer is trained for:

- the design and technological and performance-related optimisation of the building organism and its built, plant and

- structural parts and the appraisal of energy efficiency and environmental performance;
- the design and management of the production processes of building systems and components;
- design verification for validation and technical control in the execution phase;
- the safety of on-site work;
- the monitoring, diagnostics and management of maintenance and the relative processes;
- the economic management of the project;
- information flow management in the design, construction and life cycle of the building and its parts and management of the advanced digitisation process.



Buffer zones		Site	
		Public transport proximity	3
		Neighbourhood and amenities	3
Partitionable space		Building	
		Collapsible/expandable	1
		Modularity	5
		Cores at perimeter	✓
		Simple plan	5
		Multi-functionality	4
		Variation planned	1
	Simple skin	2	
	Overdesign/redundancy	✓	



THE PRIORITISATION OF PROBLEM SOLVING AND THE SYSTEMIC VISION OF THE BUILDING AND CONSTRUCTION ENGINEER

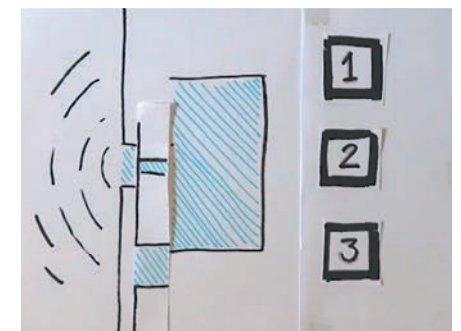
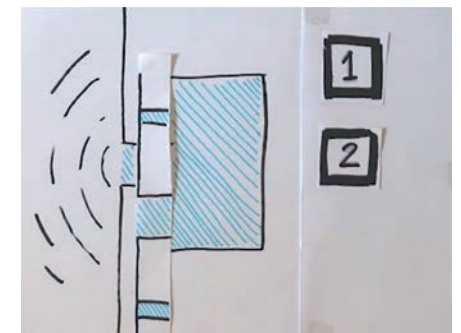
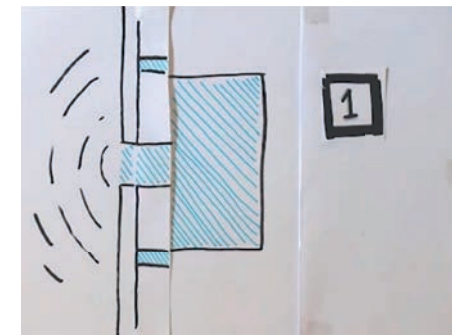
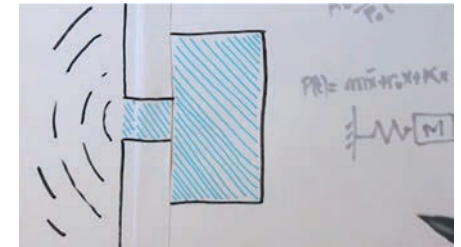
Problem solving is an educational-didactic approach aimed at developing skills for solving complex problems. Finding correct and appropriate problem-solving methods for different relevant situations and scenarios is one of the most difficult elements. The Building and Construction Engineer is required to act creatively and think outside the box. It is in this "creative act," together with his ability to systematise information, that the value of the BCE Engineer lies.

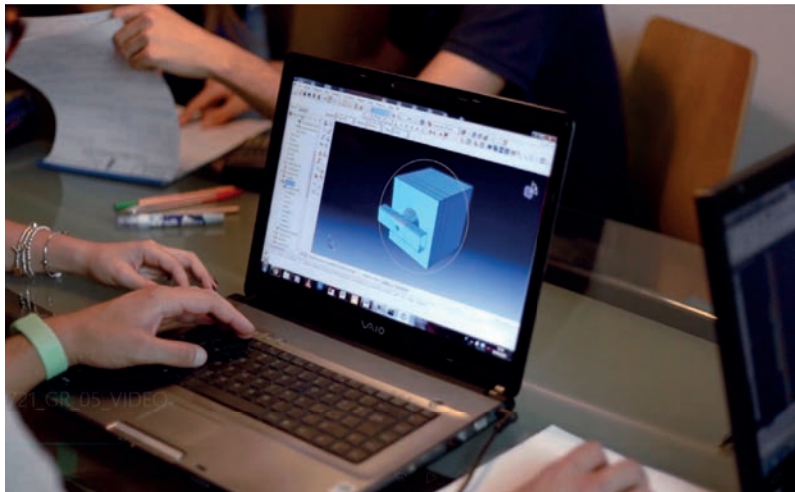
From the second year onwards, students are confronted with simulations of design activities that require skills in: i) identifying and classifying problems and relationships (multiscale and multifactor analysis) ii) solving problems with appropriate and customised strategies iii) identifying scenarios and assessing the impacts of solutions.

The interdisciplinary approach to problem solving makes it possible to avoid a frequent mistake that heavily affects the quality and costs of construction: separating each phenomenon, studying it separately and making generalisations about the conclusions. On the other hand, the study programme leads to increasingly in-depth and analytical knowledge of specific issues, always having a clear vision of the systemic effects that the constituent parts have on the whole (building and/or built environment in general).

The deep and essential knowledge of engineering acquired in the first part of the course develops analytical skills, namely the ability to take something apart in order to understand it. Conversely, the second part of the course develops systemic thinking, namely the ability to see problems in a wider context, allowing the best solution to be found.

A Building and Construction Engineer trained at the Politecnico di Milano is, for this reason, a unique figure, professionally recognised and valued in Italy and abroad.





MULTIDISCIPLINARITY AND THE ENHANCEMENT OF TRANSVERSAL SKILLS AS A VALUE

The BCE course, unlike other courses in the engineering area, is multidisciplinary right from the first year of studies when students are taught core subjects that characterise the training of any engineer, from mathematical analysis to physics to technical drawing, together with programming fundamentals, to give future engineers skills to use the tools that modern digital technologies make available.

This approach continues in the second year, when the focus tightens around the disciplines of structural mechanics and hydraulics, building physics and Building Information Modelling. The professors of these modules are inspired by the principle of transdisciplinarity and this vision allows students to combine and accumulate knowledge and experiences, fostering a process of exchange and learning. Finally, multidisciplinary – as a key element and added value of the training process – is also emphasised in the third year, when the modules all focus on the same case study (integrated design for structural, technological, plant engineering and site aspects).

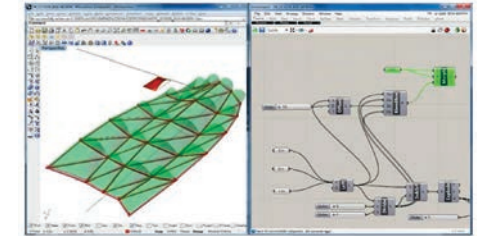
Over the three years, the transversal (soft) skills necessary to quickly and satisfactorily enter the world of work are also developed. Whilst the core engineering disciplines addressed at the beginning of the programme are not an easy challenge to overcome, they promote autonomy, self-confidence and the ability to adapt to the situation and meet objectives. Further down the line, some classes, in particular the studios, promote critical thinking and problem solving skills and encourage group work so that students become accustomed to i) collaboration (team working), ii) planning and organising work, iii) leadership and iv) effective communication.



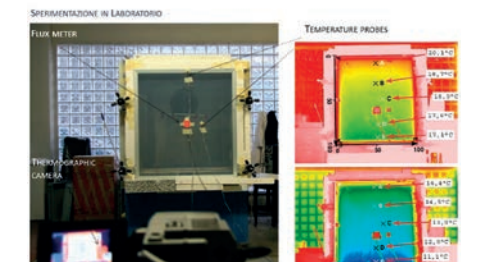
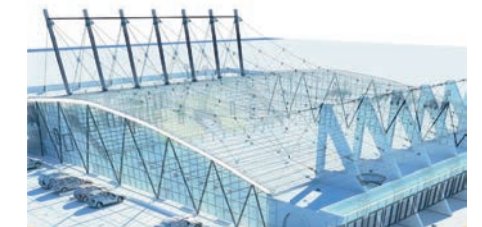
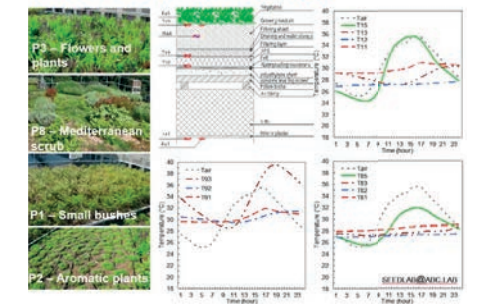


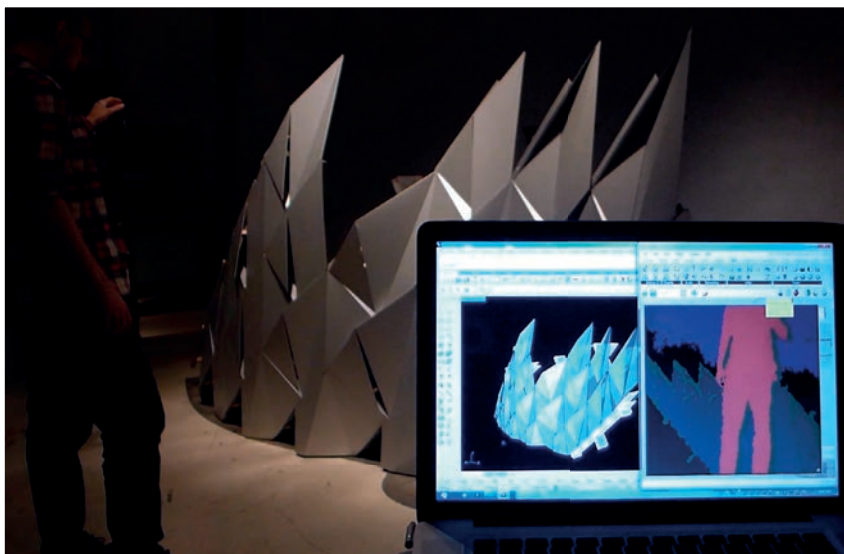
EXPERIMENTATION IN THE BCE CURRICULUM AND COLLABORATION WITH THE WORLD OF WORK

The Building and Construction Engineering programme is subject to continuous experimentation. Each year, new optional courses and workshops are added to the range of courses on offer, enriching the programme and making it possible to respond to the challenges of the construction sector in the best possible way. There are two types of course/workshop in the third year: professional training courses/workshops (which in some cases also allow students to gain credits that can be used for qualification in fire safety engineering and non-destructive testing) and courses/workshops that enhance transversal skills (such as preparing for internships and assessments in collaboration with the Politecnico di Milano's Career Service). Over time, flipped/blended forms of teaching have been introduced to core engineering subjects and all modules that characterise the construction sector are co-taught by professionals from the world of work (construction companies, engineering companies, manufacturers of building and plant systems and components, the Order of Engineers, Associations and public authorities). Throughout the degree, students have opportunities for continuous contact with Alumni of the programme who not only bring skills but also experience in transitioning from university to the world of work, instilling their passion and commitment – aware of the responsibility they have – for designing, building and managing buildings, and the built environment in general, in future generations. BCE alumni are a merit to the degree programme. They are an active and proactive community: they participate in the Alumni meet Faculty initiative, an opportunity to interact with the world of work aimed at continuously updating the curriculum; they participate in and support orientation activities for future freshers (Open Day) and they form the reference network for internship activities.



Green roofs Tech (monitoring and testing)





WORKSHOPS TO SUPPORT THE THESIS PROCESS

The third year of the BCE programme is characterised by theoretical-applicative teaching, a series of workshops aimed at enhancing the student's aptitudes or enhancing transversal (soft) skills and professional training courses. The rich and detailed programme ends with an internship which provides an opportunity for research and experimentation (internal internships in research groups) and/or training in the field (external internships in engineering/design companies, the construction industry, construction companies, public administration, etc.). As far as experimentation is concerned, students will be able to collaborate with research groups belonging to the departments, and particularly the departments/groups working for the construction sector, who are tasked with the decarbonisation of buildings, resilience and adaptation of the built environment, the health and well-being of the user, product and process innovation, the protection and enhancement of cultural heritage and the energy and digital transition. Specifically, the programme views the Department of Architecture, Built Environment and Construction Engineering (DABCE) as its main point of reference. DABCE is equipped with a laboratory system (ABCLab) which coordinates laboratories, measurement tools, technologies and skills to support teaching, basic and applied research and industrial research in the construction sector. Students can also carry out experiments in interdepartmental and/or university Design Studios.

Experimentation in the field or in the laboratory or research in structured groups which tackle emerging issues on an international scale represents an opportunity for growth and the acquisition of specialist skills, but also an important moment to understand one's inclinations and make an informed decision about master's degrees.



THE DOUBLE DEGREE AND BCE STUDENTS' EXPERIENCES ABROAD

Being in a multicultural environment enriches BCE students both in Italy, thanks to the arrival of foreign colleagues as part of the exchange programmes that the degree programme takes part in, and abroad, thanks to international mobility and the double degree programme with the Universitat Politècnica de València.

The presence of foreign students in the classroom, albeit in limited numbers (10 places every year), creates a multicultural environment that enriches the training

received in the classroom as it enables a multicultural exchange.

Studying abroad can be a life experience; it offers the opportunity to meet new people and learn about new cultures. Moreover, having a period of study abroad in one's CV is a valuable asset. Time abroad allows BCE students to experience different educational models and a different university life (typical of international campuses). International mobility can be used to take classes and exams at a foreign university for a semester, for a period

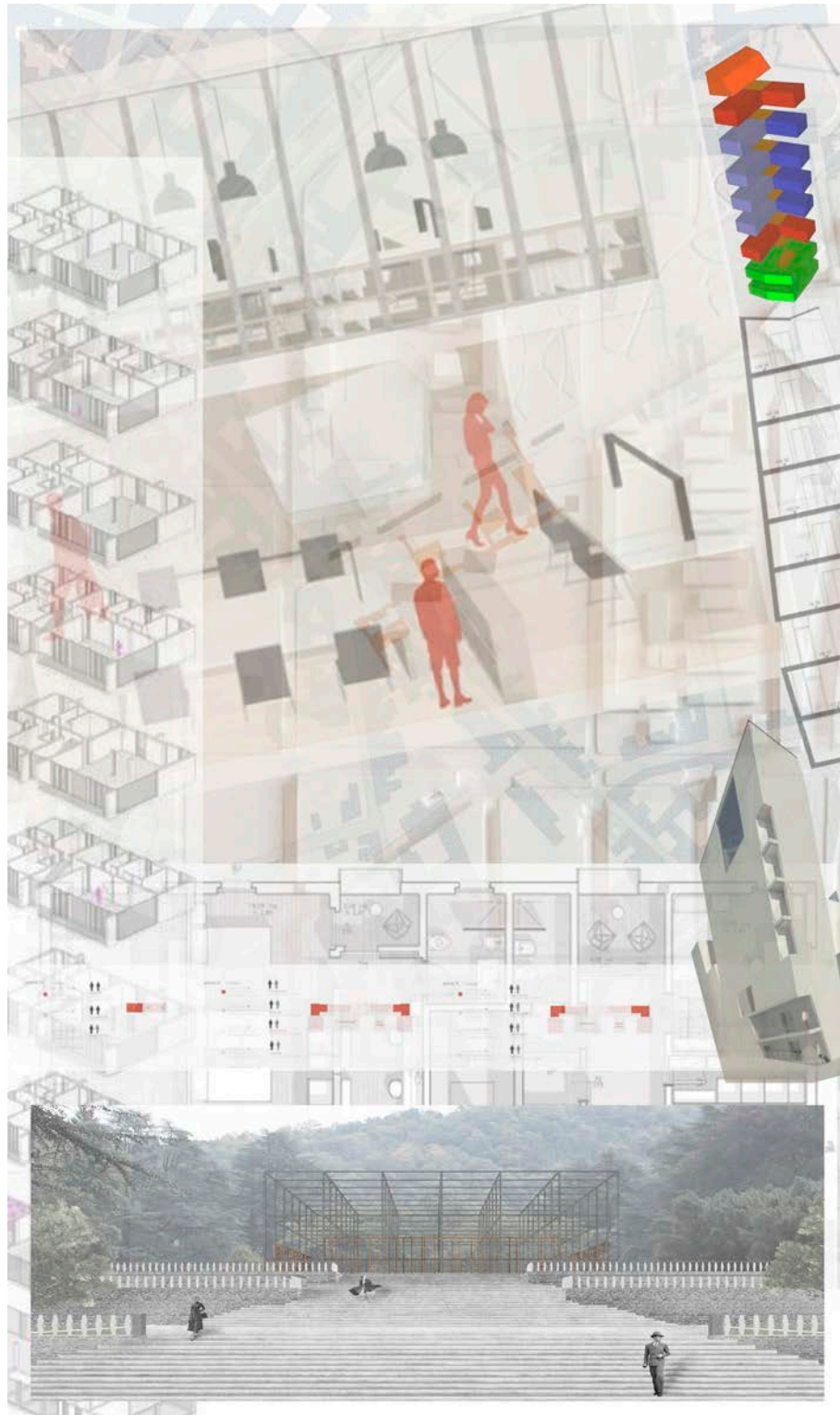
of study and research related to their thesis, or to do an internship. The BCE programme boasts more than 50 exchange agreements with universities worldwide. In addition, since a.y. 2016-2017, BCE has had a double degree programme with the Universitat Politècnica de València, Escuela Técnica Superior de Ingeniería de Edificación – ETSIE (Bachelor in building engineering).

The double degree allows you to work in Spain without any restrictions.

BCE students are eligible for international

mobility grants from Erasmus+, Athens, IDEA League (a strategic alliance in the technological and scientific field between ETH - Zurich, TU - Delft, RWTH - Aachen, Chalmers University and the Politecnico di Milano) and the A.T.H.E.N.S. (Advanced Technology Higher Education Network / SOCRATES) network which is made up of 14 prestigious European technical universities.





ARCHITECTURAL DESIGN

COORDINATOR
Luigi Mario Lorenzo Spinelli

2019-2021
Andrea Campioli

2017-2018
Andrea Campioli

2016
Emilio Faroldi

DURATION
3 Years

ENROLLED STUDENTS
850 Milano Leonardo (750 Italian; 100 English)
100 Mantua (Italian)
100 Piacenza (50 Italian; 50 English)

LANGUAGE
Italian and English

STUDENTS ENROLLED
IN A.Y. 2021
2989 Italians
75 EU international students
451 Non-EU international students

GRADUATES
A.Y. 2019-2020
749 Milano Leonardo
66 Mantua
59 Piacenza

*Laurea (equivalent to Bachelor of Science)
Milan - Mantua - Piacenza*

The Architectural Design degree programme has been offered by the School of Architecture Urban Planning Construction Engineering since a.y. 2014-2015. The programme is the result of a careful reorganisation and synthesis of the comprehensive framework of courses that characterised the first cycle of studies in architecture at the Politecnico di Milano in previous years. The course offers students a 'generalist' and 'foundational' training experience in the field of architectural design, with the specific aim of building a solid knowledge base in order to adequately deal with professional activity master's degree teaching programmes.

Within the proposed training programme, design is defined as a practice based on both technical competence and cultural awareness, understood as the ability to place the design work in a precise social, economic and productive reference context, fostering a vision in which the design acts within a broad perspective that involves critical comparison with the pressing needs of society, interference from the economy and the

drivers of production. Today, the professionals involved in the transformation processes of the built environment are required to make extraordinary efforts to stay up to date in order to respond to issues that are arising as a matter of urgency: energy efficiency, environmental sustainability and the new technological frontiers of Industry 4.0 are only some of the issues that are radically changing the reference scenario of architectural design. It is because of these renewed contexts that the Architectural Design graduate is called upon to systematise the complex problematic framework, in terms of both the dynamics of radical and deep transformation and the painstaking project to conserve, enhance and redevelop the wider built environment. The training programme that has been outlined in recent years has therefore sought to ensure that the students acquire design skills, knowledge, abilities and expertise to deal with increasingly complex transdisciplinary processes, reinforcing skills; expertise that can be applied to various working contexts. The programme's two constituent teaching methods are studios and courses. In the studios, students acquire the methods and tools necessary for developing a design (practical design teaching), drawing on the contents of the various disciplines needed when designing. Conversely, in the classroom-based courses, students acquire knowledge related to the various disciplinary fields that form the necessary background for design work (theoretical design teaching), ranging from historical disciplines to physical-technical and plant engineering disciplines, from architectural and urban design disciplines to structural disciplines, from the disciplines of representation to technological disciplines for architecture and building production, from appraisal disciplines to the disciplines of spatial planning. Taken as a whole, this provides an educational experience in which the student has the opportunity to engage with expertise and skills that cross the traditionally fixed boundaries of the disciplines: expertise in the design of environments characterised by high levels of comfort; expertise in involving the people affected by design and planning actions in the decision-making process; expertise in the protection, conservation and enhancement of historical-cultural heritage; expertise in managing the dynamics of transformation of the built environment whilst respecting natural capital; expertise in designing spaces intended for the most vulnerable sections of the population; expertise in digital innovation processes. This scenario calls for a pedagogy that places transversality alongside disciplinary rigour and experimentation alongside the acquisition of consolidated knowledge, thus opening up unprecedented connections with disciplinary areas traditionally considered distant from the world of architecture. Taking design, and knowledge of design, as fields of exploration, as well as bodies of expertise and skills to be acquired.

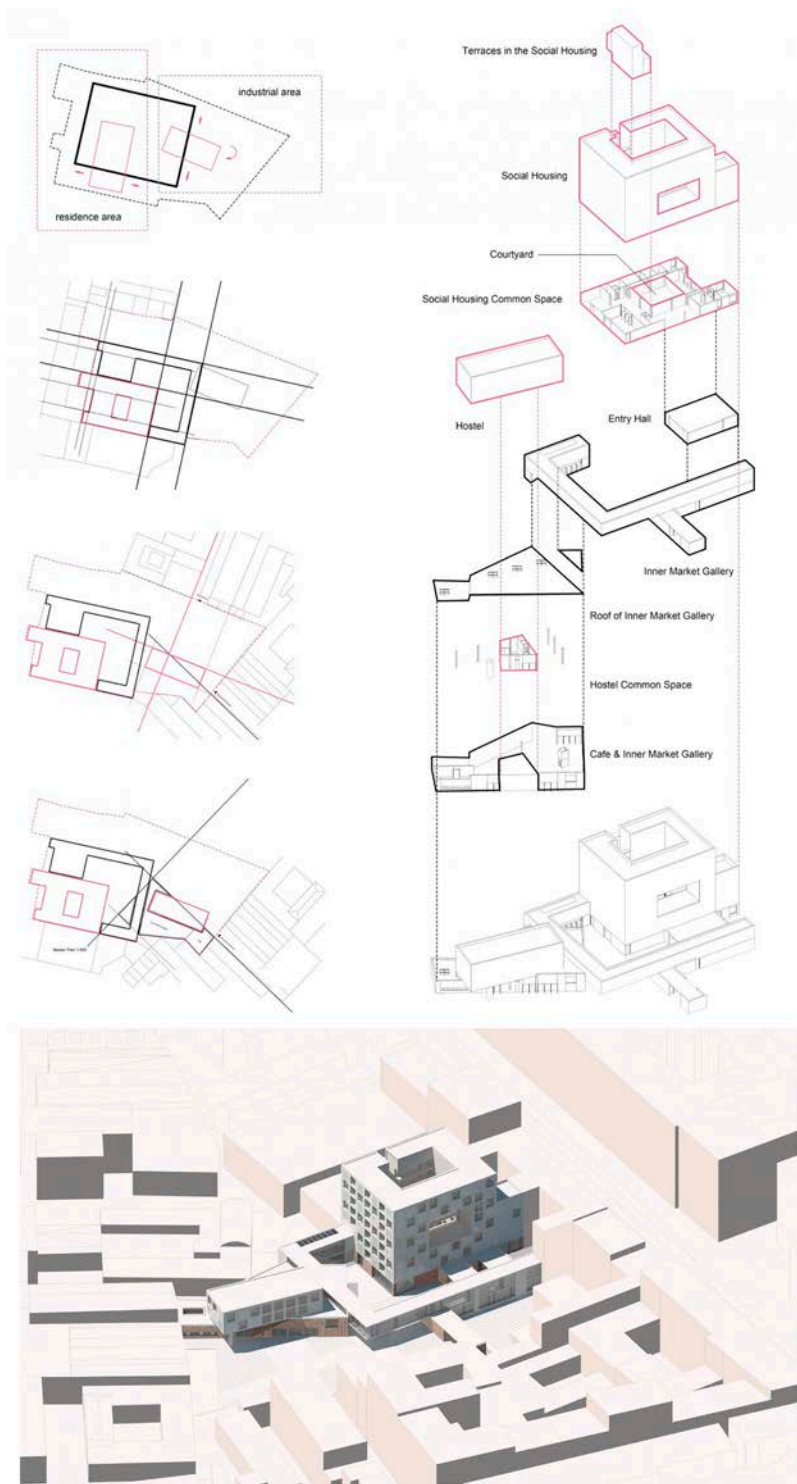
TEACHING ARCHITECTURE: A PEDAGOGICAL CHALLENGE IN THE MAKING

Architecture is, by nature, in constant transformation. Its teaching therefore encompasses the dual need to provide sound disciplinary foundations – the legacy of a thousands-of-years-old tradition – and to promote a forward-looking approach and the development of the new. It is a demanding pedagogical challenge, accentuated by the growing complexity of the professional world and the global agenda, which requires often-unprecedented interdisciplinary visions. In the curriculum, humanities and technical and scientific disciplines prepare the student for the design task, carried out in studios in relation to various fields, issues and scales of

intervention, combining knowledge and know-how in a polytechnic setting of international renown: a promoter of innovation in teaching methodologies and technologies which was further accelerated by the pandemic.

The course is rounded off with an opportunity to gain experience abroad, a professional internship and the thesis. The result is an open-minded graduate, capable of reading and influencing current transformations with critical sensitivity, assuming social ethical and aesthetic responsibilities as a result of his/her work without losing the deep and noble identity of being an architect.



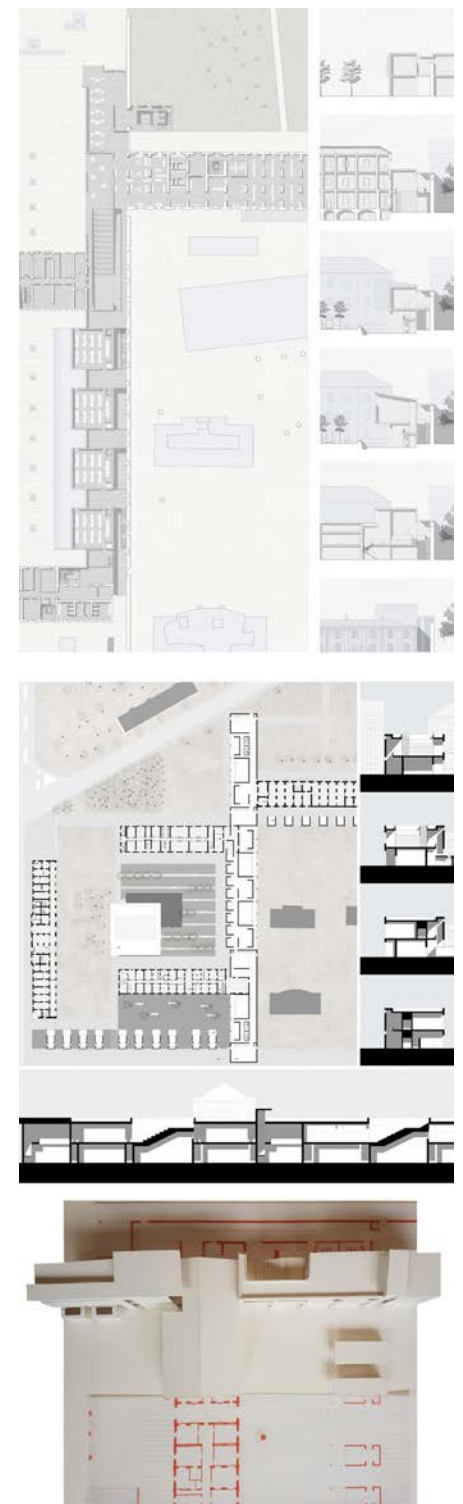


DESIGNING ARCHITECTURE: TO INNOVATE, ENHANCE AND PRESERVE ENVIRONMENTS

The design experience that students undertake as part of their degree course serves to build skills and tools and to sharpen their sensitivity towards current and significant issues in architecture. Through architectural design, students are confronted with highly complex issues. The experiences gained throughout the various studio projects lead them to reflect: on what it means to 'make architecture'; on the relationship between buildings and their context and, therefore, the need to respond to urgent demands of communities; and on contemporary aspects of living and on technological choices, increasingly geared towards sustainability.

From the first year of the course, students refine their aptitude for project design in the studios; first through preparatory exercises and, later, with increasingly complex projects. In the studios, the diversified design experiences on offer are all based on the common and shared need to face problems and challenges related to the complexity of contemporary contexts. Architecture is a tool to innovate the places in which we live, to transform our cities and create new buildings, public spaces and collective facilities. At the same time, architecture can enhance and preserve existing historic places through timely and environmentally-sensitive renovation projects.

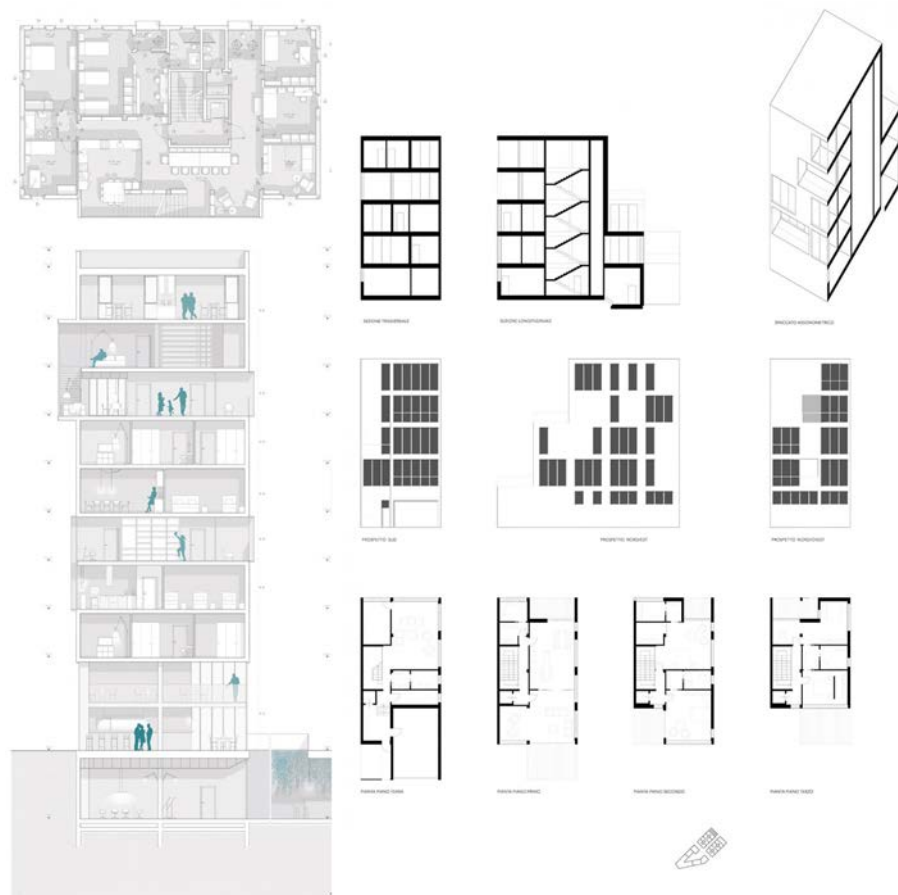
With this in mind, over the course of the three years students are presented with design themes in which architecture is a tool for learning about, studying, intervening in and renovating existing contexts. Housing, public and collective facilities (schools, theatres, cultural centres and sports centres), public spaces and infrastructure are among the design themes that stimulate the student to envision new scenarios and architectures.



FORMS, TYPOLOGIES AND SCENARIOS FOR CONTEMPORARY HOUSING

The forms and typologies of contemporary housing are a significant theme in the degree programme. Particularly in the first years, the house is a fundamental theme that is addressed both through theoretical courses and design exercises. Students work on projects that envision and design spaces and architecture for housing: these projects understand the new requirements for living, both from a typological point of view and in their relationship with the contexts into which they are grafted. Today the home is no longer just a domestic space, but a place for many other activities. The design of residential spaces is an important element in the students' training

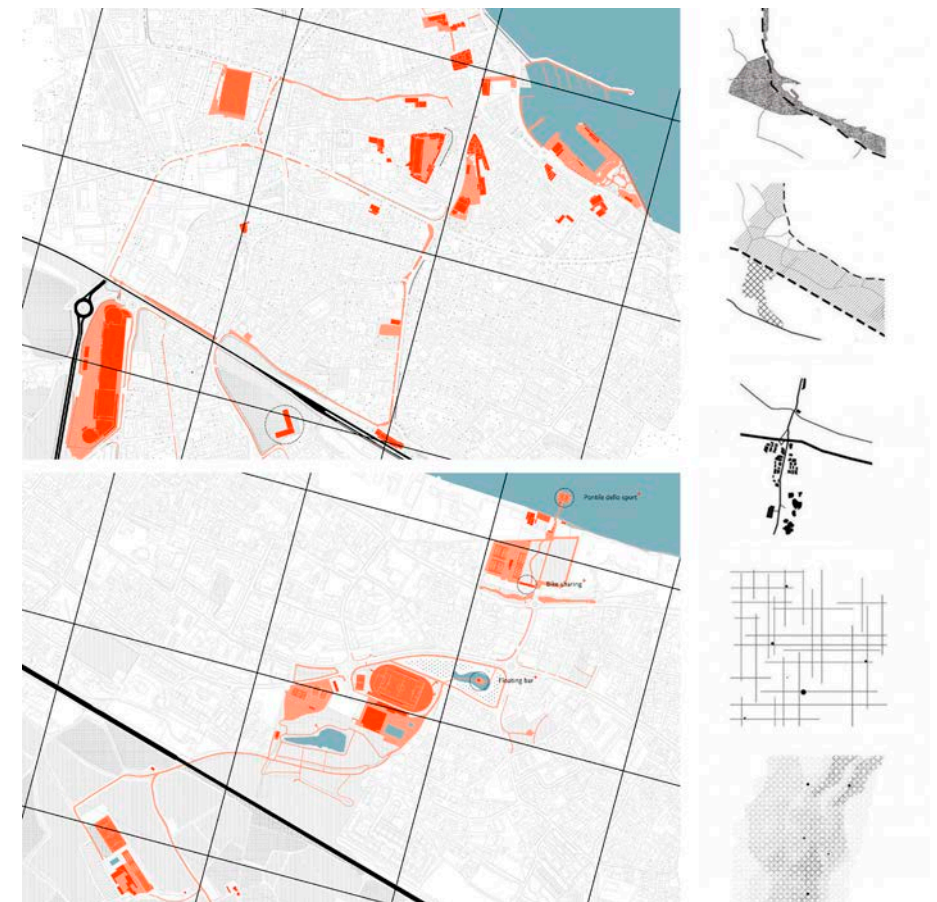
because it means designing architecture that establishes urban relationships with its context, implements new typologies of individual and collective housing, and is based on the careful integration of functional, compositional, material and technological aspects. The living spaces exercises start with volumetric studies, based on the compositional articulation of primary forms, and move on to more complex functional and constructive projects which aim to be quality living spaces in harmony with their surroundings.

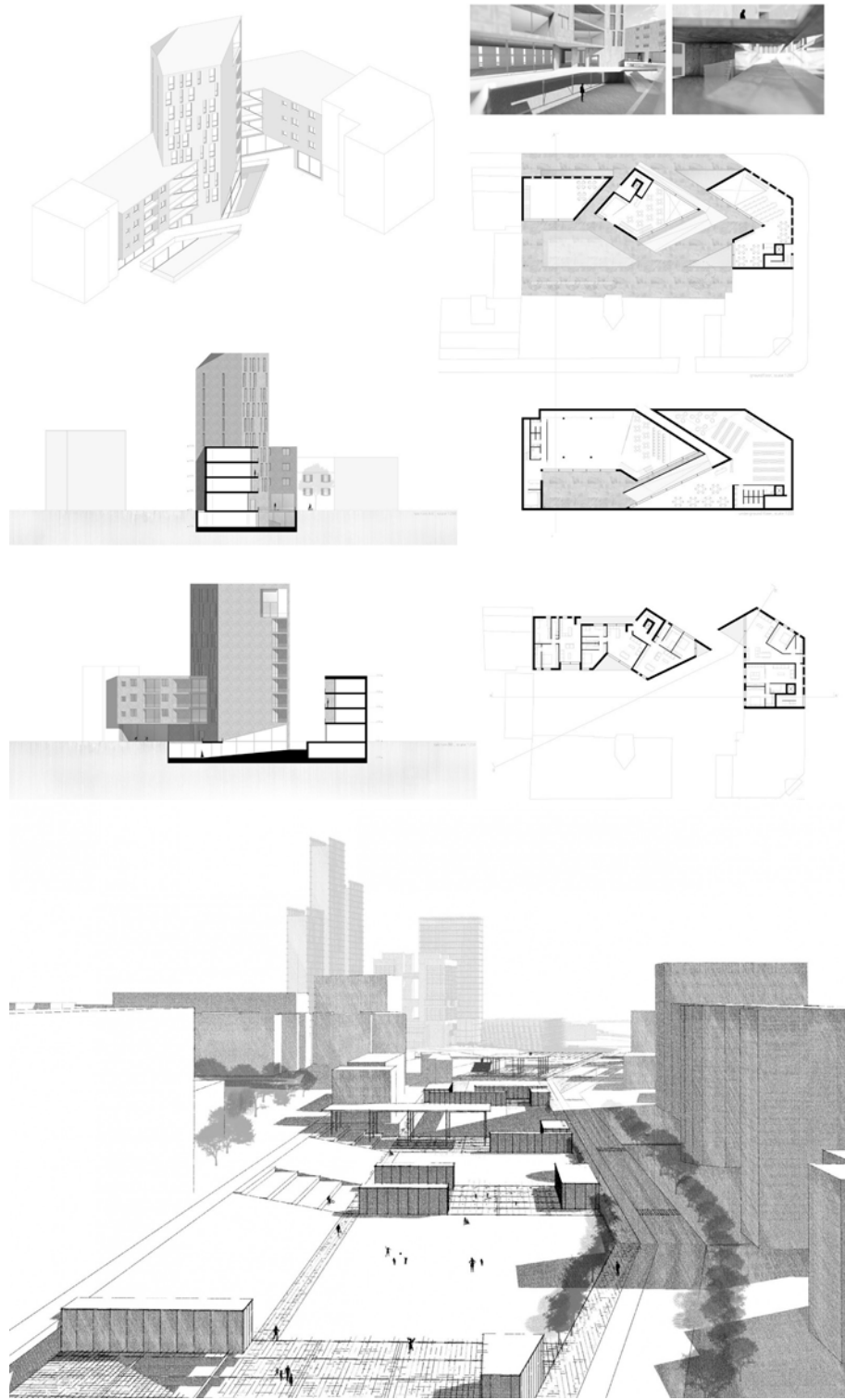


SUSTAINABILITY AND ECOLOGICAL TRANSITION: IMAGES FROM THE FUTURE

Process innovation, sustainability and ecological transition are the central issues that need to be invested in in the field of architecture; they may require our design tools to be updated, but they are an essential challenge for the near future. The renewed attention to these issues is at the heart of various design tasks that students face over the course of the three years, as they learn to work with and utilise local resources and intervene in fragile and delicate situations. During project development, students learn how to choose appropriate materials and construction technologies, how to limit environmental impact and how to ensure

greater comfort and quality in the designed spaces. It is an increasingly pressing challenge for future architects who will have to be able to take action on existing heritage, without further consuming the planet's resources. In the various design activities, students are guided to study the tools with which architecture can play a leading role in a future era geared towards ecological transition: a future open both to the renovation and reuse of existing buildings and to new constructions, which are examples of high energy and technological efficiency and low environmental impact.





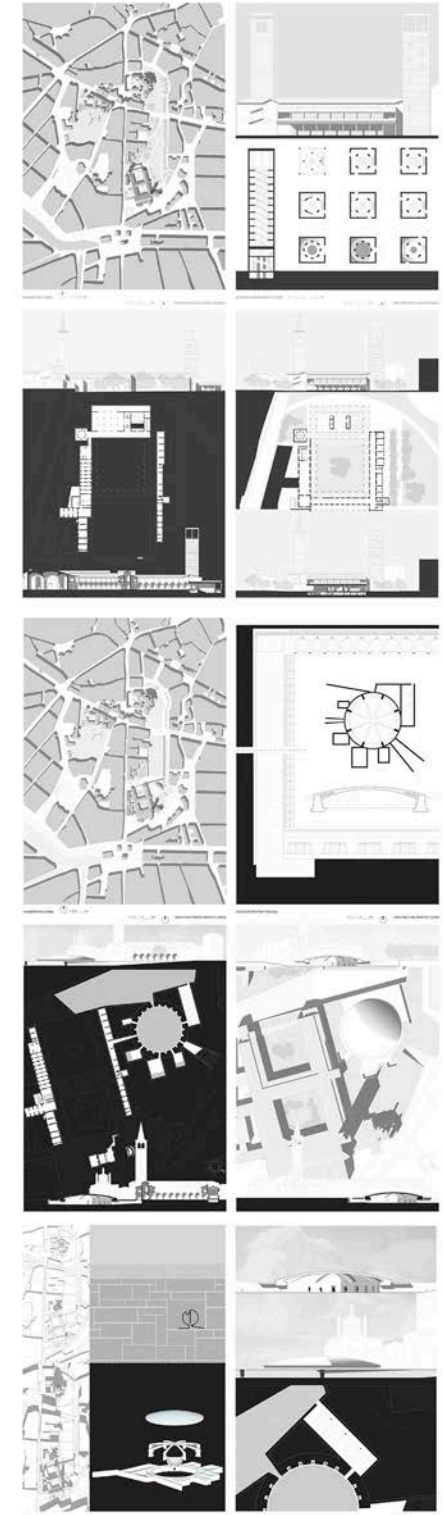
MULTISCALAR VISION AND RELATIONAL CHARACTERISTICS OF ARCHITECTURAL DESIGN

The programme offers the student the opportunity to experience a design approach that takes advantage of the intersection between various dimensions and reflects on the dual nature of the subject being taught: on the one hand, understanding that architectural work is an integral part of a wider and more structured system of relationships, consisting of the landscape, the natural environment, the region and the city; and on the other, that any architectural work has a dimension linked to its social value, namely, its ability to build an explicit and recognisable relationship between the individual and the community.

It is an attitude that stimulates the predisposition to understand the complexity and heterogeneity of phenomena and to design solutions capable of strengthening all relationships according to the varying scales of work focused on.

Scale and measure are essential criteria for interpreting and representing, for understanding the relationships between various elements and for questioning relationships of hierarchy, interconnection or complementarity. Therefore, taking multiscalarity as a fundamental element of architectural design means designing and giving shape to choices that occur coherently within general reference frameworks and, at the same time, are measured by the need to express one's own defined and individual character, i.e. these choices work towards design solutions capable of comprehensively interpreting the value of sustainability.

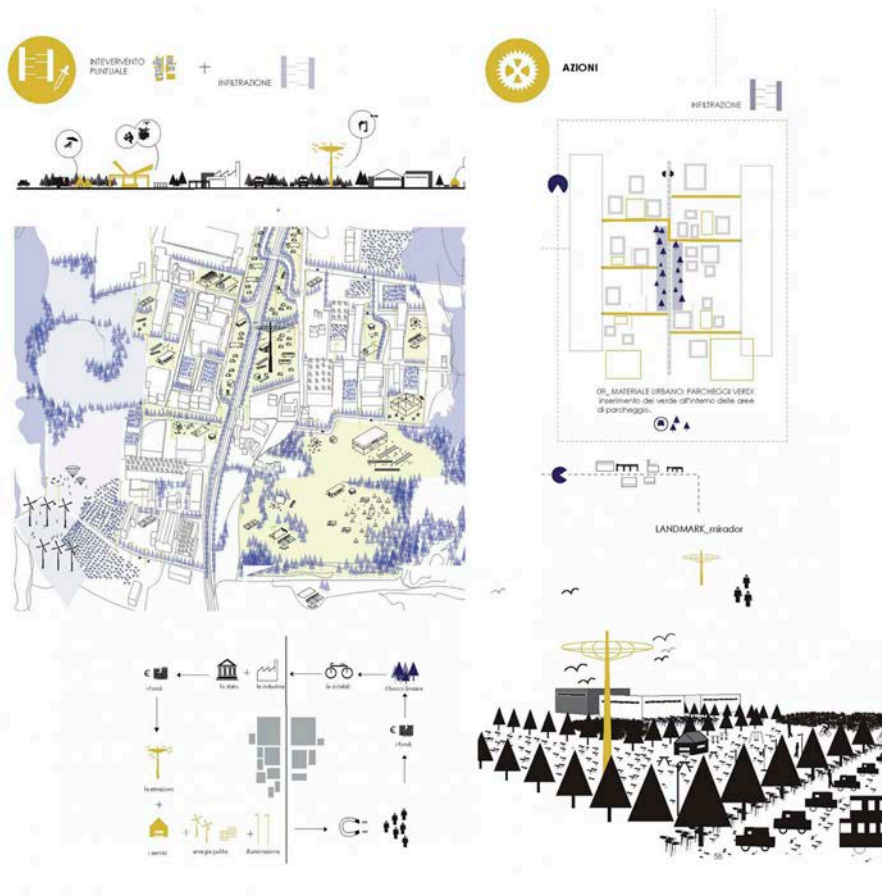
This approach allows us to follow our School's cultural tradition, which bases design on a careful reading of the scalar relationships between building and city, between architecture and urban system, and between landscape and man.



THE READING OF LANDSCAPE FEATURES AS THE APPLICATION OF SYSTEMIC KNOWLEDGE

The reading of the landscape represents a possible starting point for developing an awareness capable of providing a more in-depth and systematic knowledge of the material and immaterial values that make up architectural design. The landscape represents the visible features of the territory we inhabit; it contains the signs and traces of the collective perception of space and provides a means for understanding historical and social continuity. The landscape, represented by the shapes of natural environments and the image of places, constitutes consolidated collective heritage capable of giving shape to settlements and the land. The various scales at which students study

these phenomena offer them the opportunity to grasp and understand the meaning of the various relationships between built environments and the system of material and immaterial values that structure the city and the surrounding area. In this regard, there is no scale specific to architecture, the city or the landscape, but a comprehensive range of scales within which different design practices operate. In the programme, the landscape does not represent a scale for reading the territory: it crosses the scales of representation that make it possible to interpret the nature and consistency of relationships, their visible and perceptive aspects and their material and immaterial dimensions.



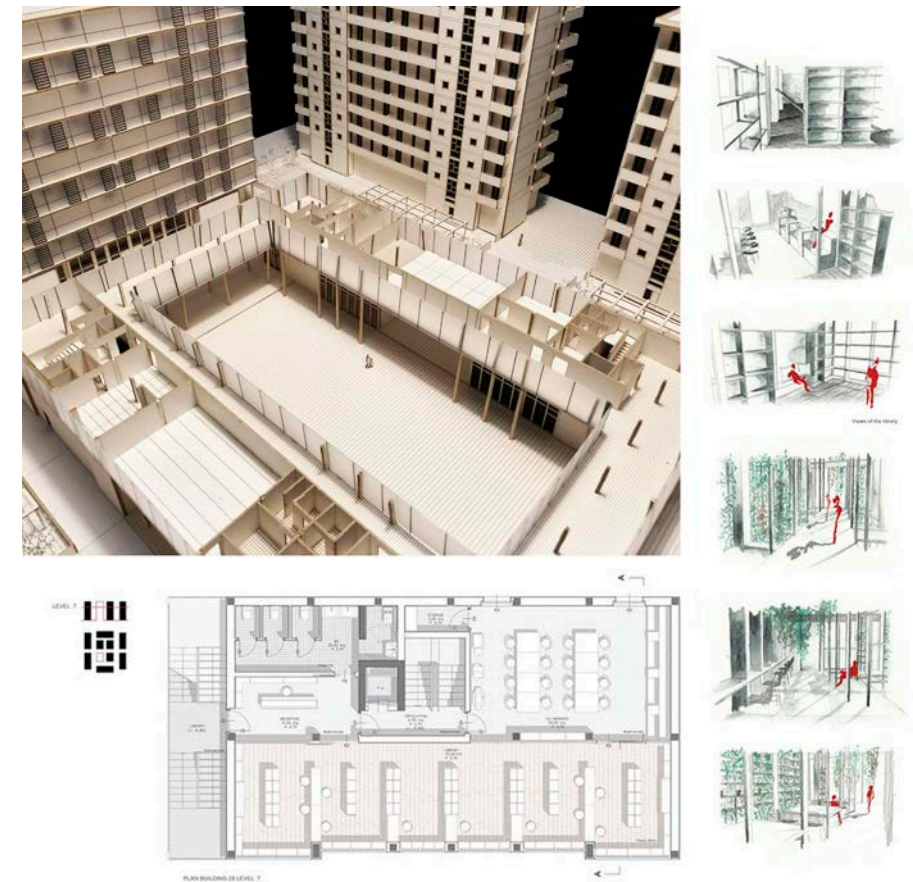
THE HUMAN DIMENSION OF ARCHITECTURAL INTERIORS

Designing architectural interiors allows the student to relate to the human dimension of space, referring to an all-encompassing design field of empathic and inclusive relationships between human beings and inhabited places.

This area of design concerns spaces in the home, places of work, business, and religious worship, museum exhibits, temporary exhibitions and events, scenography and furnishings, urban interiors and interstitial areas of the city. In relation to these spaces, design practice is particularly attentive to the issues of reuse and renovation of buildings, such as pre-existing architectural and urban

structures and our wider tangible and intangible heritage. The scale of the design ties the spatial domain together with furniture and detail.

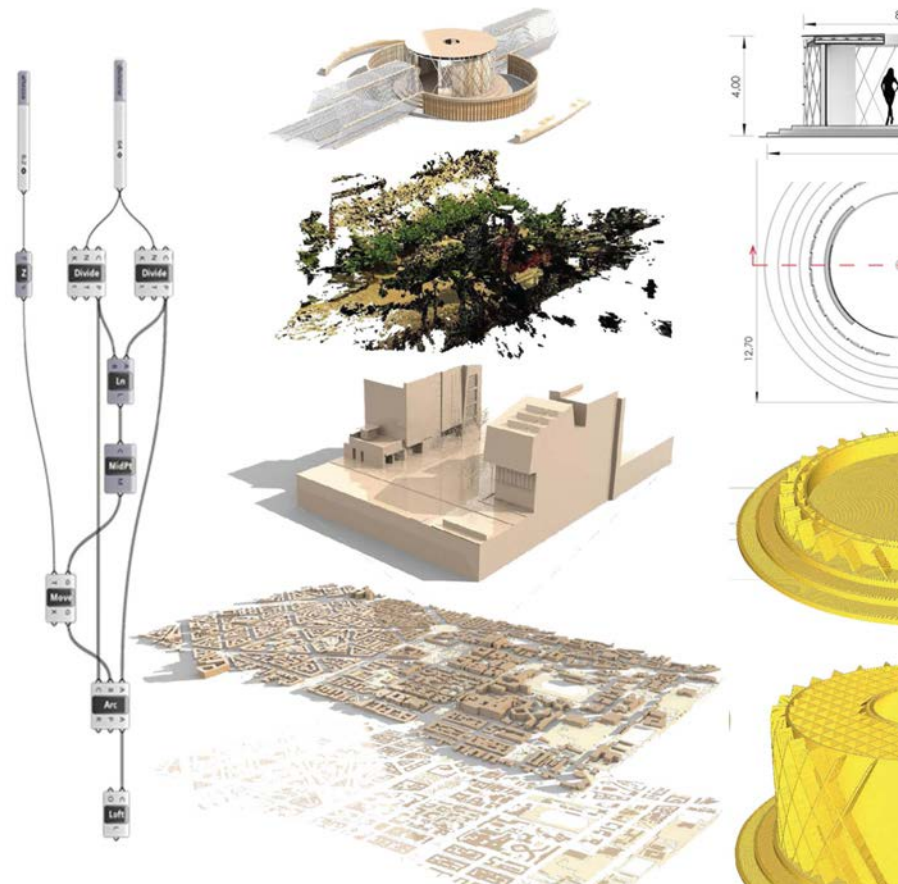
Finally, the design process is substantiated by theoretical and historical-critical issues relating to the culture of interiors, referring back to a founding tradition, in particular the Italian and European traditions, and to its masters, recognised worldwide as innovators of architectural design.



DESIGN: BETWEEN THE MATERIAL AND THE IMMATERIAL, THE ANALOGUE AND THE DIGITAL

Designing and building are at the centre of a process of rapid and profound transformation. But unlike other areas of human activity, new knowledge does not replace that which had been consolidated, but rather overlaps and merges with it. The digital does not cancel out the analogue, the immaterial does not do away with the material, but rather the digital and the immaterial offer an 'augmented' version of reality that puts the architect in an advantageous position compared to the past. The possibility of simulating the behaviour of things before building them and of having information available in real time, that once required onerous research, today allows us

to better understand the objects we work on and to perform such work with greater awareness. Throughout the programme, students learn to use tools that enable them to deal with the digital dimension of things in order to better tackle the design process in this hybrid environment. But at the same time they are required to make a great efforts to learn about concrete reality; how buildings are made, what are the processes and who are the people that allow you to transform an idea into architecture.

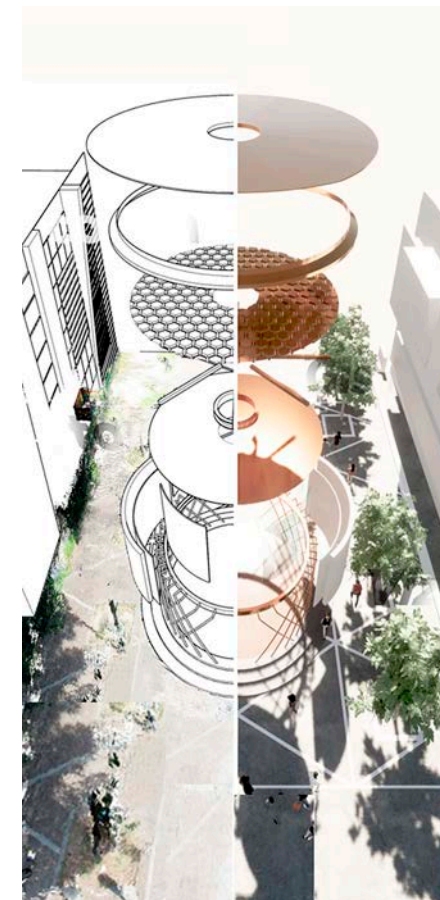


AUGMENTED REALITY: DIGITAL SKILLS

The introduction of the digital literacy program in the three-year Architecture course responds to an overt need for linguistic and instrumental updating, which has been implemented and promoted by UNESCO for a decade now. While the programme, entitled Digi Skills is strongly focused on the three-dimensional modelling of architectural space, it also offers a wide-ranging approach to digital skills, in line with the multidisciplinary and holistic character of architectural studies and the profession as a whole, whose traditional horizons are evidently 'augmented', not only on a purely operational level but also by the indisputable potential of the digital.

THE RELATIONSHIP WITH PRODUCTION, THE CONSTRUCTION SITE AND INTERNSHIP ACTIVITIES

The knowledge of how things are in practice, as well as their physical reality and procedural rigidity, constitutes a significant feature of the programme. Frequent interaction with various professionals in the design and construction process (from companies to the manufacturing industry), construction site experience and internship activities are major opportunities that allow students to see the work they do in the courses put into practice and to gain the right perspective of their own vocation: that of training an intellectual called to interpret the community's needs through the full control of a complex implementation process within a specific social and economic context.





URBAN PLANNING: CITIES, ENVIRONMENTS & LANDSCAPES

COORDINATOR
Andrea Arcidiacono

2018-2020
Paolo Galuzzi

DURATION
3 years

PLACES AVAILABLE
130 per year, of which 5 are reserved for non-EU students

LANGUAGE
Italian

COURSE
4 Laboratories, 5 Integrated courses, 11 Mono-disciplinary courses, 43 Professors SUBJECT AREAS Urban planning, history, design, sociology, economics, statistical mathematics, administrative law, urban geography, transport, geology and environmental sciences.

SKILLS
Interpretation of the city and the territories from an interdisciplinary perspective. Analytical and design skills for plans, urban programmes and sectoral policies. Ability to participate in design processes at different urban and territorial scales

*Laurea (equivalent to Bachelor of Science)
Milan*

The degree programme in Urban Planning was established in 1996 from a polytechnic perspective within the Faculty of Architecture of Milan.

What is Urban Planning? Over time, it has been given many meanings, but our degree programme considers Urban Planning to be practical and design-oriented knowledge. A set of applied knowledge that aims to help improve the quality of the spaces in the cities and territories in which we live and increase the well-being and quality of life of their inhabitants, at various scales and at differing levels of complexity, through actions, projects, programmes, plans and policies. This is practical and design-oriented knowledge that has always considered the city and the territory as its own fields of study - a reciprocal relationship which is intertwined with the environmental, landscape, ecological, social and economic issues that contemporary life presents.

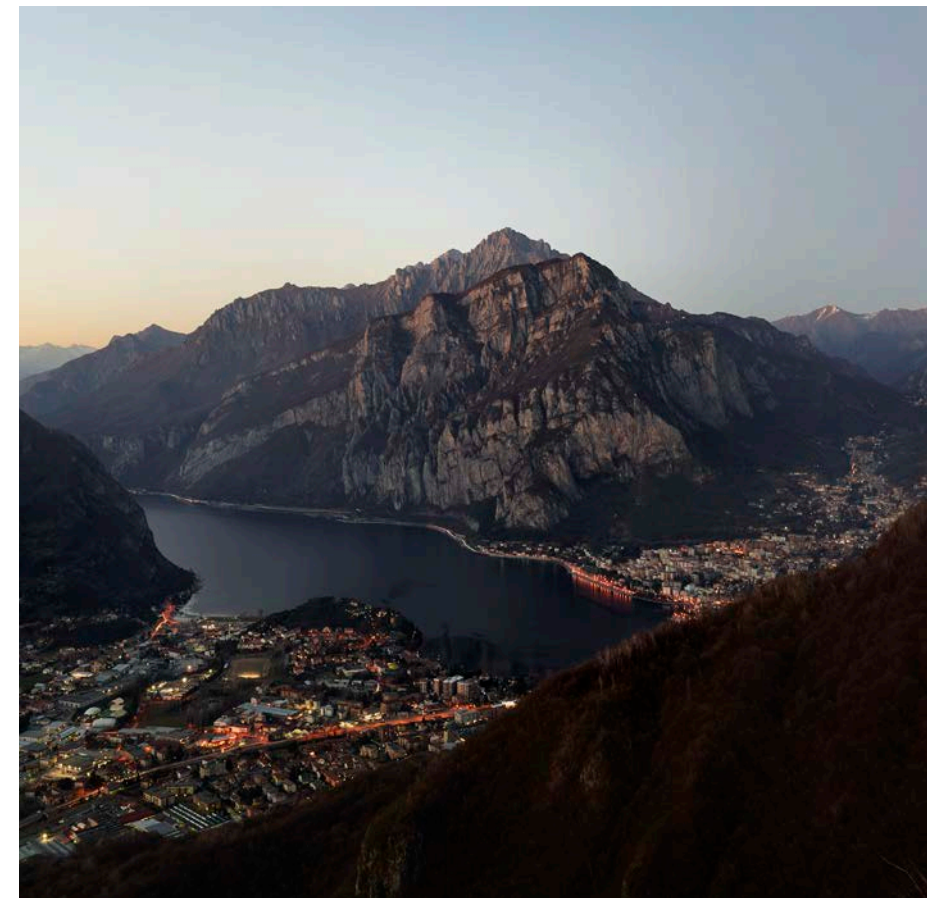
It is dynamic and interactive knowledge, able to dialogue and work in synergy with other fields of knowledge in a transdisciplinary manner, and to activate and involve the

final recipients of our design activity – the citizens, the people who inhabit cities and territories – in the processes of physical transformation. In 2014, in-keeping with these objectives, the degree programme chose the broader denomination of Urban Planning: Cities, Environment & Landscapes. The educational objectives of the UCEL degree program are operational and design-oriented; at their centre is the largest, most complex and stratified artefact made by man: the city, a place of social and spatial organisation of human life which is increasingly relevant in the contemporary world. In a historical era in which urbanisation processes worldwide are showing increasingly intense and unsustainable dynamics, contemporary cities are privileged places for urban planning from a perspective that focuses on sustainability, environmental, social, and economic issues as conditions for the effectiveness of design action. The design training of the UCEL programme combines humanistic knowledge with a solid technical-scientific basis and provides multidisciplinary knowledge that is useful for developing critical skills and design approaches in complex situations: projects, plans, programmes and policies for cities and territories. The three-year modular programme includes: design studios, which combine knowledge, investigation and design actions; integrated courses, which offer opportunities to experience interdisciplinarity and the combined contribution of different disciplines; and mono-disciplinary courses which deepen and consolidate the theoretical foundations for urban planning. This is a degree programme that stimulates strong student-faculty interaction and offers a wide range of internships as a bridge between training and professional practice. The faculty are directly involved in research in the fields of urban planning, including through substantial contributions from other fundamental disciplines – from the social sciences, to economic and environmental sciences – which is what distinguishes the training programme as one of excellence and helps to continuously improve it in order to correspond to the current needs and dynamics of the labour market. An important instrumental and research aid to the cultural and professional training pathway comes from the DASTU's experimental laboratory system, which includes the CCRRLab (the Climate Change, Risk and Resilience Laboratory), the MAUDLab (Mapping and Urban Data Lab), and the 'Fausto Curti' Urban Simulation Laboratory. These laboratories allow students to experiment with and apply the most innovative digital, modelling and simulation technologies in relation to urban and territorial phenomena as a further contribution to the increasingly robust integration between teaching and interdisciplinary research, with a strong focus on looking ahead to the urban challenges of tomorrow.

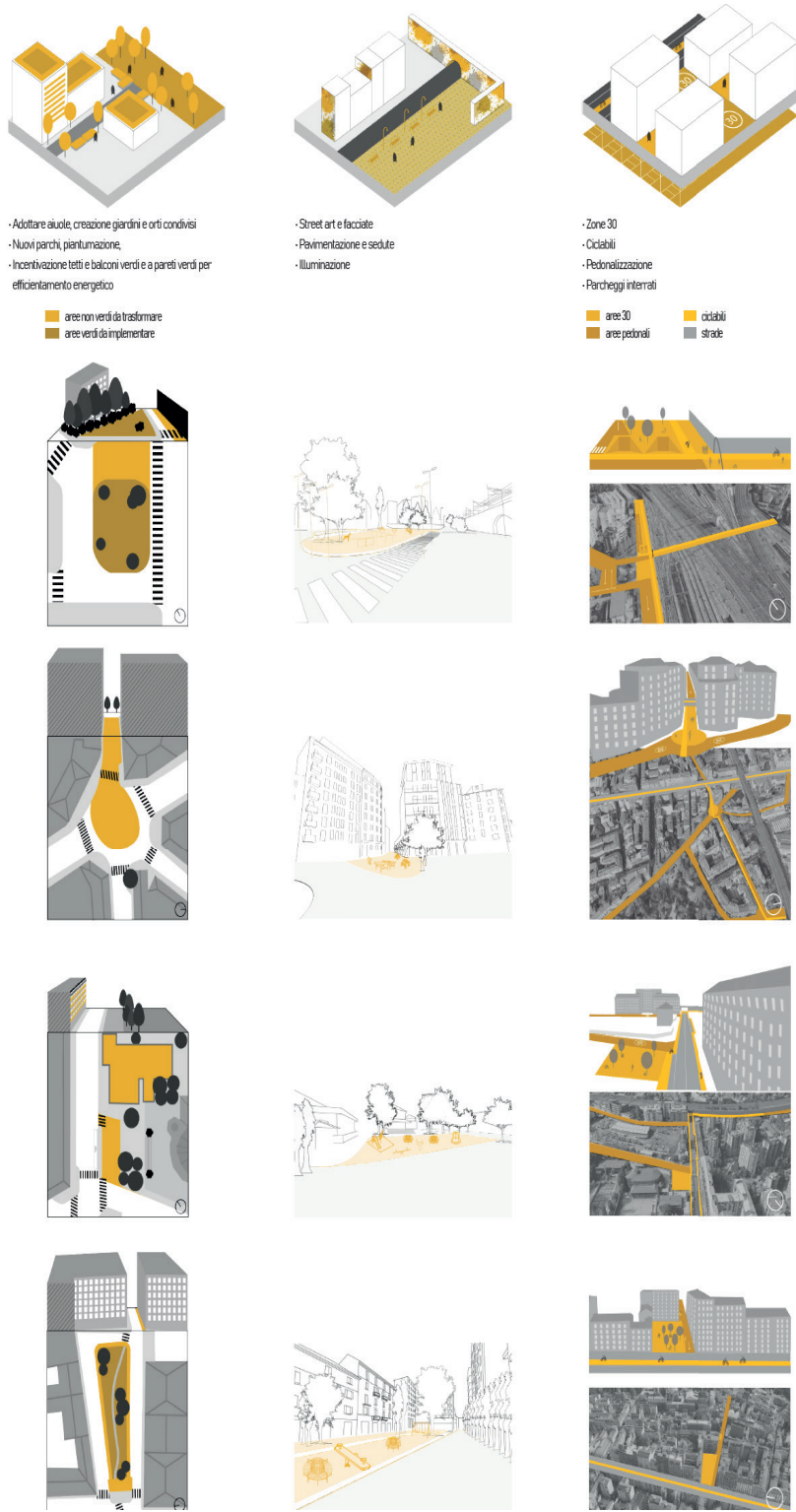
THE CRAFT OF THE URBAN PLANNER

The Urban Planning degree programme's curriculum aims to contribute to the development of urban planners, as a reflective and critical professionals, able to interpret, evaluate, design and manage the transformations of the city and surrounding area. At the end of the three-year course, graduates will possess the multidisciplinary knowledge necessary to design and manage transformation processes; use the theories, techniques and methods of urban and territorial planning and design; use their technical skills to deal with administrative procedures and complex processes. The programme responds to demand from public bodies, professional firms, research bodies, companies and other economic sectors

active in the processes of urban and territorial transformation by producing three main types of graduate: the analyst, the manager and the designer. With a view to continuing education, in addition to specialisation courses and first-level University Master's, graduates have several options to continue their studies, both within the AUIC School – with the Laurea Magistrale (equivalent to Master of Science) in Urban Planning and Policy Design or the Laurea Magistrale (equivalent to Master of Science) in Landscape Architecture - Land & Landscape Heritage – and in other universities, both in Italy and abroad, which offer a related programme, available as part of the AUIC's network of international relationships and exchanges.



LECCO (2019), FOTO DI F. SECCHI

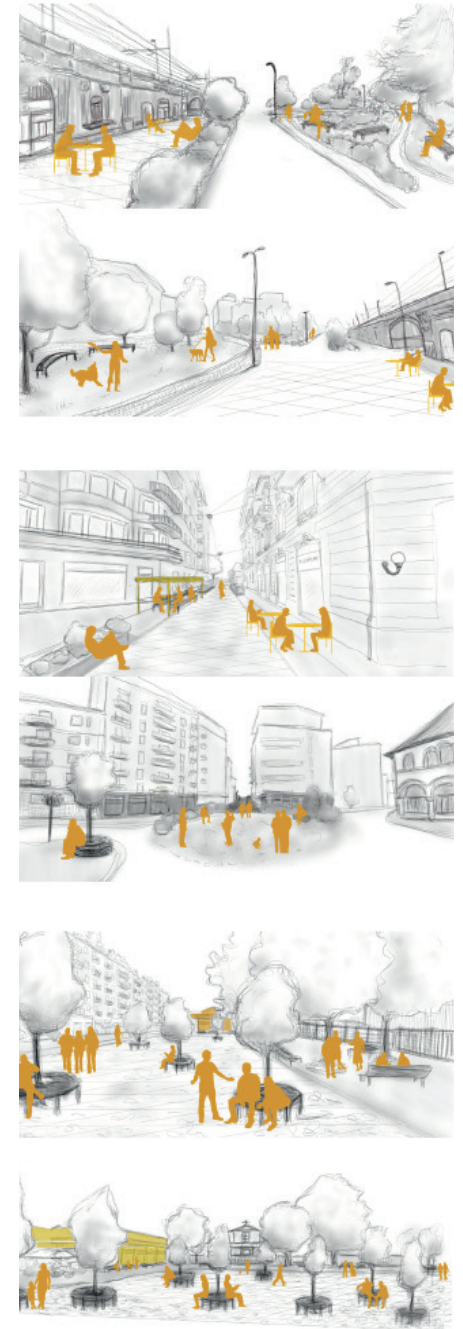


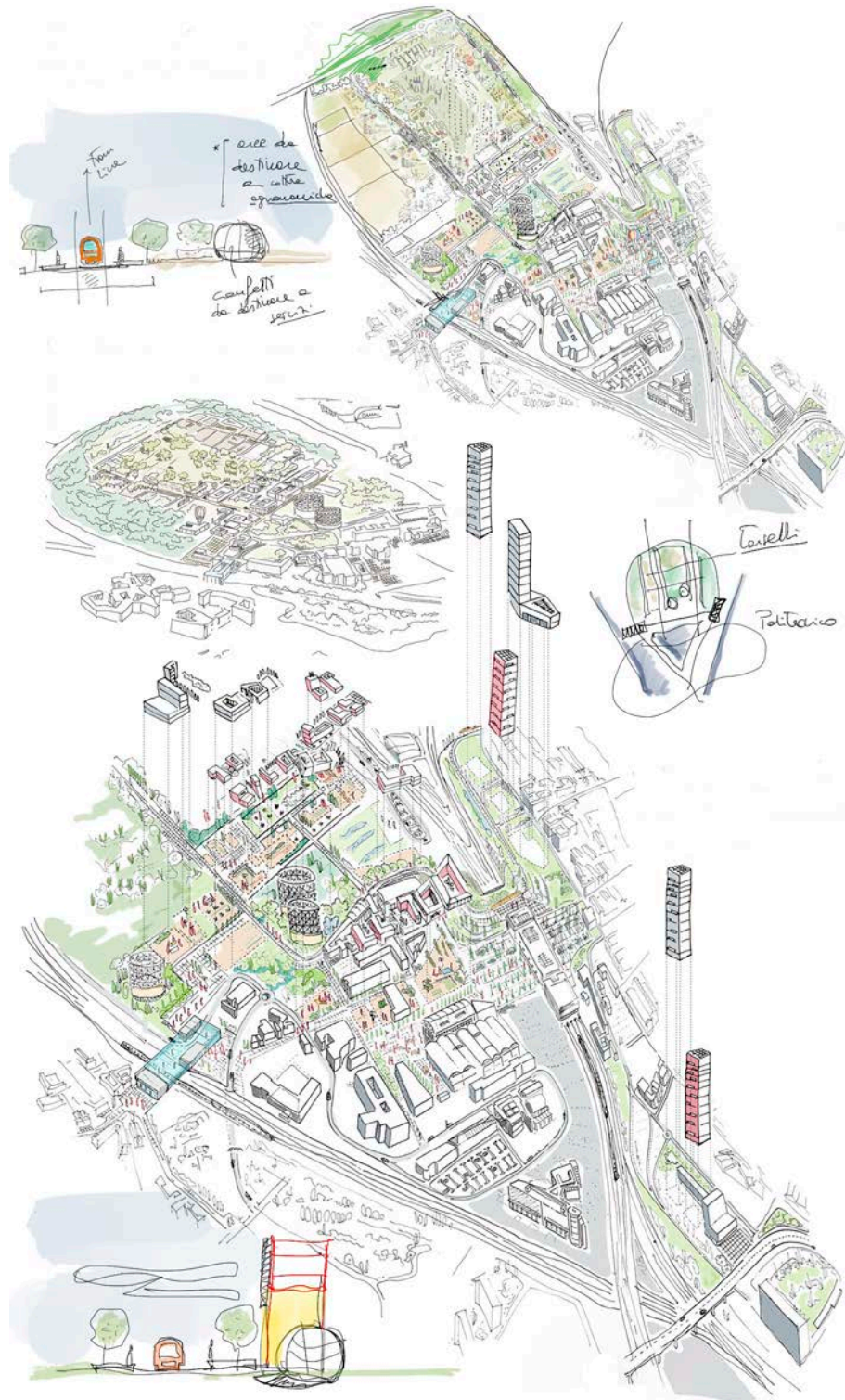
INTERPRETATIONS AND FIGURES OF THE CITY AND TERRITORY

The city, the territory itself, is silent. It is our ability to read and question it that makes it speak. The critical selection of different aspects, dimensions and relevant issues builds a tentative interpretation of those contexts, which is both the restitution of a profile and the expression of a design tension for transformation. In this fundamental operation of interpreting and designing urban environments, recourse is often made to the 'image' as a construct capable of condensing and synthetically expressing the salient features of that characterising profile. The interpretative image of a city or a territory is not necessarily visual and rooted in space. However, it becomes so when it becomes a 'territorial plan'.

Figure-making is a powerful device for the design-oriented interpretation of a territory. The territorial plan is a mode of schematic representation: the scheme retains the essentials, selects what is important and describes and proposes an architecture, a layout. The design of the territorial plan - the spatialised representation of a territory - can be practised in many different alternative ways - by "ecologies"; by systems, by landscapes, by themes ...; and yet, when it is used, it depicts the design rationale behind what the 'structure' makes of that context: in search of a principle of 'organisation and form'.

The idea of the need for a territorial representation is linked to an awareness of the long duration of spatial configurations: the forms of the territory - the organisation of the 'objects' that make up the settled landscapes - outlive the generations of 'subjects' that inhabit those territories, and will condition their lives. This means that sensitivity and responsibility are intrinsic to that interpretative act: giving organisation and shape to the territory through its figurative interpretation is an essential feature of urban design, and of the very meaning of this practical knowledge.

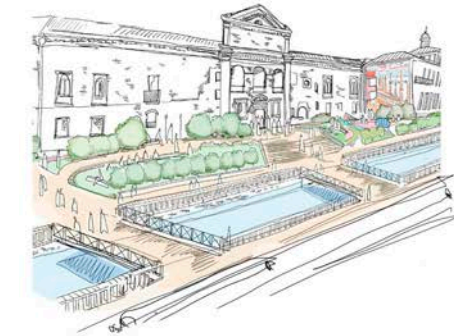
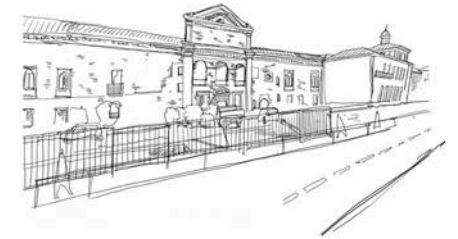


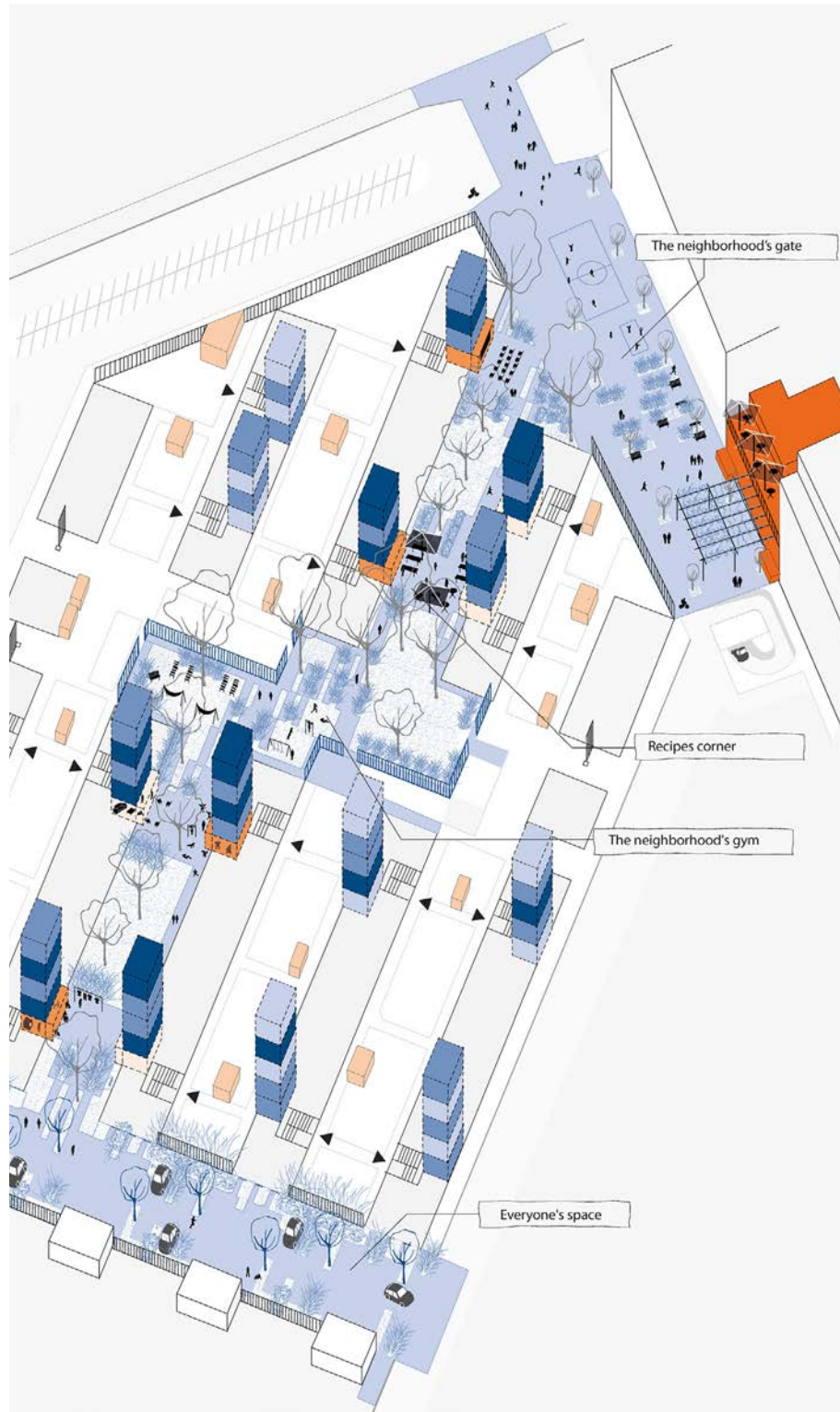


URBAN DESIGN

Although criss-crossed by contradictions, injustices, inequalities and conflicts, European cities are fascinating places of change, palimpsests of epochs, and the result of articulated grammars, syntax and urban languages comparable to a musical polyphony. The modelling of the physical space of the city – a combination of extraordinary and intensive actions (urban regeneration) and ordinary and widespread actions (care of the existing), tied to the ability to naturally read the context – is at the heart of urban planning; a multiscale design that holds together a plurality of dimensions: housing, social, economic, environmental, landscape, institutional, and participatory. For those involved in urban design, new challenges of great depth and beauty lie ahead – in our country, in Europe, and throughout the world.

Urban design – technical and practical knowledge, together with applied and multidisciplinary know-how – is above all the ability to express beauty, understood as a patient and continuous search for the quality of space in its different forms, built-up and open. Urban beauty: the composition of space and its dimensions, not only of the individual building, but of the choral nature of the relationship between public and private space, which can restore that homely feel of a historic city, with its empty spaces housing us as if they were interior, open-air spaces in a large home. Relational beauty: represented not only by relevant and appropriate architecture, but by its ability to build an urban fabric that gives meaning and measure to public and collective spaces. Civil beauty: the value capable of triggering virtuous relationships between the materiality of things (urbs) and the people who inhabit the city and bring it alive (civitas); human coexistence, the exchange of cultures and experiences, in one word: urbanity, the result of a rich and deep-rooted civil heritage.

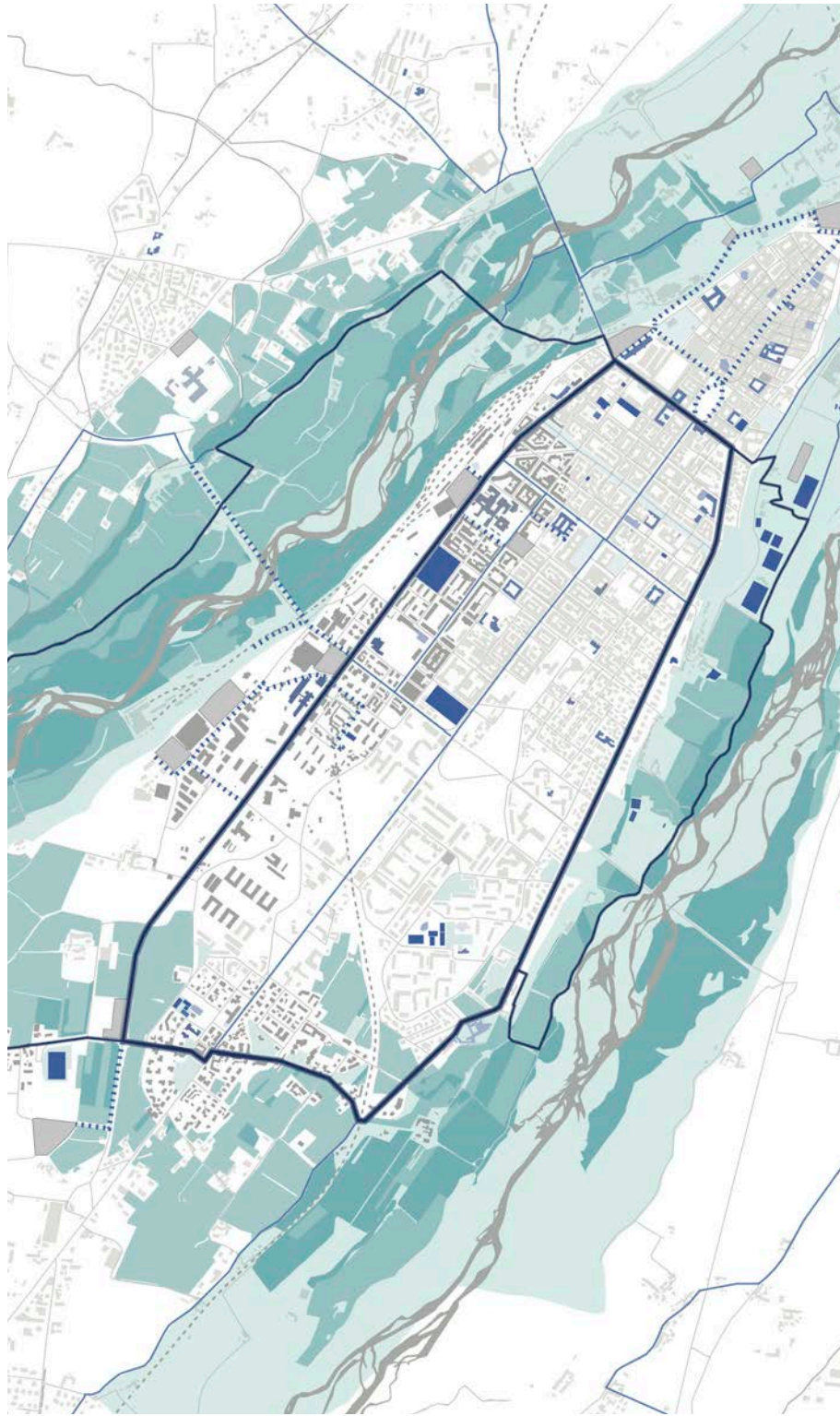




URBAN POLICIES

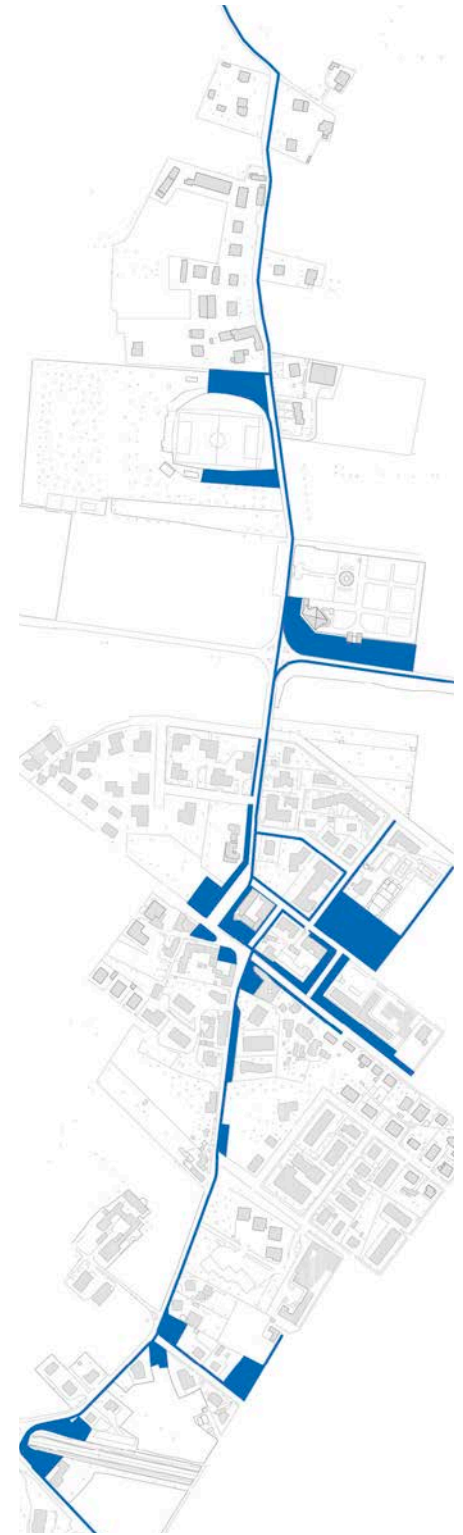
There are cities in the world where the meaning of the term 'policies' is very clear. 25 years ago, Medellín was considered the most dangerous city in the world. With the approval of the country's new constitution in 1991, the national government gave power to local governments and pledged to dismantle the crime network that gripped the country. In order to remove capital from this situation, the work was not limited to the safety of inhabitants: the emphasis was placed 'positively' on the city, its spaces, its neighbourhoods, its infrastructures and its people. This introduces the requirement that all cities have a plan, and that this must not be a simple document, but a process that involves citizens and gives them a say. The mayor of the time set up a task force of experts, architects, urban planners, engineers, sociologists, but also representatives from the local communities, and organised a series of workshops that envisioned a different future, such as the one created by one of the iconic projects of those years – a cableway connecting the poorest and most disadvantaged neighbourhoods, allowing everyone to go to work and school safely and efficiently. The mayor made use of special resources that came from the state, but also from the local municipality-owned energy company, which supplied power and used the autonomy enshrined in the new constitution to transform Medellín into a city that is not only less dangerous, but more liveable. These are (public) policies: a set of decisions and activities that aim to solve a collective problem, an unfulfilled need, an opportunity, which can be achieved through public action. The degree programme offers students a critical perspective on the problems of the contemporary city and on how public (and other) actors try to define and address these problems today.





CLIMATE VULNERABILITY AND SUSTAINABILITY

Awareness of the acceleration of the impacts of climate change on the planet has led countries around the world to promote various global policies of sustainability and climate action (mitigation and adaptation) in recent years. Whilst the Sustainable Development Goals of the 2030 Agenda (SDGs) and the commitments of the Paris Agreement have been agreed globally, the local role of cities and territories is fundamental in translating policies into concrete contributions towards sustainability and resilience. The current challenge for urban planning is to “territorialise” the SDGs. Therefore, new knowledge and tools are needed to respond effectively to that challenge. The urban planner is now called upon to measure and assess the impacts of planning and design choices with respect to the use of both tangible resources (soil, energy, water, biomass) and intangible resources (flows of people and goods, information). In a growing drive to regenerate existing heritage, it is important to know how to identify and locate local resources and capabilities, with the active involvement of territories, building solid cognitive frameworks in terms of mitigation and adaptation strategies. To address mitigation at an urban and territorial level, it is necessary to determine the potential for reducing energy demand, improving efficiency and producing local renewable energy. To respond to this adaptation, one priority is to identify climatic risks, such as increasingly extreme temperatures and intense precipitation. The (social and environmental) vulnerability maps highlight particular local features and provide an indications of how to proceed with the redesigning of places in order to identify tailor-made actions and solutions. Green and blue infrastructures and Nature Based Solutions (NBS) are today the ‘raw materials’ of urban planning, integrated into planning tools at different scales and capable of promoting adaptive and resilient urban models.





OPEN SPACES, ENVIRONMENT & LANDSCAPE

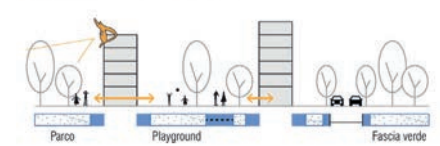
The urban scene in which daily or long-lasting collective rituals take place; that we cross distracted, alone, with others, by car, on foot or by bicycle, and where we meet; as well as the green-filled spaces, agricultural fields, terraces, small gardens and large parks, riverfronts and the road network for both slow and fast mobility, are all open spaces. These green, blue and grey infrastructures are the backbone that organises, gives meaning to and reassembles different and fragmented cities and territories. On the one hand, they are the substratum of movement and social interaction, and on the other, ecological spaces where the thickness of the soil can safeguard water, air and food cycles and thus the health of species, including humans, and the planet. These spaces are mostly the result of a design, implementation, management and care process that, in various forms, involves the skills of the urban planner. And it is the urban planner who, in the current fragile environmental condition, often has the task of explaining the need to safeguard nature and the landscape in public decision-making arenas, with respect to territorial planning choices.

Thus, the task of the urban planner – which may be technical or carried out by coordinating different areas of expertise – ranges from the planning of accessibility and multimodal mobility to the design of public space, from the design of ecological connectivity and ecosystem services to the participatory devising of climate change adaptation and mitigation strategies. These activities are carried out through urban design and planning, urban and landscape design and urban and territorial policies. This is done with the awareness that action taken on open space is the framework for a morphogenetic design of cities and territories, which can easily become removed from the reason for which it was created and become a constraint and invariant. It becomes part of the continuous rewriting of the palimpsest that characterises the man-made environment.

1. SEZIONE DELLA "ORTO STREET"



2. SEZIONE DELLA "AGRI ROUTE"



3. SEZIONE DEL "LAM QUARTER"



MATERIALI e OGGETTI DELLO SPAZIO APERTO





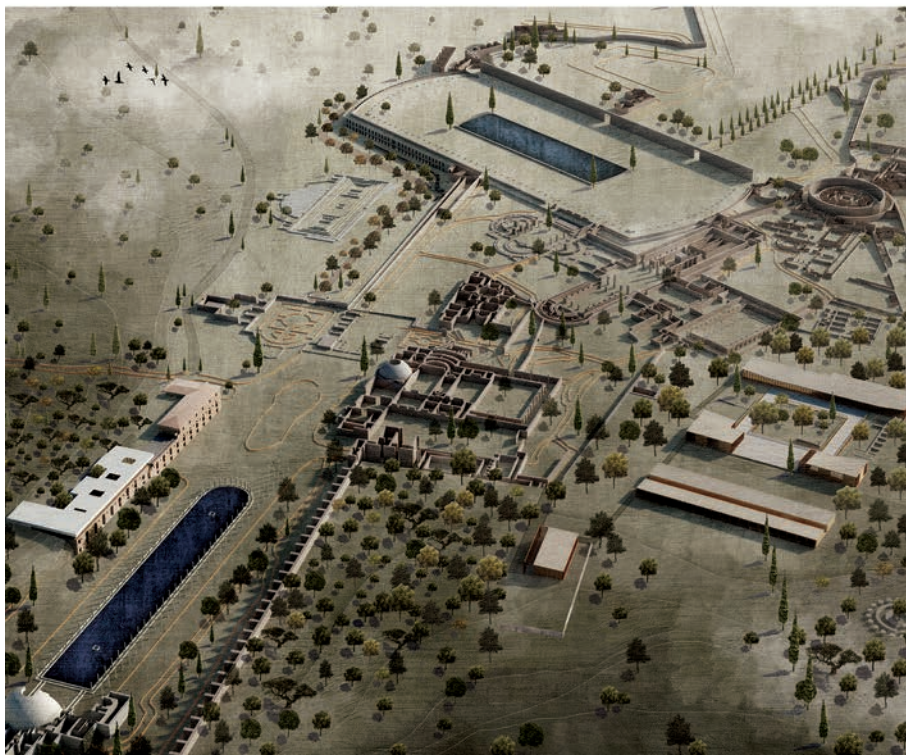
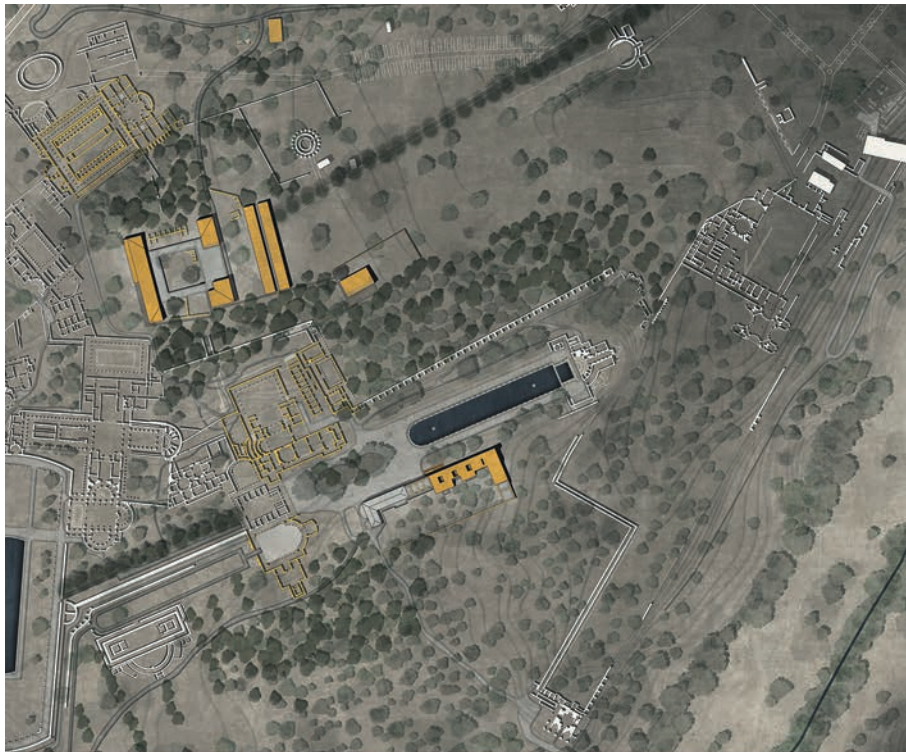
MOVING WITHIN CONTEMPORARY TERRITORIES

The location of production activities, residences, services, logistics and, to a lesser extent, recreational facilities, is also largely dependent on accessibility conditions. Traditional public action on the planning and creation of services can partly influence these dynamics towards different and – possibly – more desirable structures, but these are also strongly influenced by market forces (individual choices, pricing system, etc.). The role and tools of transport and mobility planning are therefore complex. On the one hand, public action acts on the supply side, establishing service levels and designing the evolution of the networks. On the other hand, the regulation of demand becomes important, through the increasingly stringent measures of nudging, policies, prices and bans.

The increasing attention to environmental and sustainability issues and the growing sensitivity of citizens and companies have led to visible changes; however, so far only a few market or territorial niches have been affected. Their mass diffusion is made difficult due to public and private costs, as well as the inevitable inertia of the territorial structure.

The practice and study of transport planning therefore require wide-ranging skills: technical (relating to transport systems and their design and management), economic (for evaluating the effects of actions and for their effective and efficient design), regulatory (relating to the structure of transport markets and their varying degrees of liberalisation), technological (relating to the increasingly pervasive role of IT in mobility choices, but also in the techniques for surveying mobility), as well as, of course, territorial (mobility is, first and foremost, linked to places and the relationship between them) and social (mobility practices change between social groups).





ARCHITECTURAL DESIGN AND HISTORY - PROGETTAZIONE ARCHITETTONICA E STORIA

COORDINATOR
Carlo Peraboni

2019-2021
Luigi Mario Lorenzo Spinelli

2016-2018
Luigi Mario Lorenzo Spinelli

DURATION
2 Years

ENROLLED STUDENTS
100/year

LANGUAGE
English

*Laurea Magistrale (equivalent to Master of Science),
Mantua*

The Laurea Magistrale (equivalent to Master of Science) Programme in Architectural Design and History, in the specific context of the exceptional field of study offered by the city of Mantua and its territory, offers a curriculum that focuses on the design of architecture and the new and historical built environment.

The programme offers a curriculum that clearly seeks to form a profile of great awareness and preparation, following paths that interweave disciplinary fields with other artistic and cultural fields, tracing a close relationship between research and training.

The cities and territories in which architectural designers work today are complex, highly characterised and stratified, formed over time in different ways. The objective conditions of the environment in which we live impose primary and prevalent design interventions on the built environment. The logic of consumption applied to date has proved to be a waste of material and content, giving rise to the need for an approach that centres around the idea that building, architectural and landscape heritage are

resources to be protected and should be essential in the theory behind the design of a sustainable city and territory. This responds to an ethical responsibility of architectural design, which must be matched by the possession of specific technical and humanistic skills.

The Laurea Magistrale Programme is in line with this attitude and offers a curriculum characterised by an integrated disciplinary approach, clearly aimed at training an architectural designer who is educated in and conscious of history and, at the same time, able to tackle a complex and dynamic field such as intervention in historical and built contexts using appropriate and innovative methods. Within this vision, the design of the new, on the urban and architectural scale, fits into and is compared with the existing heritage – the buildings, the fabric and the urban space – measuring its consistency and history on the basis of its formal, typological-constructive and technological contents, with specific details dedicated to safety in seismic environments. History, understood as knowledge and experience of the built and urban space, recorded in the forms and architecture of cities, places and landscapes, is the cultural substratum of design proposals and suggests several possible strategies: reuse, redevelopment and consolidation, completion or new insertion. It is worth mentioning two moments of interest associated with the Laurea Magistrale Programme. For several years now, Mantua has hosted cultural architecture-related events in the month of May. It is an exceptional time in which spaces of absolute architectural value, both open to the public and lesser known, come back to life through communication, debate and joint work, in a state of urban re-appropriation enlivened by the spring season. It is not just a well-established festival of events on contemporary themes: the events are directly integrated into the classes of the Laurea Magistrale, whose long-standing presence in areas concerning architecture and history, concretely rooted in the Mantuan context, offers the city an international vocation.

Furthermore, in August 2018, the Laurea Magistrale Programme on the Mantua Campus of the Politecnico di Milano's AUIC School won the International Design Call for the Grande Villa Adriana Designing the UNESCO Buffer Zone, with a project coordinated by Eduardo Souto de Moura, Federico Bucci, Angelo Lorenzi and Barbara Bogoni. The Scientific Merit Award, organised as part of the Piranesi Prix de Rome 2018 by the Accademia Adrianea for Architecture and Archaeology, was awarded by an International Scientific Commission. The proposal intended to enhance ancient and contemporary documents by reconfiguring the vast area through the construction of a necessary and indelible relationship between the remains and fragments that characterise the urbanised and natural landscape. The landscape is the subject, the tool and the ultimate goal of the project; it places the extraordinary space of Villa Adriana at the centre of a productive and intensely modern life, integrating features which, in the past and today, convey the beauty of these places.

UNESCO CHAIR AND MANTOVARCHITETTURA

The Mantua Campus combines the values of belonging to the system of great traditional universities and the added value of belonging to a specific area, characterised mainly by the extraordinary nature of its architectural and cultural heritage. The Mantua Campus is committed to becoming increasingly specialised with regard to the safeguarding and enhancing of cultural and architectural heritage through the teaching and research activities carried out on site.

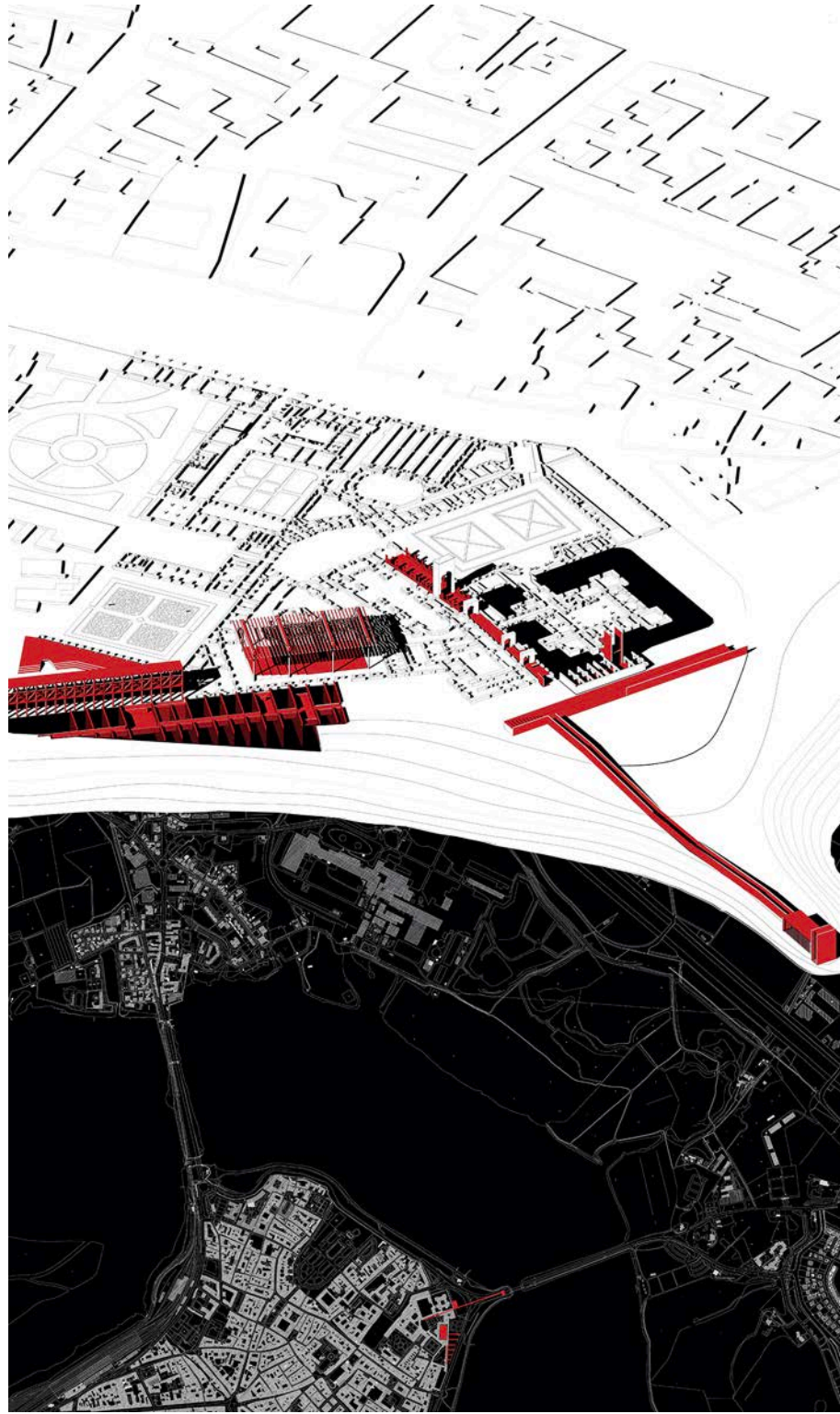
The UNESCO Chair for 'Architectural Planning and Protection in World Heritage Cities' aims to combine different disciplines and

technologies in order to efficiently manage complex and multiscale issues of architectural and environmental protection in contemporary cities.

MANTOVARCHITETTURA is a cultural project conceived and organised by the Territorial Pole of Mantua as part of the activities of the UNESCO Chair. Since 2012, the initiative has offered a rich program of exhibitions, workshops, conferences and meetings with the protagonists of international architectural culture, which transform Mantua into a Capital of Architecture in May every year.



THE CITY OF MANTUA AND ITS CONNECTION WITH WATER

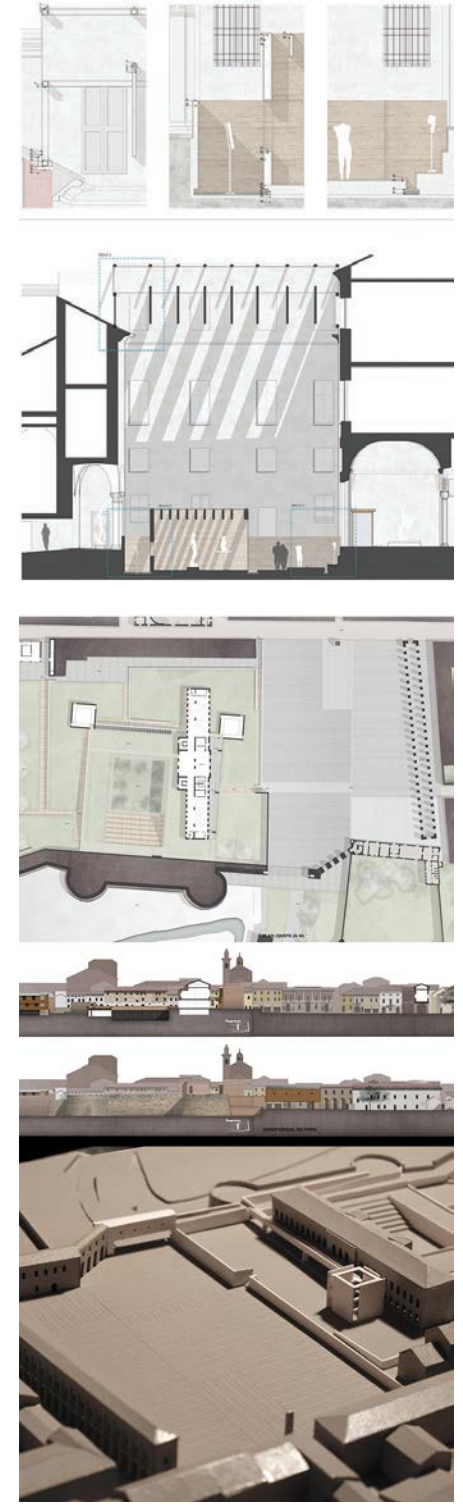


ANCIENT AND NEW

Calling the inherited curriculum into question made it possible to envision – as the conclusion of the two-year course – a final studio project, with the potential to become the centre of the educational experience thanks to the innovative programme offered, as well as a concrete approach to the thesis, written to specifically address themes concerning urban design – in its different expressions – within the historical building.

Architecture and history – which solidly anchor the School in its host city Mantua – have become the two terms of comparison on which to structure the relationship with disciplinary research, by targeting, from the outset, design research within a contraction and expansion of virtuous relationships between the Ancient and the New. But in these positive relationships, which have always been suspended between story and memory, between reality and transformation and even more clearly, between tradition and innovation, the solid foundation of plentiful imagination is the natural glue holding the design where – in the widest possible sense – it belongs. That proper anchoring to an environment, which is not only physical but also abstract, and represents the cultural basin that produced it, is an indescribable syllogism that also draws the design from the characteristics of the site.

The Mantuan expression of this theme finds, within the city and in the territory more generally, concrete synergies with local institutions – from the Ducal Palace to the Palazzo del Te, and even the Renaissance city of Sabbioneta – in order to identify, in close dialogue between the various protagonists, contemporary needs and thus enhance the historical and cultural heritage. Therefore, while paying this amount of attention to Mantua and its territory, one cannot help but consider, through design, the fate of the city and its spaces. Adjectives, adverbs and other elements coalesce to create that material constructed from the crystalline, perfect, geometric structure that is ducal design. A close dialogue that continues in this direction and represents the specificity of the School.

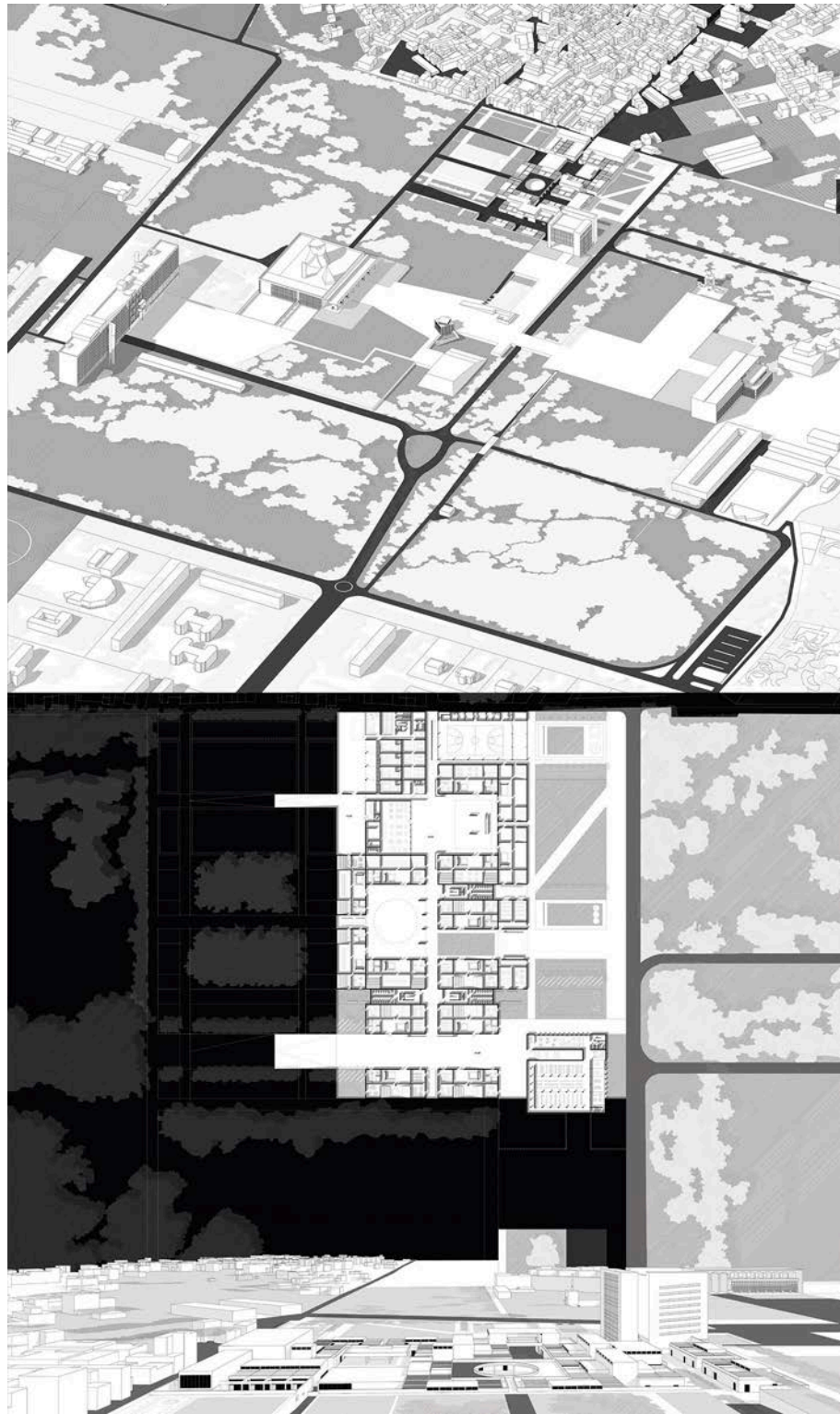


01. TEMPLE, SWIMMING POOL AND CANOPY A NEW GIP-SOTECA IN THE CORTE VECCHIA OF PALAZZO DUCALE, MANTUA

THESIS BY CAROLINE KROEGER; SUPERVISOR: PROF. LUIGI SPINELLI, A.Y. 2016-2017

02. THE CITY AND THE ROCK PIAZZA D'ARMI REDEVELOPMENT PROJECT IN SABBIONETA.

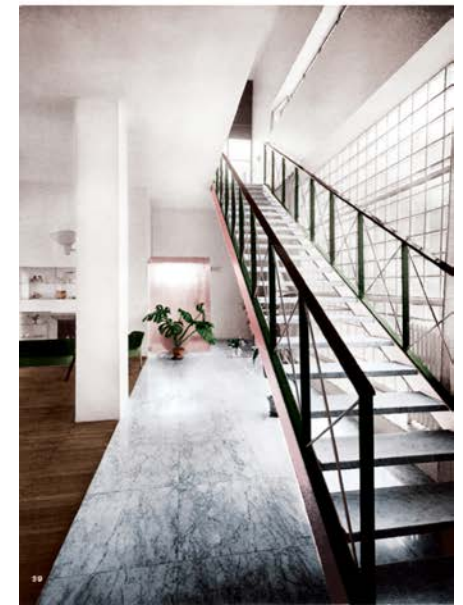
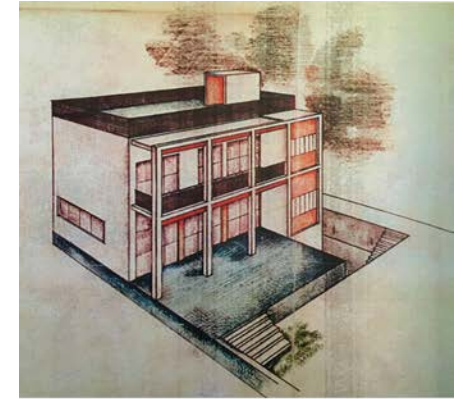
THESIS BY ANNALISA LUGLI; SUPERVISOR: PROF. ANGELO LORENZI; CO-SUPERVISOR: PROF. HELDER CASAL RIBEIRO A.Y. 2016/2017



WORKING WITH THE MASTERS

Increasingly present in our modern world, dialogue with the architecture of the near past – the architecture of the Twentieth Century – reminds us that in reality there is no absolute value judgement within the relationship between past and future, making it impossible to devise a universal categorisation to aid the practice of conservation. In this regard, the concept of Heritage today opens up to a possible broader interpretation which, in addition to the various scales of design, also considers the temporal distance between us and what preceded us, with an intellectual honesty capable of placing antiquity alongside more recent 'cornerstone' buildings of the last century without prejudice. Thus, research into, care for and often the enhancement of the architecture and architects closest to us chronologically represent one of the most concrete challenges posed to the contemporary world. Recognising the tangible and intangible qualities of this Heritage is the first phase of an interdisciplinary design that acts as a bridge between memory and the demands of contemporary life. Only in this way can disciplinary research do justice to the most typical character of our cities' tradition which, as in a continuous substructure, transforms, expands and aligns itself in a fruitful dialogue. It is a necessary transformation that often completes, increases and clarifies known architecture, that becomes a sensitive engine of possible re-imaginings, from Le Corbusier's Chandigarh to Eero Saarinen's Athens to Zen in Palermo.

This often close dialogue with those figures we consider 'masters' goes beyond the discipline of architectural composition, and shows how the philological work of rediscovering Franco Albini's drawings in colour allows us to read past designs with new tools by investigating, in the available sources, information on the quality of spaces and materials and transforming black and white images with colours convincingly similar to those of a time gone by.

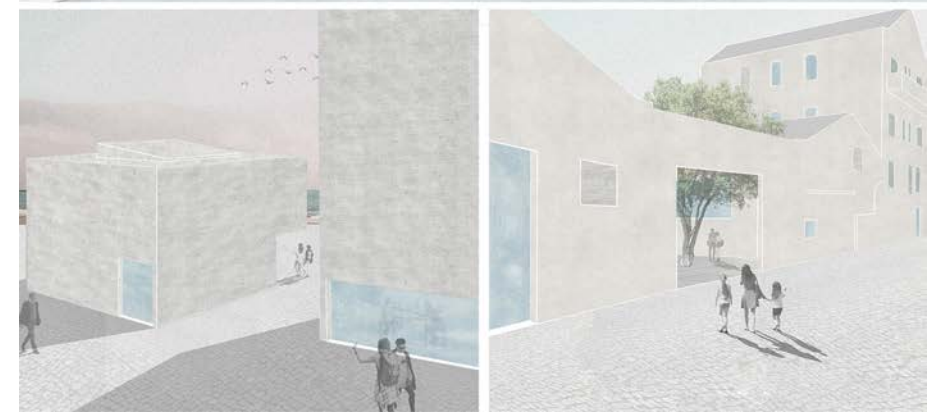
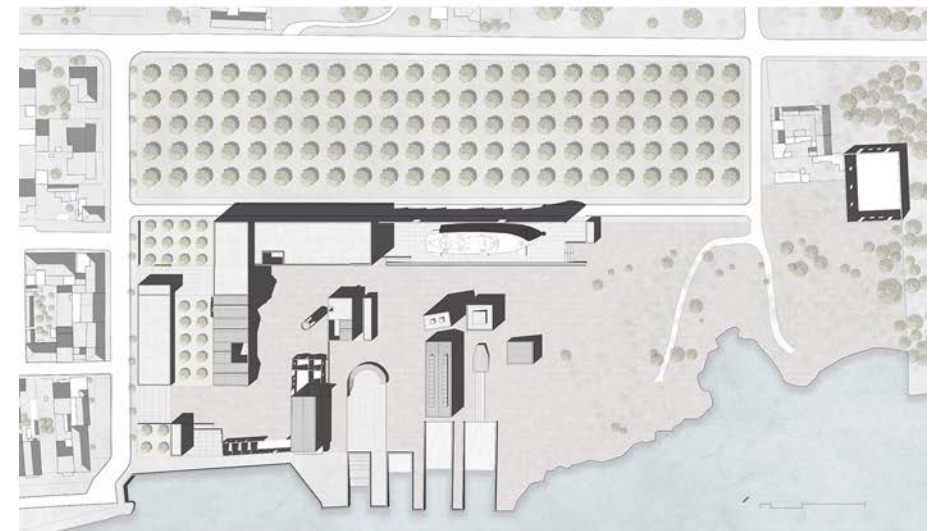
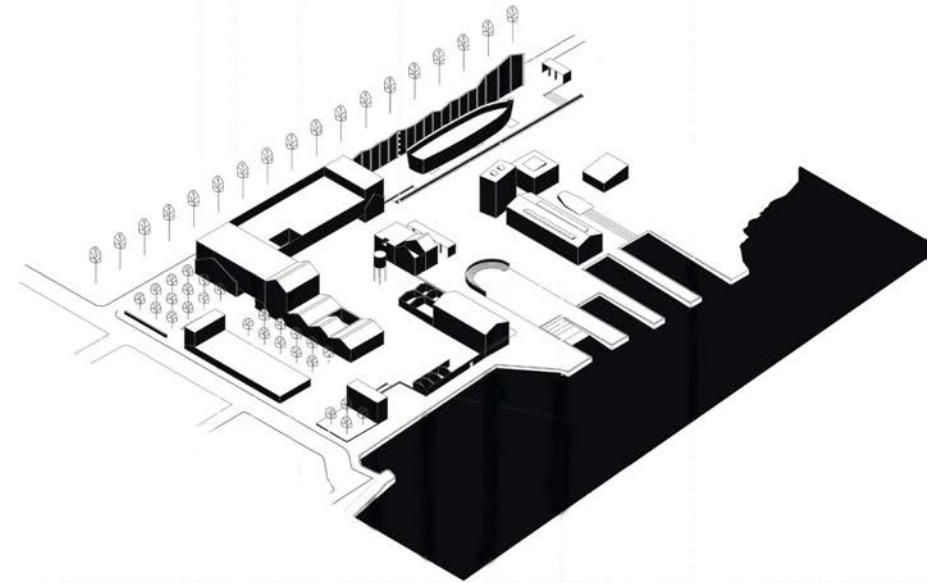


LOOKING BEYOND THE BORDERS

The attention and care devoted to knowledge of the specific features of architecture in such a privileged field of action as that of the Mantua area, in close dialogue with the existing heritage – with a view to its enhancement and transformation – imply, conversely, the possibility of an equally profound and fertile comparison with environments that are so geographically distant but culturally aligned and close. Looking to distant places, with the knowledge to be able to search for and rediscover environments and places of design action that are equally emblematic and linked to the consolidated history and intrinsic quality of the spaces, allows the architect to review and to put the work carried out in his vicinity

to the test. Problems to be confronted and new experiences to be faced characterise designs in Portugal or Latin America by privileging, without excluding other latitudes, environmental units that are equivalent or only comparable to the better-known spaces that seek to show from afar the most proper and recognised qualities and values. Interpreting space thus becomes the possibility of a broad knowledge that translates the meaning of design into various languages, its ability to read from afar defined territories and needs which we would never have imagined could be transferred over to become an instrument of knowledge and research in comparison with the present closest to us.

REVITALISATION OF THE HISTORIC CORE OF HYDERABAD
THESIS BY RAHUL PALAGANI AND RAMYA NANDYALA; SUPERVISOR: PROF. ANGELO LORENZI; A.Y. 2018/2019



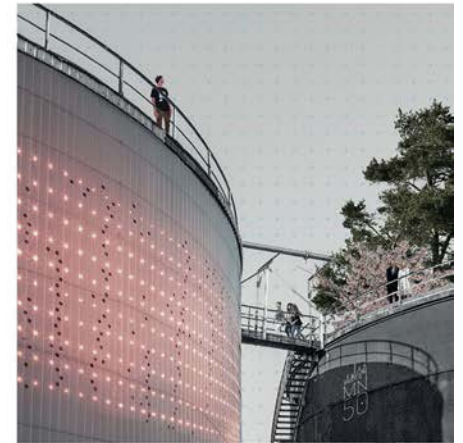
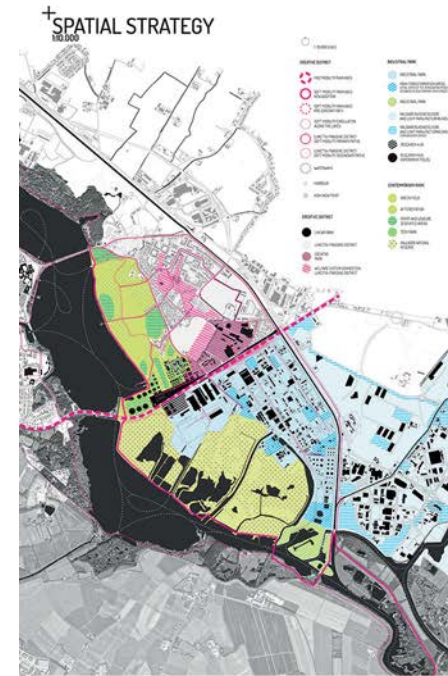
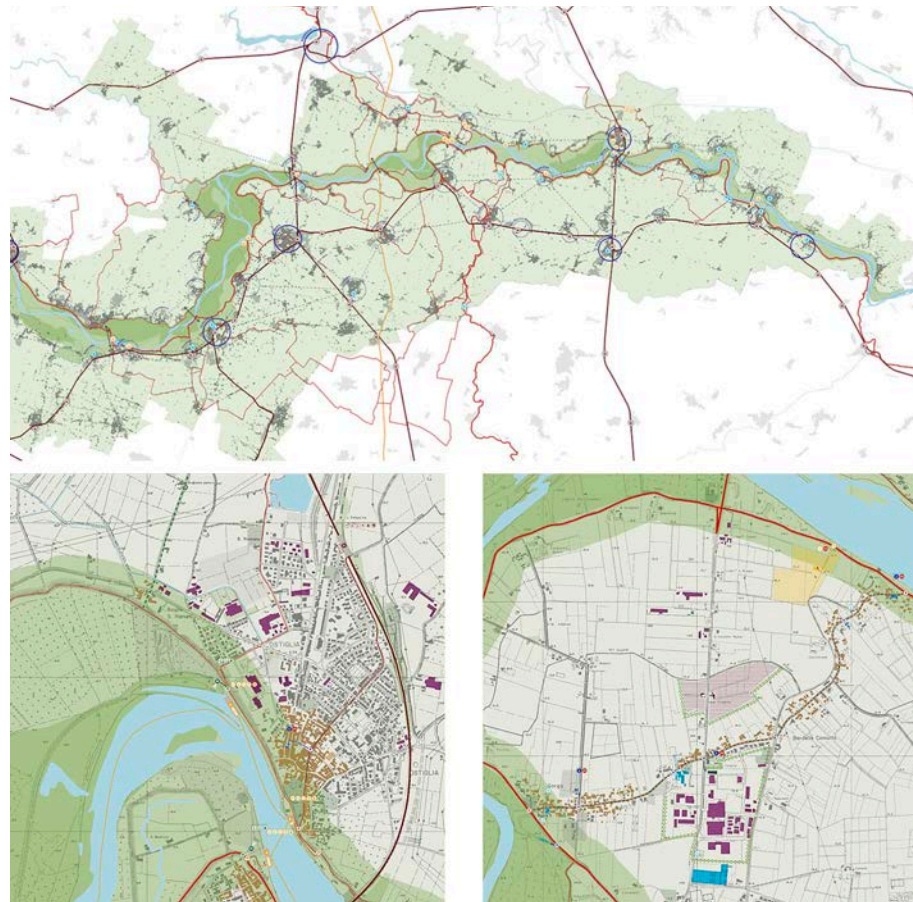
INDUSTRY AND CULTURE. INTERPRETING S. JACINTO SHIPYARDS, PORTUGAL
THESIS BY FERESHTEH NAZARI; SUPERVISOR: PROF. BARBARA BOGONI; CO-SUPERVISOR: PROF. HELDER CASAL RIBEIRO A.Y. 2018/2019

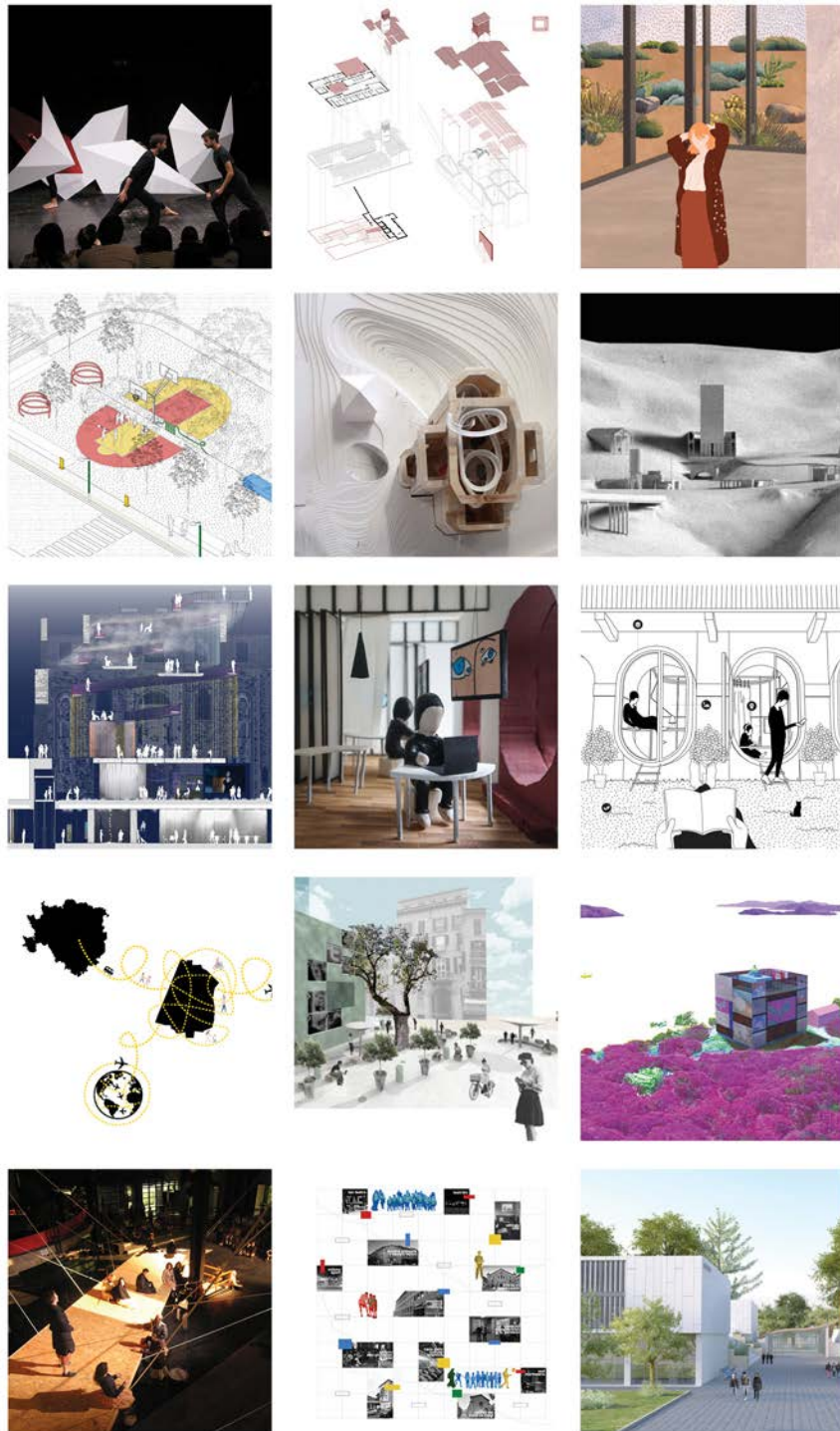
LANDSCAPE AND HISTORICAL CONTEXT PLANNING

Landscape and urban design are the contemporary instrument for reconnecting all those heterogeneous and often fragmented places that are the result of recent planning that has not always been in line with historic heritage.

The opportunity for research, driven by concrete design, therefore opens up the possibility of tackling complex problems that simultaneously concern aspects of urban design and landscape architecture related to territorial transformations. In the variation of geographical and cultural contexts, broad-scale design becomes capable of deploying tools – intellectual and scientific – that can be used to identify the various problems of the city and

the landscape and in turn identify the need for a physical design. The enhancement of Mantua's urban edges through the study of the way they shape interactions with the city and the lakes, as well as the redefinition of the industrial city as a driving force behind the coherent transformation of a wider territory, are just some of the concrete possibilities for putting the advocated settlement strategies to the test. The application of principles such as experimentation, temporariness and sustainability – topics which cannot be avoided if one hopes to obtain a quality and environmentally friendly design – is done with the aim of enhancing the existing heritage on a multiscale basis.





COORDINATOR
Pierluigi Salvadeo

2018-2020
Gennaro Postiglione

2016-2017
Gennaro Postiglione

DURATION
2 Years

PLACES AVAILABLE
200 on the Italian track
200 on the English track

ARCHITECTURE - BUILT ENVIRONMENT - INTERIORS ARCHITETTURA - AMBIENTE COSTRUITO - INTERNI

*Laurea Magistrale (equivalent to Master of Science)
Milan*

The stable and defined identity once attributed to urban spaces now seems to be dissolving under the pressure of material and immaterial flows, increasingly heterogeneous and composite, made up of people and things, data and information, goods and waste, and more. New connections and new meanings of the city and architecture require the adoption of increasingly open and inclusive visions of reality. The metropolis can no longer be described as a mere architectural space, but as a complex structure, where the various forms of landscape and the functions of housing, production and services are freely distributed on a uniform and continuous plane. Today's cities are therefore composite frameworks, characterised by multitudes of forms and styles, uses and languages, places and environments, images and scenarios, which interpret history, geography, ecology, etc. in ever new ways. Shaped by technological innovation, the contemporary city is everywhere and in everything: in exteriors as in interiors, in actions as in things and, paradoxically, in the urban as well as in the non-urban. In fact, the list of new territories

is getting longer and longer, but at the same time, it can no longer be codified by means of the languages, both graphic and verbal, through which architecture had hitherto tried to draw shared maps. The logical sequence with which inhabited spaces are combined has changed; everything appears scrambled and every action fades into the previous or the next. Those who live in cities seem to participate in an incessant creative process, based on the continuous regeneration of space, where even the most consolidated paradigms of reference change. Yet, almost surprisingly, the inhabited space can still be distinguished into public and private, divided into squares, streets and buildings. This resistance of classic interpretative categories, however, should not deceive. The working condition of the contemporary architect has in fact become very complicated, and his or her responsibilities are truly unprecedented. To address them it is therefore necessary to shift the point of view and rethink the parameters of design practice.

It is in this exceptionally complex and changing framework that the Degree Programme, whilst giving its professors the freedom to design the teaching programmes, has chosen to articulate itself in such a way as to prepare its students to confront an increasingly heterogeneous and inclusive reality, cultivating ambition to create an architect capable of facing all the scales and facets of design. The training objectives are therefore wide-ranging and aimed at acquiring the necessary skills in the fields of Architectural and Urban Design, Architecture of Interiors, Technology and Construction and Restoration and Conservation. Studios dedicated to these disciplines are integrated with others, which include teaching on Urban Planning, Sociology, Applied Economics, Landscape Architecture, Survey and Representation, Environmental Hygiene, Structures and Anti-Seismic Design Criteria. Other subjects of fundamental importance, such as the History of Contemporary Architecture, Construction Technique, Technical Physics and Systems, Economic Evaluation of Projects and Theory of Contemporary Architectural Design, are taught within specific courses. In this articulated and complex framework, the internationalisation of teaching experiences takes on particular importance; of particular note are the MInDS workshops (Milano Intensive Design Studio) and intensive courses, which last no longer than two weeks and are held by visiting professors from foreign universities or from the world of the profession.

The general programmes of the different disciplinary sectors that operate within the Degree Programme are described in more detail below, as well as some examples of in-depth studies from specific courses. The intention is to represent the various contributions to teaching as components of an atonal symphony, whose most interesting outcomes can also mature in an unexpected and unpredictable way.

GROUND ZERO: TESTING CONTEMPORARY FRAGILITY

By participating in a design studio, students have the opportunity to explore their own aptitudes in an inclusive testing ground, whilst engaging with their peers and the School's education network.

A theme is assigned as a frame of reference for developing a critical approach to the landscape, environment and/or architecture. Continuous social, economic and political transformations underpin each intervention as driving forces behind the contemporary fragility of the environment in which we live. Being aware of ongoing processes at different scales – from the local context of a project to the global framework of contemporaneity – is

a prerequisite for developing a competitive approach that enhances design. Grounding (or ground zero) is an interface between city and architecture, landscape and built environment, the threshold between the surface of the city and architecture. Grounding is the backdrop of social protest, the manifesto of different architectural styles, the technological device that controls the climate, access, aura and status of buildings. By investigating these issues, students hone design skills acquired previously and improve critical and analytical skills that are fundamental in contemporary architectural debate and professions.



NELSON'S COLUMN, TRAFALGAR SQUARE, CITY OF WESTMINSTER, LONDON
PHOTO: MATTEO POLI

NEW OVERLAPPING AND COEXISTING SPACES

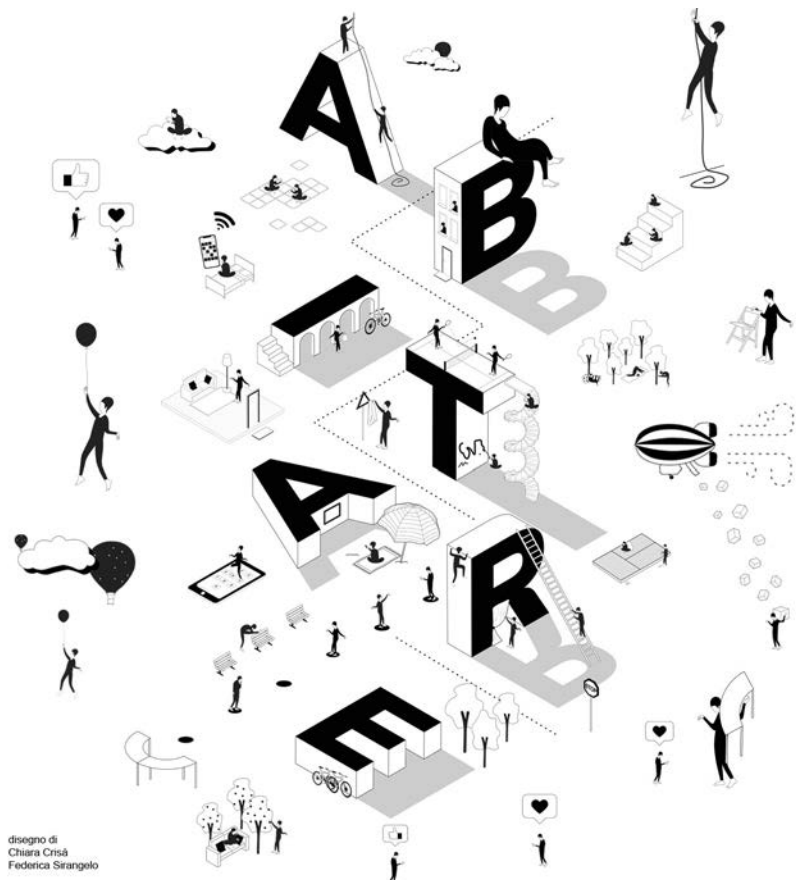
In continuity with the teaching of the Italian masters who, in this school, paved the way for an integral approach to design that is attentive to the human dimension of architecture at every scale, from the domestic to that of the city and the territory, the degree programme's Architecture of Interiors studios are generally oriented to reflect on the relationship between man and space, while remaining sufficiently aware of the evolutions taking place in society and in the territory. Today, our actions overlap one another, irrespective of different spaces, inside or outside the home. An inhabited whole, which is expressed in a panorama of

diversity, always traversable and organised as a continuous system. A different condition of interiority seems to have crossed the specific boundaries of the discipline of interior design, forcing it to take on new responsibilities regarding the city and overturning the commonly recognised relationships between building and city, public and private, interior and exterior. The domestic space, the workplace, the city's collective spaces, exhibition design, scenography, and museum design are the topics addressed in the lectures, with specific attention also being paid to recovery, reuse and architectural redevelopment projects.

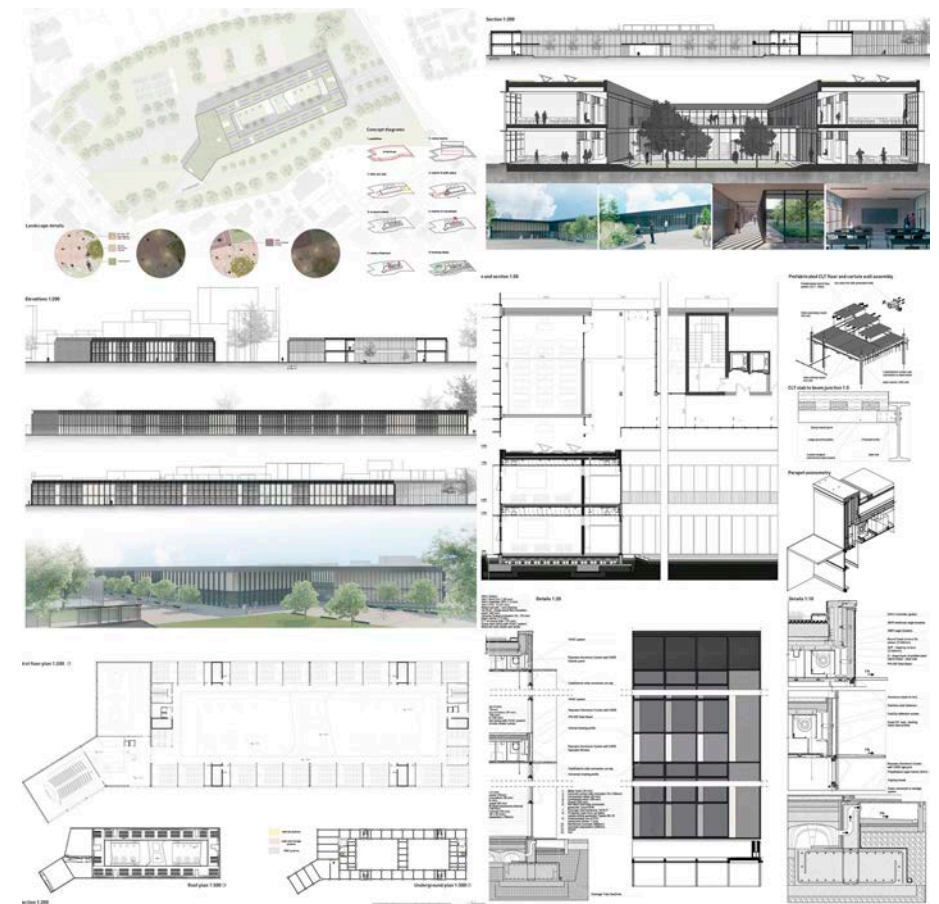
ARCHITECTURAL DESIGN AND CONSTRUCTION

Managing the complexity of architectural design, from conception to implementation, requires knowing how to define the relationships between the morphological, technological, energy-environmental, structural, regulatory and even socio-economic aspects of its specific context. In this regard, design is a tool for anticipating and verifying the impacts of the intervention on reality. By its very nature, it must be geared towards feasibility and constructability. The designer is thus called upon to carry out his work within a technological dimension attentive to constraining aspects related to the ecosystemic, physical, regulatory and cultural

context in which the intervention takes place, to the modes of use and to the coordinated and interdisciplinary management of the issues to which the design must respond. It is a process of in-depth study and involves continuous and progressive implementation of the information necessary to guide the project through the construction phase. A process that develops both according to clearly defined methods and with the support of tools capable of controlling its quality throughout the life cycle of the building up to its decommissioning or repurposing, if there are the prerequisites with a view to future contemporaneity.



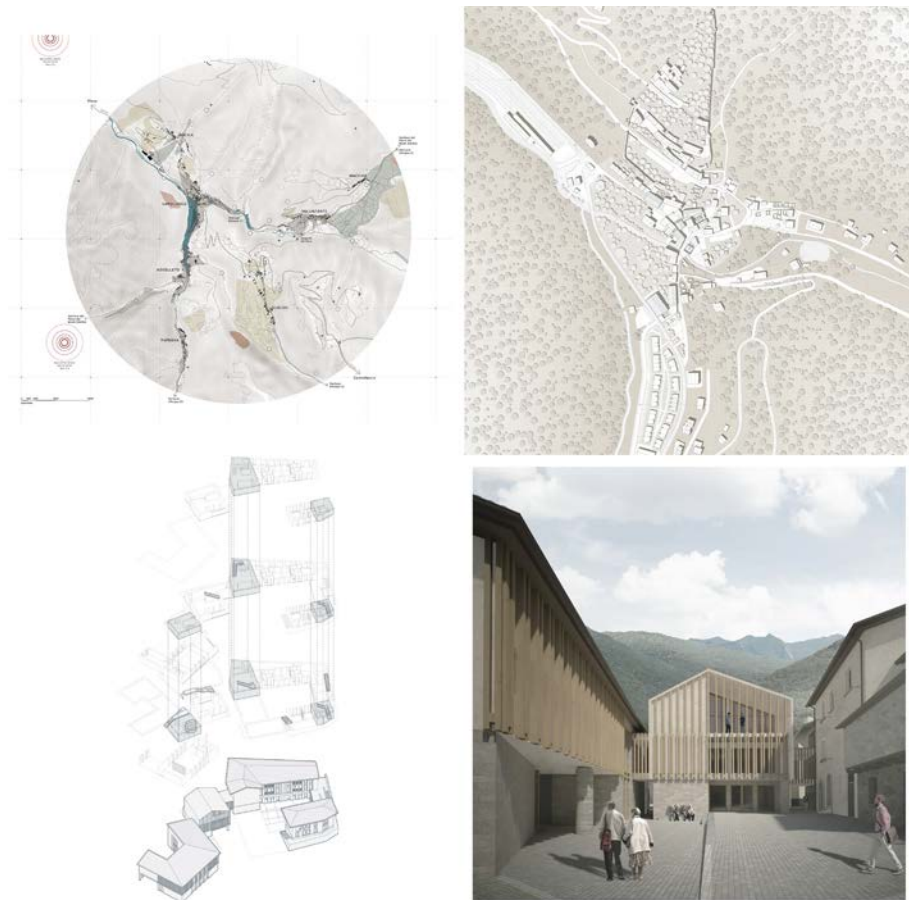
disegno di
Chiara Crisà
Federica Sirangelo



ARCHITECTURAL DESIGN TO TEST RECONSTRUCTION AND RECYCLING

In recent decades, increasingly frequent disasters have led to the transformation of the vocabulary used in architectural design, which is now fuelled by words such as repair, recover, recycle and rebuild, capable of expressing both the idea of repetition and that of restarting. For this reason, those who design in fragile and vulnerable contexts have to interpret the complex life cycles of soils, buildings, structures and infrastructures, which, by virtue of their exceptional historical and testimonial value, are often privileged materials in the regeneration process of human settlements. Thus, whilst it becomes urgent to update the

theories and practices connected with the idea of heritage, it seems more appropriate than ever to develop the legacy of that part of Italian architectural culture which, in the recent past, has embarked on a hands-on response to disasters and catastrophes of great magnitude that are unfortunately recurring in our country. From this often undervalued research, it is in fact possible to extract the information necessary to put architectural design back at the centre of the complex system of skills and knowledge with which new environmental emergencies must be tackled.

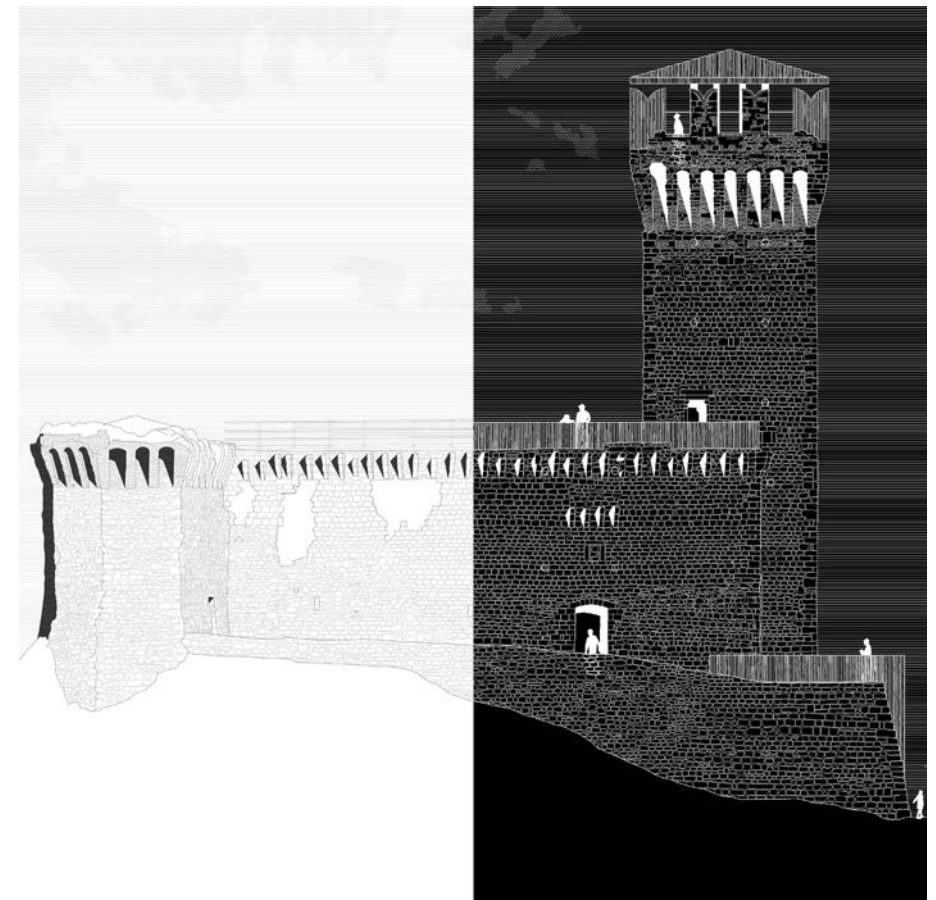


STUDENT PROJECTS FROM THE THEMATIC STUDIO (PROF. ANDREA GRITTI AND PROF. VALERIA PRACCHI)

AN EDUCATIONAL EXPERIENCE IN THE 2016 EARTHQUAKE AREA

The experience of distance learning in 2020-21 prompted a rethink of several practices among colleagues teaching restoration and the updating of the dialectic with colleagues who teach survey and representation. Due to the pandemic, Restoration Studio students lost the opportunity to gain experience in the field – usually a direct source of knowledge – and concentrated on analysing the data already available. In particular, they were asked to generate a model of the Rocca in Arquata del Tronto – a survivor of the 2016 earthquake – based on data produced by others, instead of rendering it after surveying it in person.

During this process, they perfected the use of BIM design software, producing a digital replica of the building capable of bridging the gap created by the pandemic. In fact, both versions of the course revealed a certain continuity of method: in the transition to online teaching, the interpretative and critical purpose behind the models generated by the students remained unchanged. The scientific approach to architectural design which, in the case of restoration, is defined in an aetiological sense, as a treatment-based design built on recognising and interpreting symptoms, also remained unchanged.



STUDENT PROJECTS FROM THE RESTORATION STUDIO (PROF. DAVIDE DEL CURTO AND PROF. CARLO IAPIGE DE GAETANI)

CHANGING MOTORWAYS

Motorways and service stations are one of the fields of design research. These places and buildings are often anonymous, associated with old-fashioned designs and nostalgic memories of a bygone era. Travelling by car was a social achievement and a futuristic adventure. Today, service areas are evidence of an idea of the future that has aged and needs to undergo a process of profound regeneration by updating services and spaces and finding a new design for their relationship with the motorway, the territory and users. This Final Thesis Studio produced designs for the transformation of service areas along a specific stretch of an Italian motorway. The selected sites are located in territori

interni (remote areas) in the Italian Apennine region which, due to the decline of forestry, agriculture and industry, is suffering from abandonment and depopulation. The transformation of service areas should be integrated into a regeneration process for those territories, as part of a broader movement that tends to implement new relationships between metropolitan systems and rural areas. We want to envision a development that mixes elements of novelty, technology, connectivity, business, and local cultural factors and that interacts with the local scale of landscapes and settlements which, in the not too distant past, were the nation's nervous system.

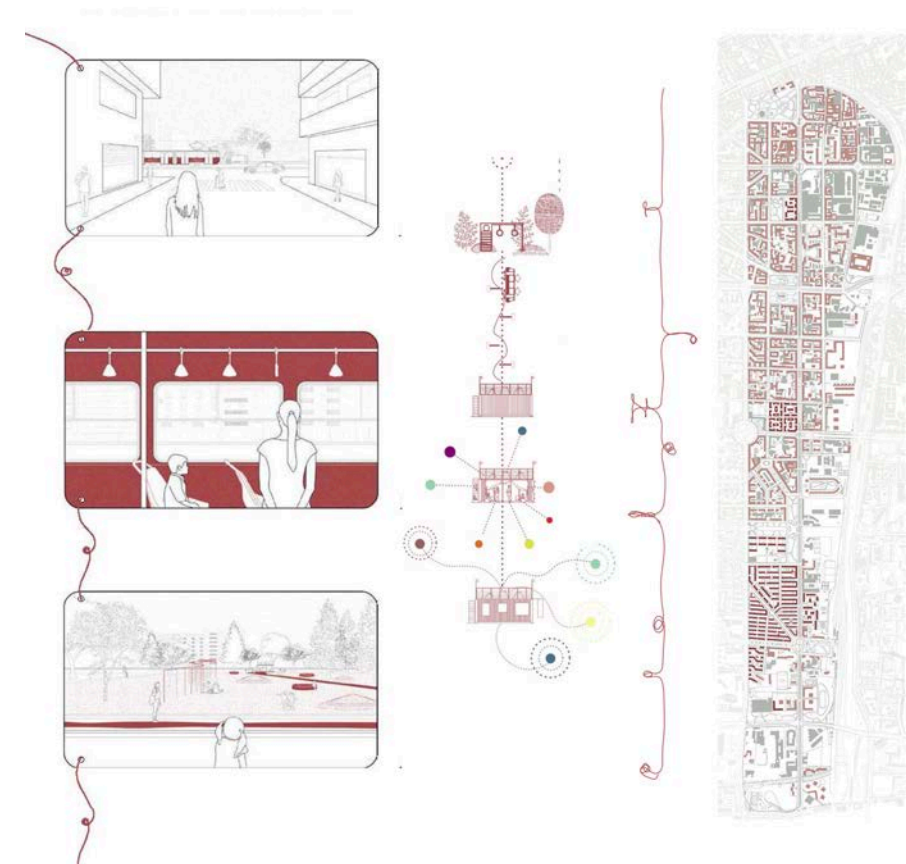


STUDENT PROJECTS FROM THE FINAL THESIS STUDIO
(PROF. ALESSANDRO ROCCA, PROF. JACOPO LEVERATTO, PROF. ANDREA ROLANDO)

THE COMING CITY. SPACES AND TRAJECTORIES IN THE EVERYDAY LIVES OF YOUNG PEOPLE IN MILAN

The principle of proximity and accessibility to basic services in the daily lives of those who live in contemporary cities is both current and dated. In fact, the world of work has changed, with the emergence of increased precariousness and discontinuity in terms of the incomes received, together with the destandardisation of work hours and places. The profile of the population has changed, with significant portions of elderly people and citizens with a migratory background. Household structures have changed and the daily organisation of individuals and families has changed, with more women in paid work. How then, can the concept of proximity to

public and collective spaces and services be reconceived? Is spatial proximity really a necessary and sufficient condition to respond to the needs and aspirations of those who live in the city today? Starting from these questions, this integrated course in Urban Planning has explored a portion of the city of Milan, imagining that it could become a sort of super-block on which to intervene by envisioning projects (for spaces and services) capable of supporting conditions of greater well-being for citizens who inhabit them for various reasons, with particular regard to the younger generations.



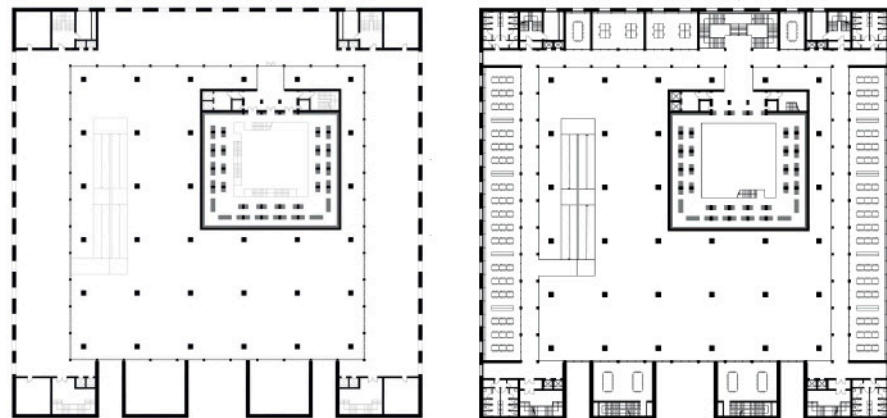
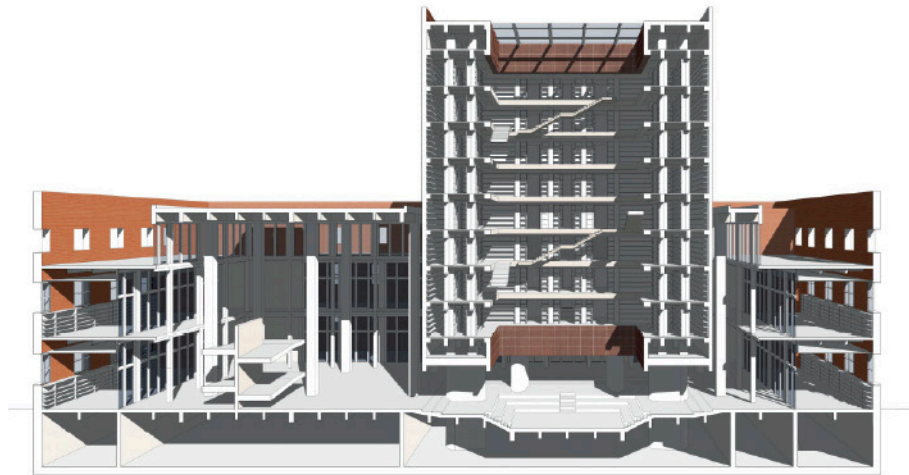
STUDENT PROJECTS FROM THE INTEGRATED COURSE IN URBAN PLANNING
(PROF. STEFANIA SABATINELLI AND PROF. PAOLA SAVOLDI)



MINDS: AN INTENSIVE LEARNING MODEL

As is often the case with acronyms, MInDS is a play on words. It is a name, of course, that refers to different ways of thinking. But it is also an acronym, which stands for Milano Intensive Design Studio and, in this sense, indicates a particular model of teaching. Namely, an intensive design workshop, conceived as an international platform for exchange and training to be taken between the third and fourth semester of the Laurea Magistrale programme. It is offered as an opportunity to conclude the taught curriculum through an opportunity to combine teaching, research and profession, which allows students to start thinking about their thesis beyond certain consolidated disciplinary boundaries. The field, of course, is always that of architectural design, as is the object of study and work. But it is a project that is no longer recognised on a single scale, or in a predetermined typological catalogue. Rather, it concerns an architectural know-how that tries to open itself up to the influences of other practices in order to better respond to the demands of an increasingly heterogeneous and constantly-changing reality. For this reason, the MInDS workshops are entrusted to professionals and researchers with an international profile, selected for their ability to intersect several different disciplinary areas – from conservation to landscape, from urban planning to exhibition design – from the perspective of a specific design approach each time. In fact, in the two weeks of MInDS workshops, ten lecturers were invited to set up this temporary forum for discussion and experimentation on design. Each of the ten classes are attended by thirty students engaged in exploring the topic through doing, from a specific perspective, in a constant and continuous cycle of studio activities. As if to offer students a first glimpse of what their near future could be.





ARCHITECTURE - BUILDING ARCHITECTURE

COORDINATOR
Mariacristina Giambruno

2017-2020
Lorenza Petrini

2016
Elsa Garavaglia

DURATION
2 Years

STUDENTS ENROLLED 2020
427
246 Italians
181 EU/non-EU

LANGUAGE
Italian and English

PROFESSORS

2018 GRADUATE EMPLOY-
MENT RATE
92% (2018, 1 year after gradu-
ation)

*Laurea Magistrale (equivalent to Master of Science)
Milan*

The Laurea Magistrale (equivalent to Master of Science) Programme aims to train students in the conservation and enhancement of complex works – complexity here referring both to the works and to the places they define – that are in harmony with the environment in which they are situated, are developed according to sustainability criteria, meet the required standards in terms of functionality and well-being, and are suitably robust and durable in their normal use and in the case of severe natural events.

The contemporary condition requires design, redevelopment and enhancement processes that give rise to interventions capable of conferring quality to cities and territories. Therefore, on the one hand, the construction and conservation of complex architectural constructions require increasingly higher levels of architectural quality, safety, functionality and liveability to be achieved and, on the other, entail the use of natural resources and the consumption of energy, which significantly affects the economy and the environment, and whose effects will be felt by several generations over the years.

These objectives must therefore incorporate high levels of ethical and scientific awareness and an architectural knowledge that is an expression of form and content. Therefore, in the Laurea Magistrale Programme, the Milan School of Architecture's critical and design-based tradition cooperates with the scientific and technical tradition of the Politecnico di Milano's School of Engineering. Training is specifically aimed at deepening the relationship between architecture and structural design, where construction is an unavoidable technical tool of design, but also a fundamental expressive element of architectural work.

To achieve these objectives, the programme offers training based on Design Studios that look at both new and existing buildings – a key moment in the MSc graduate's education. These take a strongly interdisciplinary approach that covers various disciplines, thus contributing to the development of architectural design through continuous comparison applied to different themes. This development process integrates the different disciplines of each Design Studio with the content of specific courses. Said courses organically introduce students to the theoretical disciplinary aspects that are necessary for a humanistic education, understood in the 'polytechnic' sense, and for learning the fundamentals of the practice, according to rigorous criteria, taking ownership of planning and terminology. Therefore, within the Design process, learning takes the form of a comparison of all the cultures and disciplinary tools that contribute to determining the design itself; the main evidence for said process that the student is asked to provide is their ability to undertake an autonomous and original design path that is based on the advanced disciplinary knowledge that he or she must acquire and be able to use. In the Design Studios, the proposed design themes concern contexts of considerable importance and problematic nature. The Design Studios are a combination of disciplines related to composition, structure, technology and plant engineering, restoration and landscape, and seek to promote a multidisciplinary research process that is centred around the design theme and involves the use of design tools in a BIM environment.

The student's duty in the learning process is twofold: acquire advanced knowledge in design-based disciplines and learn how to implement that knowledge in the development of their designs. The final project undertaken by the student is their thesis. The thesis must develop an architectural project, paying particular attention to the relationship between form and construction, as well as the relative theoretical and executive aspects. The thesis project must be an expression of the disciplinary synthesis between the various areas of knowledge acquired in the student's chosen Design Studio; this knowledge is necessary for the design's final definition and will have contributed to its architectural and constructive definition.

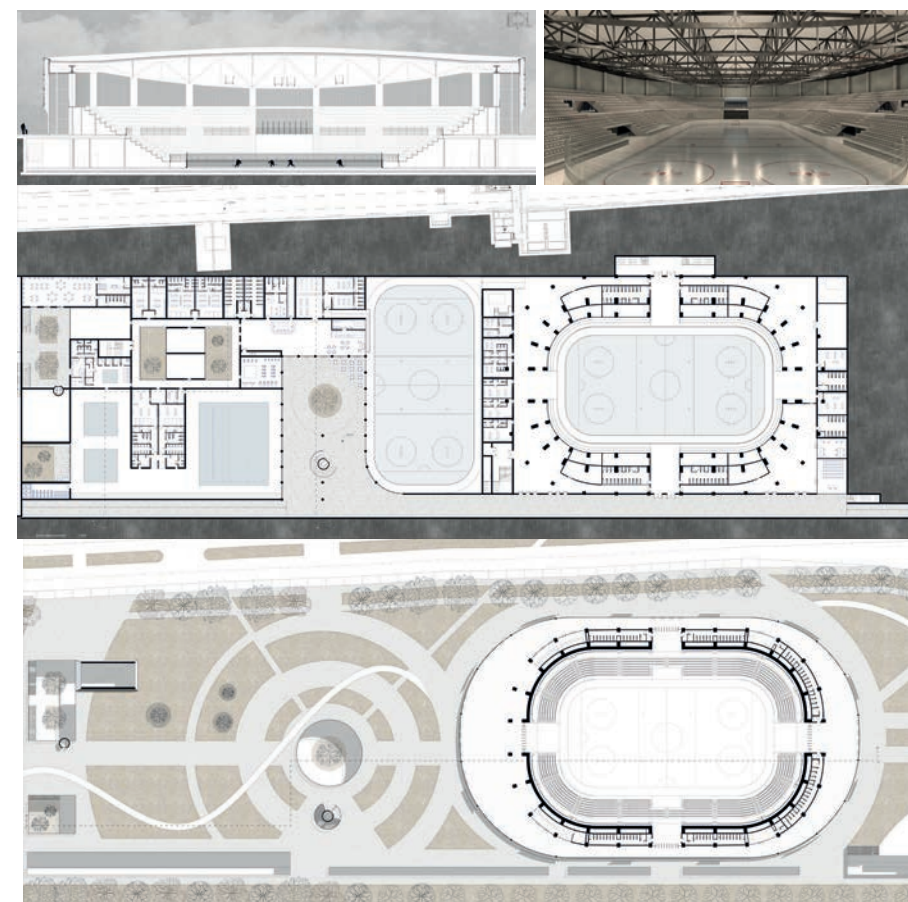
THE DESIGN STUDIO AT THE CENTRE

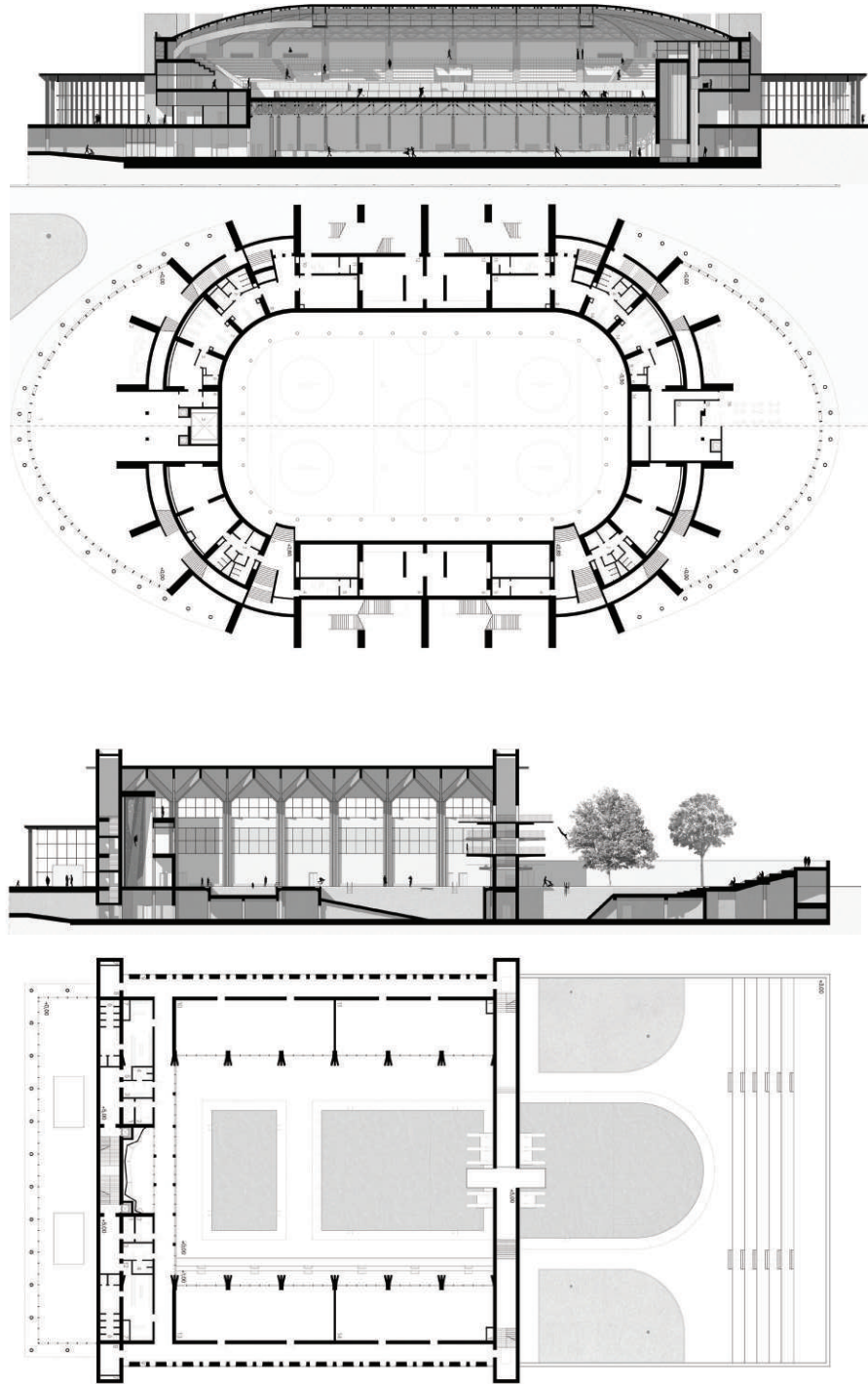
The Laurea Magistrale (equivalent to Master of Science) programme in Architecture-Building Architecture places the design experience at the centre of the student's training, with 58 of the 120 credits required to obtain the degree being devoted to it. Two Design Studios are scheduled in the first year, and one annual Design Studio in the second; these take the form of final workshops within which the student lays the foundations for developing their master's thesis.

The Design Studios are highly interdisciplinary workplaces characterised by the coexistence of various disciplines related to composition, structure, restoration, materials, technologies

and plant engineering. In the classroom, the various Design Studio professors work in a coordinated manner on the same project, alongside the students, guiding them up until the definition of the architectural and executive details, and taking care to ensure that the design is fully developed in terms of all its urban, architectural, structural and technological aspects.

This way of working, which characterises the entire training process, acts as a precursor to the professional experience of integrated design, guiding the student on a journey that fosters awareness of his or her choices, skills, role and contribution in the design process.

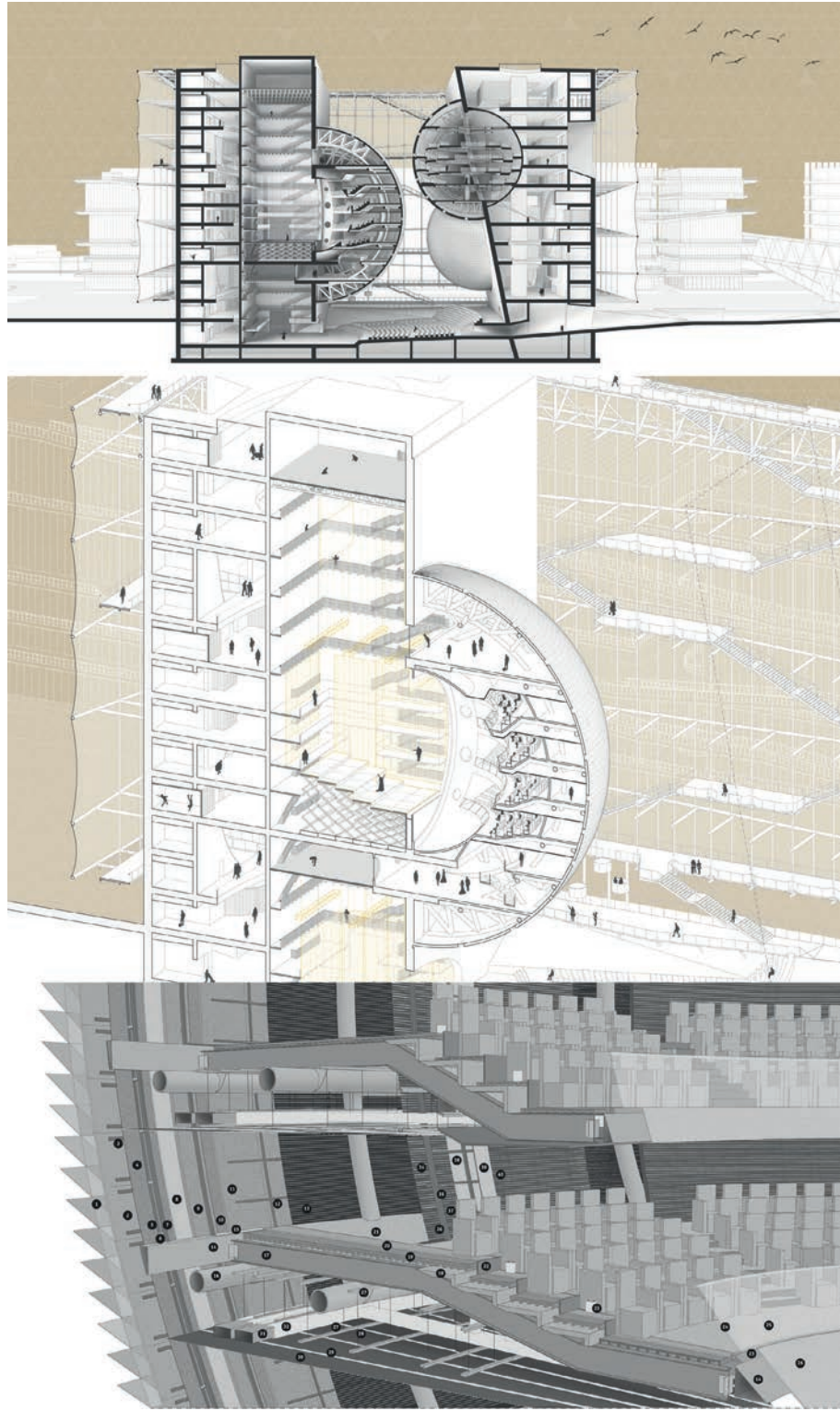




ARCHITECTURE AND CONSTRUCTION

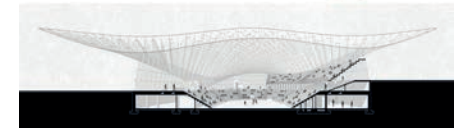
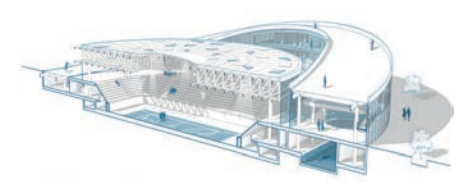
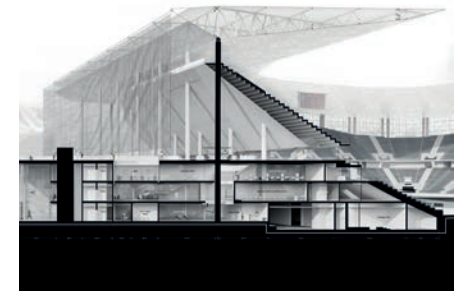
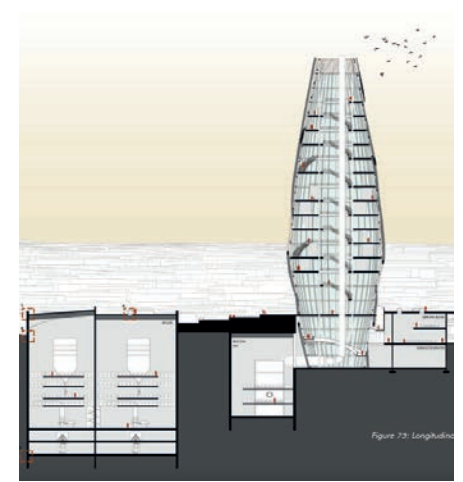
What role does construction play in defining the forms of architecture and in representing the character of buildings? Architecture is always a construction, its forms are the forms of construction. Construction is therefore the medium by which architecture is expressed and the guiding principle for the definition of its elements. However, it is not possible to superimpose architectural practices directly onto engineering practices, assimilating one discipline into the other, nor is it possible to make the former derive from the latter without incurring a loss of specificity in both and betraying the expressive purpose of architecture as an art form. Merely technical practice lacks representative intentionality: through construction, architecture represents the act of construction itself, but also, and above all, the character of the buildings, their deeper meaning and their general value. Through architecture, man represents life and its values, its culture and its institutions. This representative intent is thus the necessary gap between merely technical practice and architecture per se; a gap due, above all, to the different objectives of these activities which, in the first instance, requires a choice between the possible modes of construction to be made. This intentionality also entails another consequence: the difference between the defining the form of the elements of construction and defining the form of the architectural elements is analogous to the difference between a thing and the narration of said thing, between an act and its staging. In this transition between the two, the structural principle and elements of construction are chosen and selected, or omitted, hidden or masked, and their form emphasised and rendered grandiloquent, according to a principle that dictates that the forms must correspond to the character of the buildings. Through architectural design and, in particular, in those designs where the structural problem is particularly evident and complex, the relationships between architecture and construction are particularly put to the test.

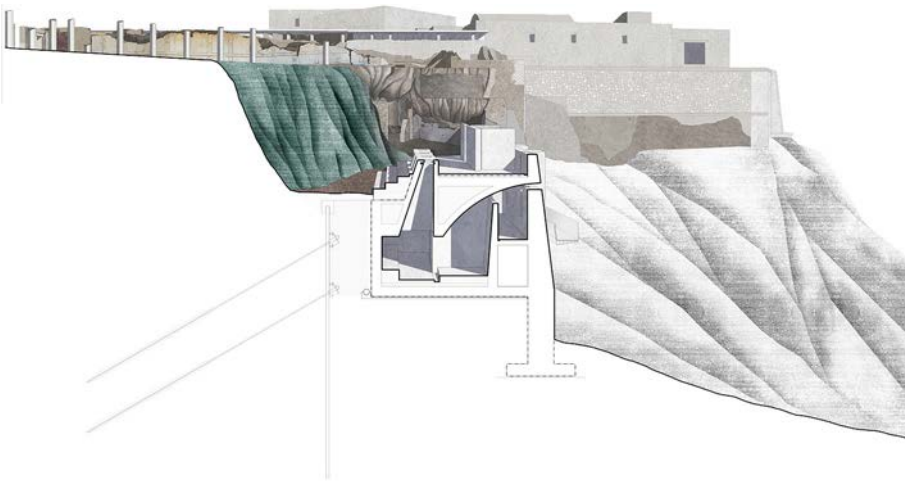




MAJOR WORKS

The programme deals with the theme of 'major works', where the adjective 'major' refers not merely to the dimensions of the building but also seeks to highlight the 'major' (high) level of design quality that must characterise architecture which, within the complex processes of transformation of reality, is of particular environmental, social, cultural and symbolic importance. Precisely because of their strong impact on their contexts, tall buildings, theatres, stadiums and infrastructure – such as stations, bridges or waste-to-energy plants – must embody an unprecedented capacity to interpret their surroundings, and be effective in promoting virtuous transformations and forms of sustainable development and responsible for historical and geographical realities, ecosystems and social needs. Too often, 'major works' have been understood as macro-interventions to be delegated to 'engineering' solutions or to the vanity of more or less globalised designer formalisms. This has resulted in self-referentiality, in both technical-functionalistic and formalistic terms, negatively increasing environmental impact and alienation from contexts. The strategic role that architecture could potentially play, through its ability to build systems of relationships, reconstruct spatial and problematic scales and interconnect society and landscapes, history and design and nature and culture, has thus been eluded. Everywhere in the world, the design of major works is central and urgently requires new paradigms and perspectives. In the Laurea Magistrale in Building Architecture this topic is addressed with the aim of producing skills, tools and innovative visions that will be useful for a more resilient future. This design and training challenge is therefore based on precise objectives and on a methodology characterised by an interdisciplinary vision, the foundations of which are rooted precisely in the humanistic and technical/scientific tradition of polytechnic culture. This approach fosters transversal design that synthesises in-depth structural, technical and functional knowledge with idealism, culture, creativity and aesthetic dimensions.





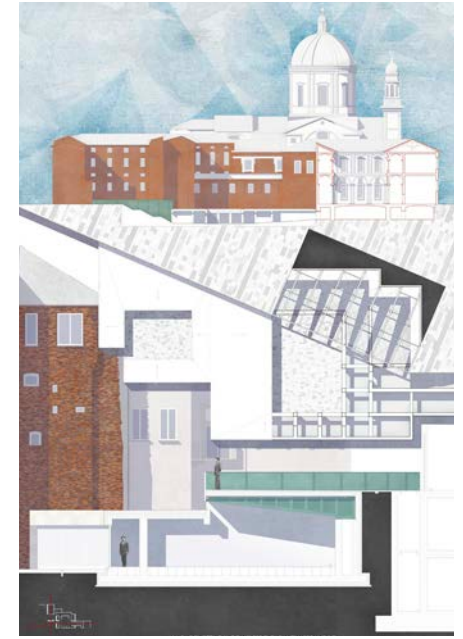
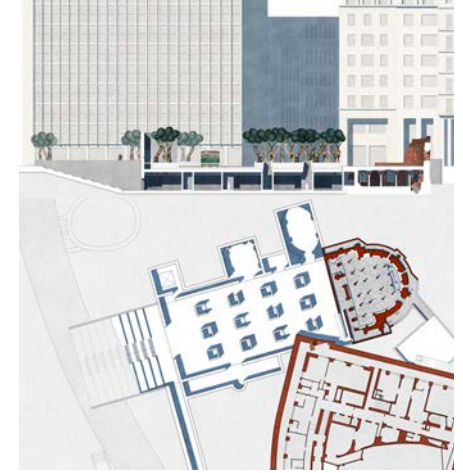
ANCIENT AND NEW. ARCHITECTURE FOR THE CONSERVATION OF COMPLEX CONSTRUCTIONS

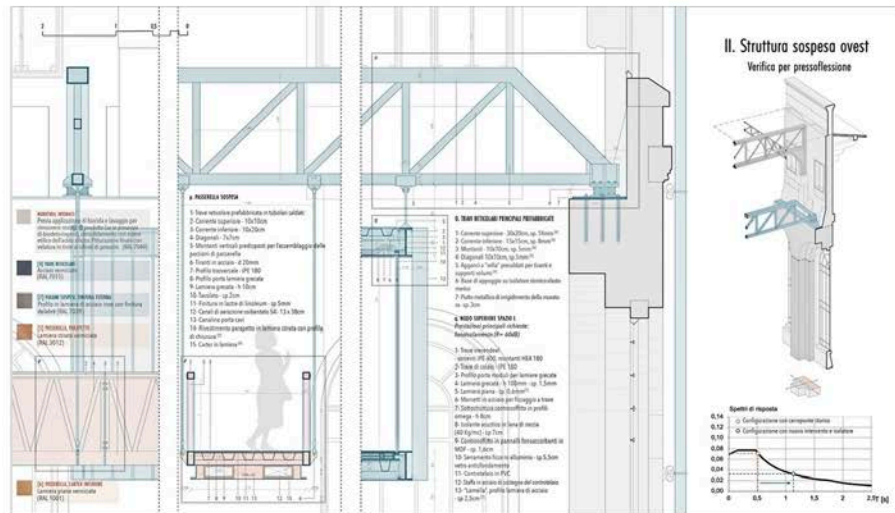
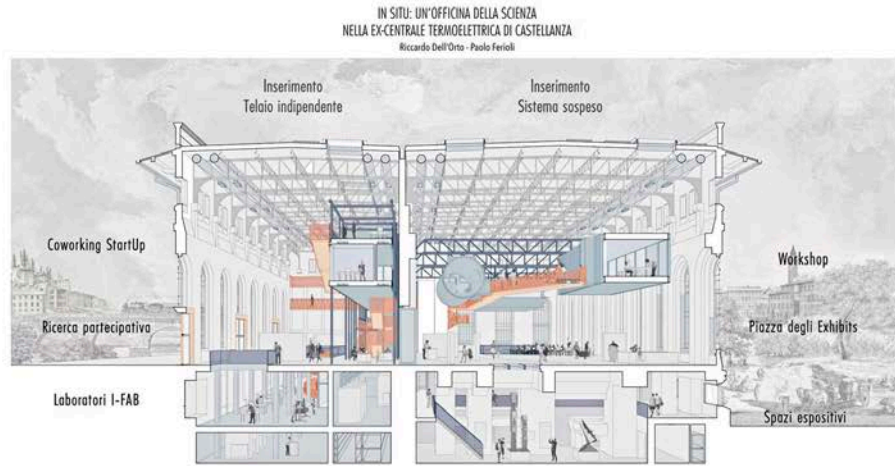
The inventive process is discernment, selection, arduous breakthrough, knowledge of reality and striving for knowledge. Design does not allow for any arbitrariness; on the contrary, it is the result of rigorous logical constructions and the use of appropriate composition techniques: critical awareness and control exercised over choices are the most appropriate vehicle for the acquisition of knowledge in doing and doing with knowledge. The design studio, together with the disciplines that make it up, is inspired by a tradition of studies and design experience that does not separate theoretical and historical-critical in-depth study from design practice. A tradition of study and work that sees – in design, on the scale of the building – an intersection between technical-practical reasoning and reflection on the general themes of architecture studied through theories and history.

The Design Studio therefore introduces the cognitive dimension of design – connected to the knowledge of places and buildings, architecture, conservation and construction – to an awareness and architectural knowledge understood as an expression of form and content. In particular, the theme of construction, in its broadest sense, is the field of application and comparison to which the learning of the trade and the understanding of formal processes refer.

The context, places and architecture are understood to be the defining terms of architecture within a specific space and the backdrop of constant reinvention that concerns both the existing and the new.

The comparison between building type and structural typology, and between the elements of the construction and their representative capacity, are identified as the cornerstones of a possible theory of architecture and design experimentation that aims to condense the choices of functional structure and architectural figure and root them in the history and the present-day realities of the settlement.



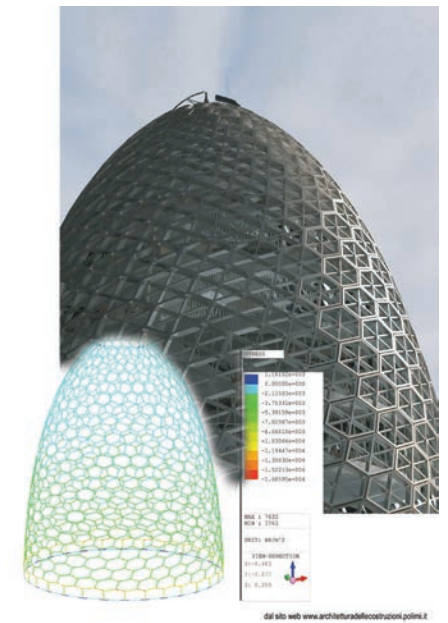
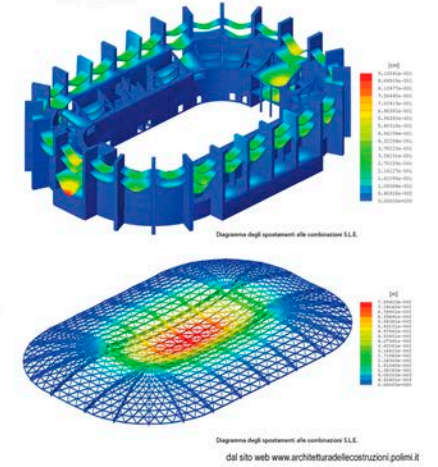
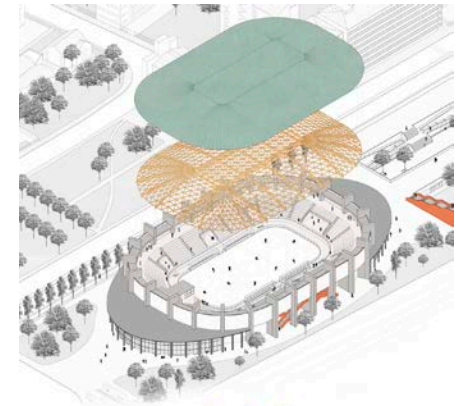


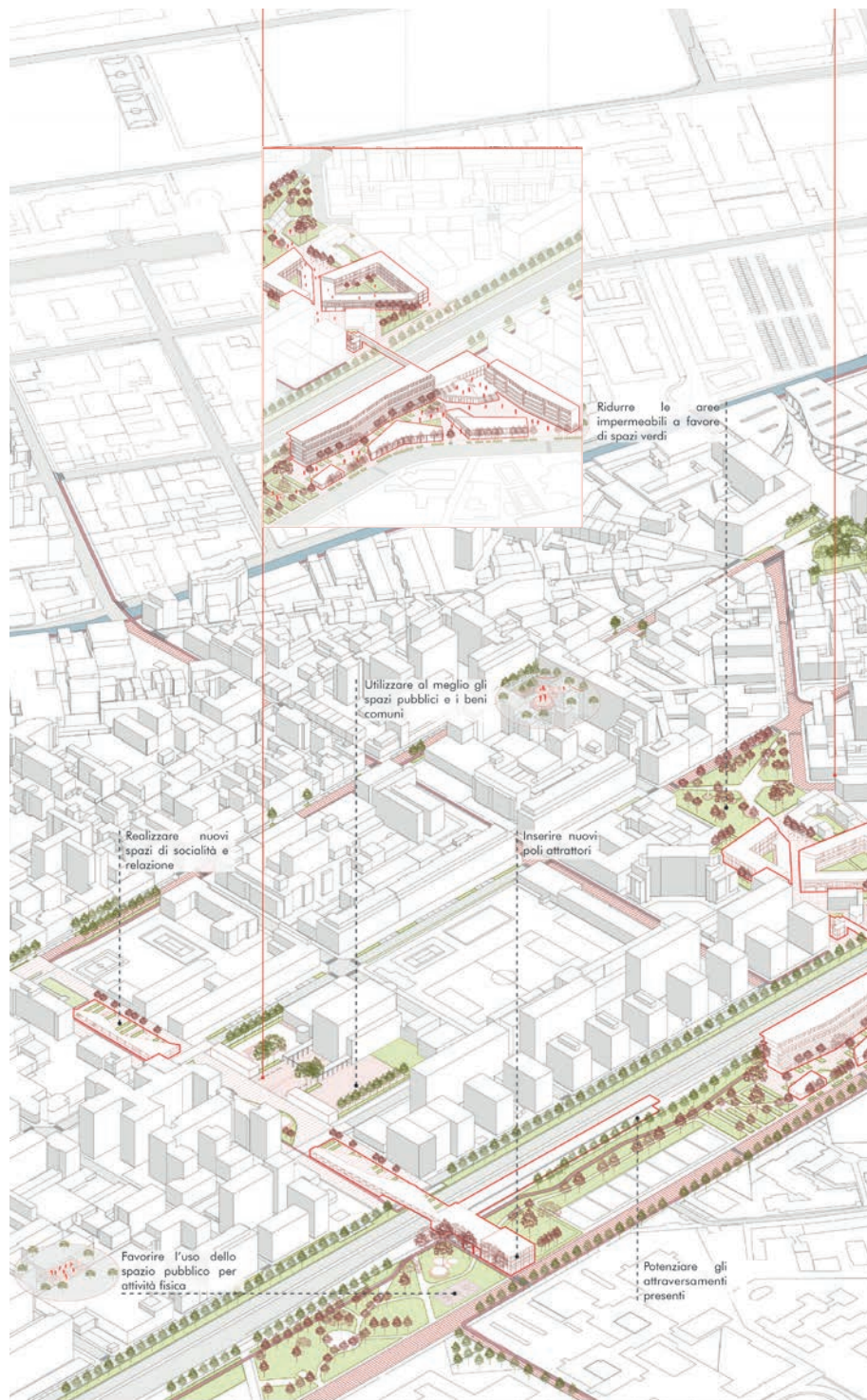
ARCHITECTURE AND STRUCTURE

Structural choices have a marked influence on architectural form. In fact, from the earliest stages of the design process, complex projects require the analysis and interpretation of spatial contexts, the ability to define concepts and the use of approaches and methodologies to make responsible choices aimed at qualitative synthesis between form and structure. In existing buildings, the definition of the relationship between form and structure is an essential area of knowledge for the conservation of architectural works.

The relationship between architecture and structure can be usefully investigated through analytical methods, supported by computational approaches and modern digital tools. Structural calculations extended to 3D models allow us to understand how loads are distributed among structural components, as in the case of the finite element method (FEM). Technologies such as Building Information Modelling (BIM) make it possible to work on the same virtual model of the building, whether new or existing, by digitally aggregating various types of data, including those derived from structural analysis. The combined use of tools, such as FEM and BIM, facilitates the exploration of interactions between formal and structural aspects of buildings.

However, the use of such tools requires a deep understanding of mechanical principles and their application in structural design. For each type of design it is necessary to evaluate the appropriateness of the structural theories used, the limits of the derived analytical procedures, as well as the approximations inherent to the numerical models implemented. The objective of the classes on structure, particularly in the case of the supplementary teaching in the interdisciplinary design studios, is to pass on theoretical and practical knowledge in order to address these issues, synthesising compositional and static aspects whilst keeping technological demands in mind.





ARCHITETTURA E DISEGNO URBANO ARCHITECTURE AND URBAN DESIGN

COORDINATOR
Domenico Chizzoniti

2018-2020
Francesca Bonfante

2016-2017
Francesca Bonfante

DURATION
2 years

ENROLLED STUDENTS
160/year - Italian Track
200/year - English Track

LANGUAGE
Italian and English

SUBJECT AREAS
Architecture and Urban Design,
Construction and Sustainability,
Restoration, Thematic Research
Seminar, Urban Economics,
Sociology, Architecture Man-
agement

MOBILITY
229 agreements

*Laurea Magistrale (equivalent to Master of Science),
Milan*

The Degree Programme in Architecture and Urban Design lives and feeds on the experience of design at different scales, from architectural to urban, with its theoretical and operational aspects always contextualised within the city. The areas of interest that share the centrality of design and intervention on the physical environment concern architectural and urban design, landscape design and the enhancement of the architectural heritage. The Programme comes to life in Milan, Italy's most innovative and ever-changing city, but travels virtually through the cities and cultures of the world in a constant search for architectural and cultural stimuli and inspirations. It has a distinctly international flavour, not only because one of the two branches of the course is completely in English and is taken by students of 30 different nationalities, but also because it looks at the challenges facing cities throughout the world.

The course is also enriched by perspectives that differ to Italian architectural design culture thanks to professors with

international experience, such as Kazuyo Sejima, Stefano Boeri and several Visiting Professors who bring design experiences to the city and contemporary territories.

The Laurea Magistrale in Architecture and Urban Design has the following objectives:

Interpret phenomena and address the complex problems of architecture and the city.

Know, select and apply the theoretical-scientific and methodological-operational tools of architectural and urban design.

Formulate experimental hypotheses for transforming the physical environment that are rooted in the history of the contexts and open to the contemporary challenges of sustainability and ecological transition.

The students' personal attitudes are central to the programme. Innovative educational courses have been set up to hone individual skills and acquire new skills that can build the foundations of a future professional career that is solid and responsive to the labour market.

Alongside a tried-and-tested curriculum, certain themes explored in the studios are related to the research taking place in the departments and thus strengthen the relationship between teaching and research activities.

The new Thematic Research Seminars encourage the student to conceive an independent topic proposal and to design a work plan to follow when preparing their thesis. Furthermore, the Thesis Seminars, organised by clusters of experts on specific topics, together with groups of students, become a place for comparison and experimentation to support the development of theses.

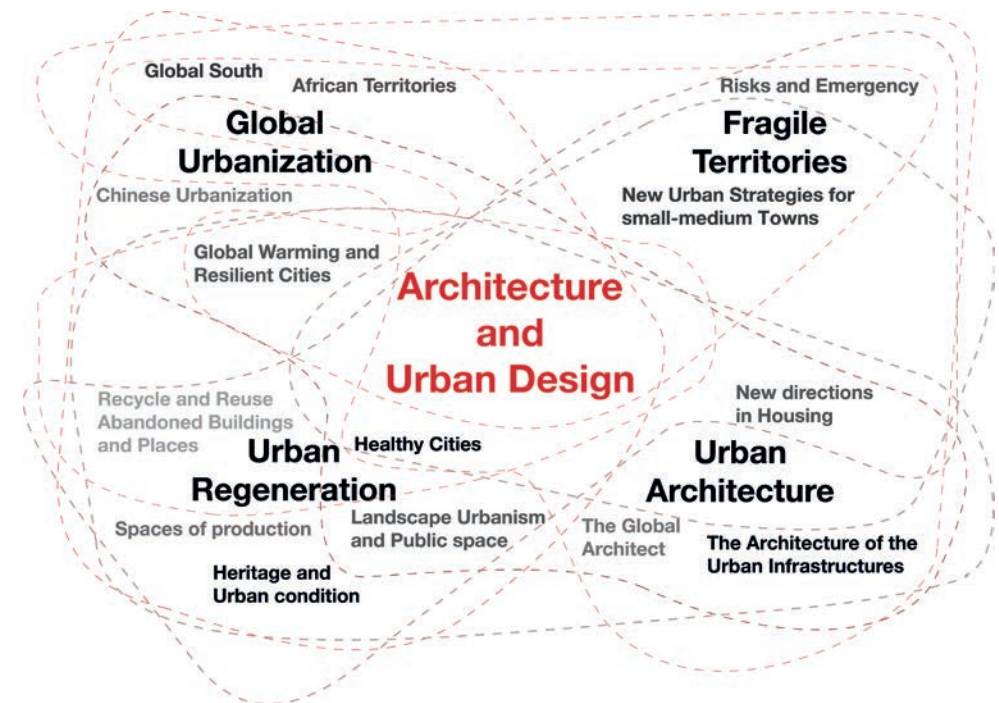
This two-year experience consolidates the essential aspects of polytechnic culture, in which design is understood as a synthesis of knowledge geared towards the transformation of space and places.

Employment figures from 2019 confirm that 85% of graduates in Architecture and Urban Design from the Politecnico di Milano find work in the field of design within one year; 11% of Italian graduates go abroad and 40% of international graduates decide to stay and work in Italy.

ARCHITECTURE, CITY, LANDSCAPE. A TRANS-SCALAR AND TRANSDISCIPLINARY APPROACH

The programme is characterised by a great variety of themes and design challenges that require a trans-scalar approach, crossing the various dimensions of design, from the strategic vision of a wide area to the drafting of the masterplan, from the study of buildings to the control of technological solutions. Similarly, the complexity of the issues addressed requires interaction and close collaboration with other fields of knowledge, albeit from a standpoint strongly rooted in the culture and expertise of spatial change. History, sociology, urban policies, the art of gardens and the science of construction, among others, offer indispensable alliances when it comes to picking apart different contexts and non-reductive cognitive

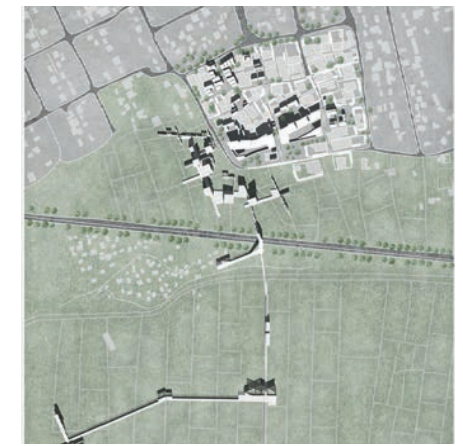
thought. Understanding the production processes of contemporary urban space as a field of reality in which one operates, as well as being aware of the role that design plays, are two of the Programme's main objectives. Multiple opportunities to gain experience in the field and dialogue with relevant institutional actors in relation to the design opportunities covered in the programme contribute to the achievement of these objectives. Architecture, city and landscape are therefore understood as terms of a unified effort to interpret how we inhabit the world, which changes at an increasingly accelerated pace, forcing us to recognise and distinguish the ephemeral from the permanent..





A GLOBAL PERSPECTIVE

International horizons and the transnational dimension of contemporary architecture introduce new forms of professional mobility and new places for the development and circulation of hypotheticals and expertise, generating unprecedented challenges for design culture. An original profile is emerging: that of the designer who works in a changed global framework, is confronted with different and peculiar geographical and cultural contexts and questions and tests the paradigms, tools and consolidated practices of architectural and urban design. By encountering different design scales and cultures, the programme is designed to be a privileged place for reflection and experimentation through study and design in such contexts. Thus, interaction between disciplinary gazes, approaches and fields of specialisation, which dialogue around certain interconnected subjects through the student's participation in studios and theoretical research, is encouraged. Studios and seminars concentrate on the study and design-based exploration of the territories of the "Global South", in its many forms and interpretations. They offer the opportunity to deal with different cultures and professional realities, through direct experience gained as part of international cooperation programmes and well-established networks. Numerous courses reflect on the challenges posed by globalisation through the growth and transformation processes that affect the metropolises of the world, and also offer an opportunity to reflect on the themes of architecture and sustainable urbanisation. Various interpretations of this theme emerge from reflections on the global dimension of the contemporary architect, observed in the context of cultural transfer processes and the circulation of practices, codes and tools, and on the vectors that contribute to the construction of a transnational reflection, from competitions to international cooperation, from exhibition events to training programmes.



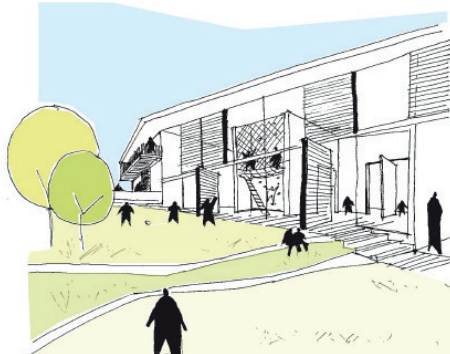
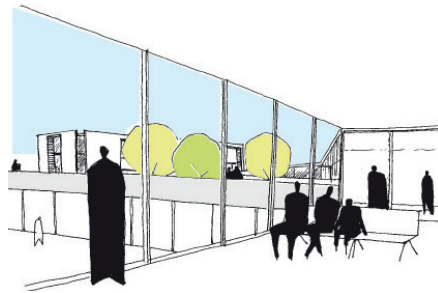
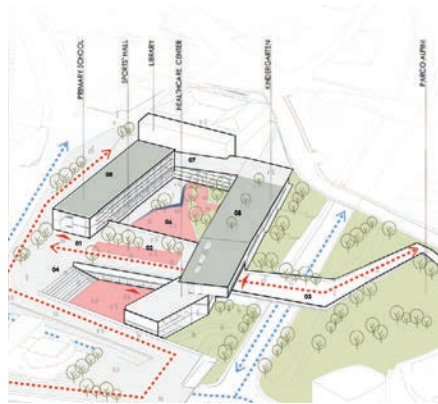
URBAN DESIGN AND CONTEMPORARY FORMS OF LIVING

Urban design is a design practice that defines the area of interaction between the different profiles and skills involved in designing contemporary cities. While the figures traditionally involved in this process were the architect, the urban planner and the landscape architect, today the picture certainly appears more complex. In fact, the connotations of urban design, its tools and its purposes also change according to the conditions in which the designers find themselves operating. As geographical and cultural contexts change, greater emphasis is placed on the redefinition of identities and vocations rather than on the formalisation of precarious spaces and settlements. It is therefore a practice that

cannot be separated from a site-specific approach, from a careful attention to place or from comparison with the historical heritage. The degree programme pays constant attention to this intermediate design scale, whose distinctive features can be identified as the predominantly three-dimensional gaze and the centrality of the urban space. Studios and seminars explore contexts and themes, intertwining design exercises with theoretical reflections in a continuous interdisciplinary tension. Three intersections – or common perspectives – can be isolated from among the many issues addressed. The centrality of open and relational spaces in the design of the contemporary city and the need to redeem

them from the inferior position they have occupied in many transformation processes, including recent ones, starting with an updated definition of what a masterplan is. The debate around forms of housing, with a particular emphasis on the spatial results produced through new practices in the use of living spaces and urban spaces. In light of the pandemic, fresh perspectives on this phenomenon have been both called for and offered. The crucial role of urban infrastructure that is reflected in the design of public and private mobility, including slow mobility, but also in the strategic significance of service structures, even if disused.



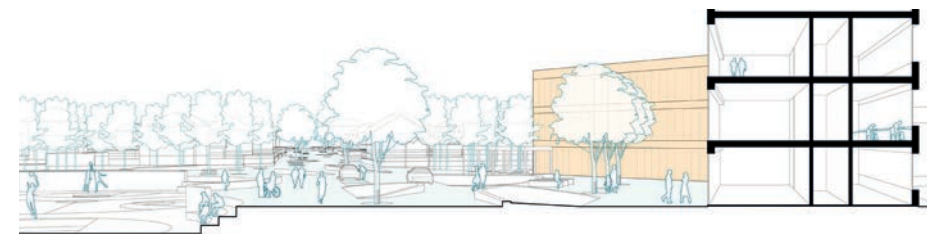
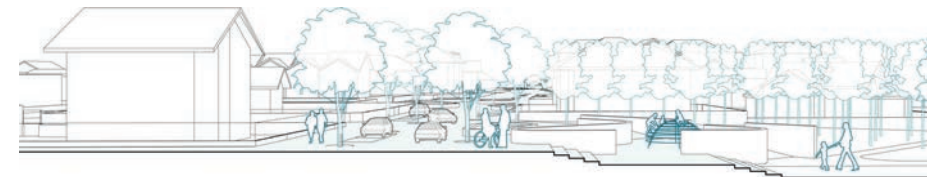
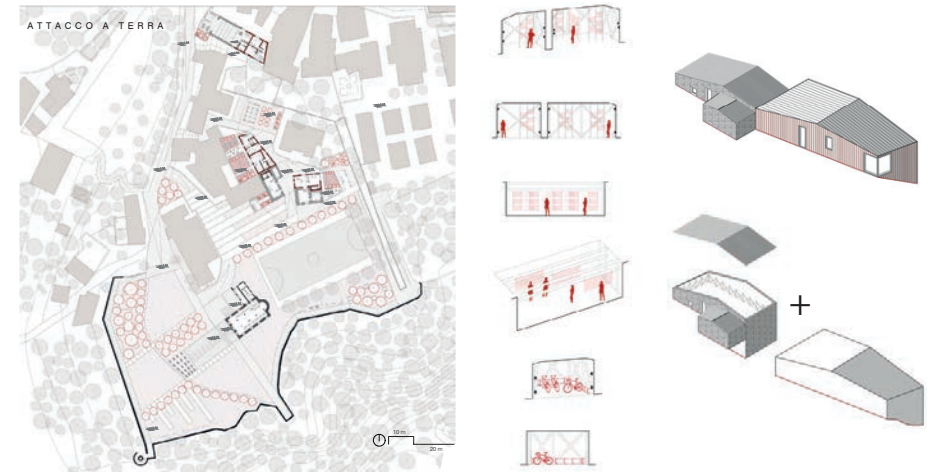
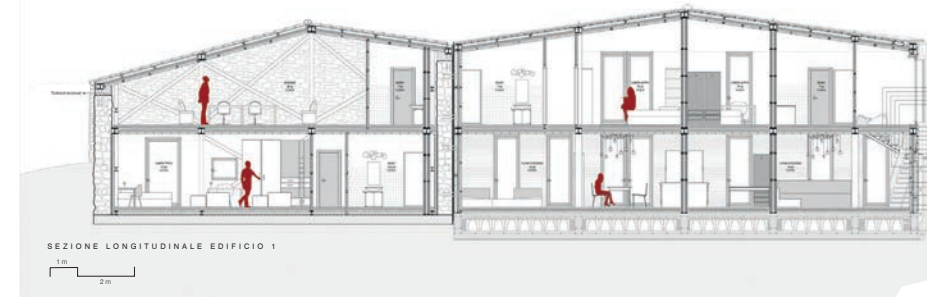


RISKS AND EMERGENCIES IN FRAGILE CONTEXTS

Contemporary architectural practice cannot escape careful assessment and consideration of the environmental risks that threaten human settlements. On top of this, there is the uncertainty factor that characterises our time and forces architectural and urban design to deal with an increasing degree of complexity. In this regard, fragility becomes an element with which to design. It must first be recognised and analysed before being able to contribute, in a specialised or interdisciplinary way, to its reduction within extremely diverse territorial situations. The Programme offers several opportunities to confront these types of issue, which are closely connected to climate change, ecological transition and socio-economic transition that pose ever-new demands on technical knowledge and its tradition.

Within the Architecture and Urban Design course, students study and design by constructing, where necessary, alternative scenarios within which to propose different design hypotheses from the perspective of prudent and sustainable development. This objective increasingly involves the study of the topics of the circular economy, the green economy, green and blue infrastructures and nature-based solutions. This leads AUD students to address, ever more directly, the question of new life cycles of settlement structures, internal spaces and in particular architectural heritage and material infrastructure.

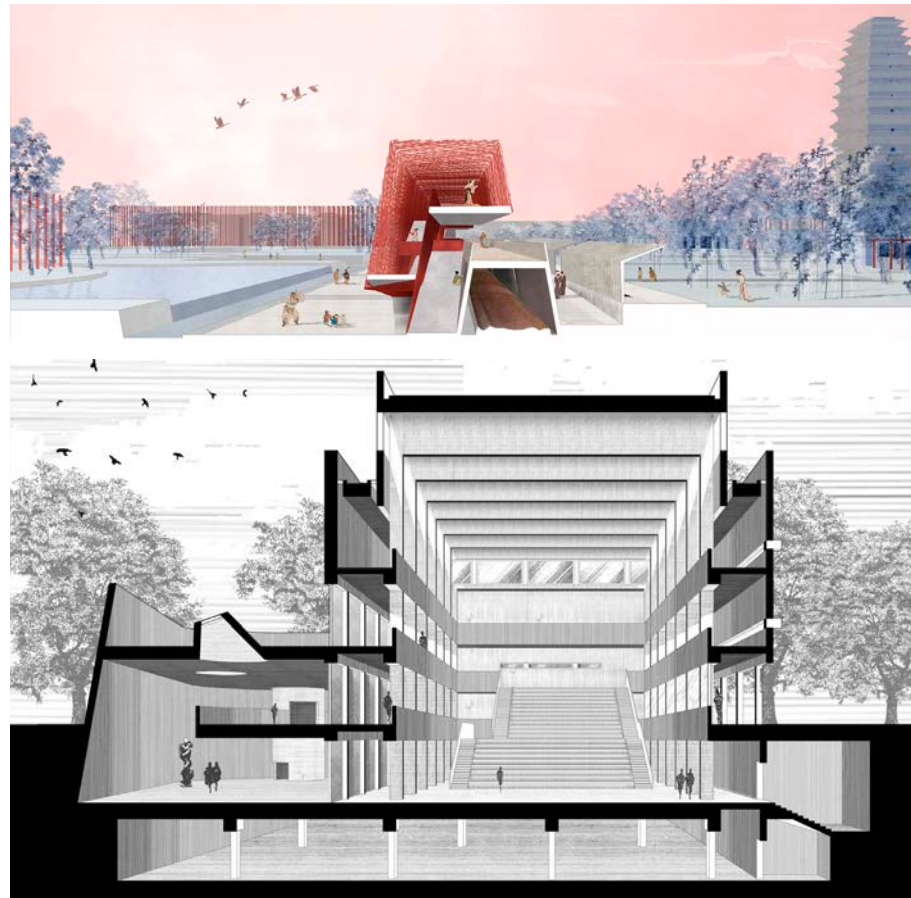
The studios and courses offered by AUD, strengthened by their propensity for experimentation, therefore aim to give the student the knowledge, tools and techniques to support decision-making concerning design that acts at different scales by integrating various aspects relating to energy/environment, society/culture, landscape, structures, technologies and plant engineering. Graduates in AUD become professionals capable of entering the labour market and strong in their knowledge of many fragilities, whether evident or latent, that characterise contemporary cities and territories.



URBAN REGENERATION AND PLACE DESIGN

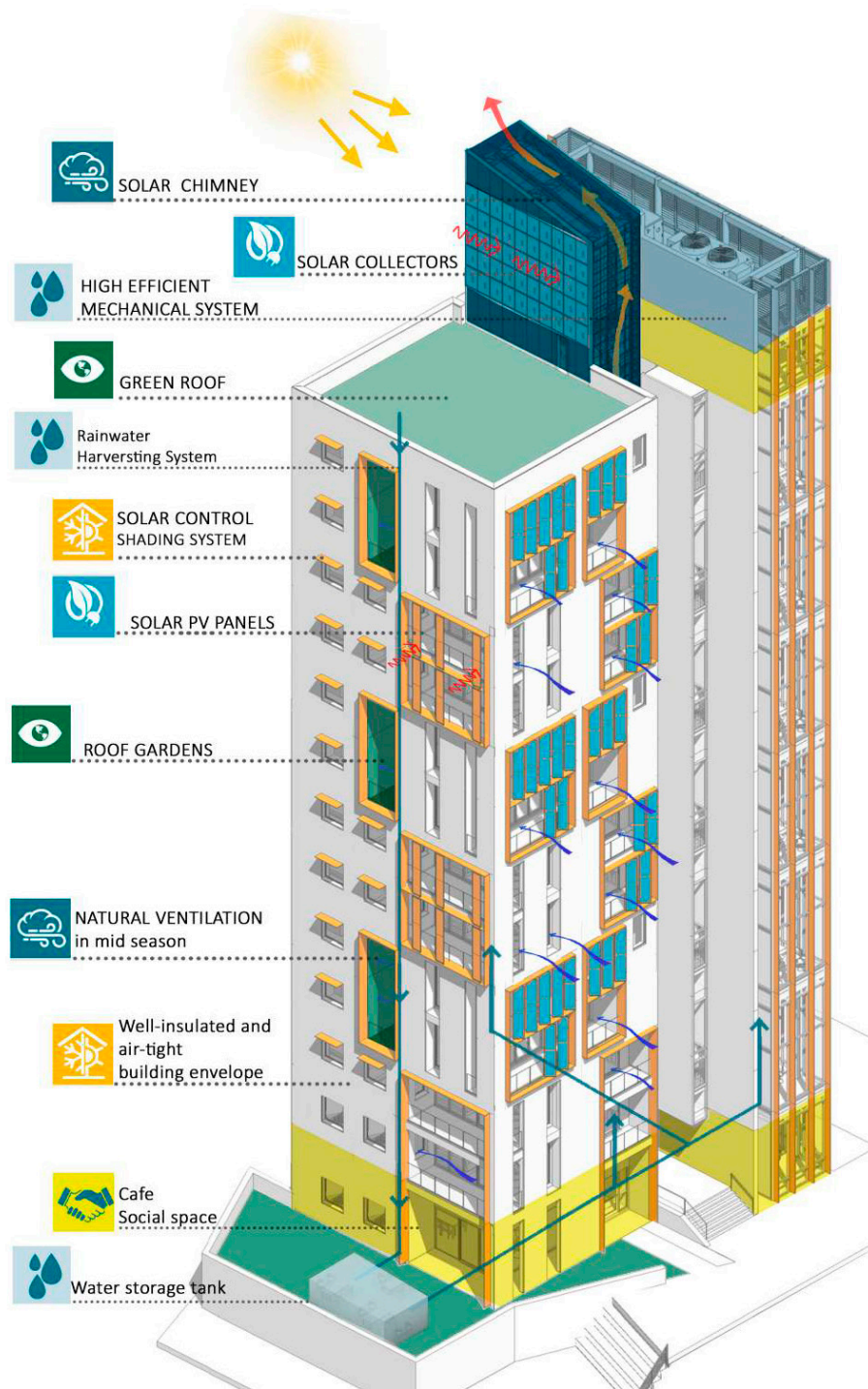
Built heritage (residential, productive and tertiary), cities and landscapes are subject to increasingly accelerated obsolescence. Whether it is the infrastructure of the industrial cycle in Western countries or colonial infrastructure in the Global South, in the metropolitan suburbs or in small villages, the challenge of reusing these materials with a view to environmental sustainability, ecological transition and landscape quality, and their re-signification, is central to the future of our habitat. In the architectural and urban design studios and research seminars, the programme ensures that students receive various training opportunities in intervention strategies and regenerative design, from

small-scale projects to large-scale territorial systems. A complex and up-to-date idea of the notion of heritage encourages the student to explore – both through cognition and design – the phenomena of abandonment, under-use or lack of maintenance. Architectural and place designers are called upon to deal with contexts that require care and imagination, and to interpret critical issues such as resources, in close dialogue with social actors able to promote regeneration, from local populations to public administrations. Understanding the processes that make it possible to activate virtuous dynamics is essential for understanding the space and role of architectural and landscape design.



The most relevant topics offered during the student's training (which consists of design and thematic studios and research seminars) concern the future of public housing districts, industrial and agricultural production districts, public open spaces in the dense city, urban acupuncture and informal city settings in the southern part of the world, supported, where possible, by direct experiences in the field and dialogue with local communities and institutions. Grounded in in-depth study, the objective of the taught content is therefore to provide the student with both the ability to take a medium- and long-term strategic stance, and the technical skills for appropriate design responses.





BUILDING AND ARCHITECTURAL ENGINEERING

COORDINATOR
Giuliana Iannaccone

2019-2021
Giuliana Iannaccone

2016-2018
Gabriele Masera

DURATION
2 Years

ENROLLED STUDENTS
80+60/year

LANGUAGE
English

EXCHANGE STUDENTS
ERASMUS
15/year

DOUBLE DEGREE PRO-
GRAMME
Yes

COURSES IN CO-TUTORSHIP
WITH OTHER UNIVERSITIES
1

Laurea Magistrale (equivalent to Master of Science)
Milan - Lecco

For several years, the construction sector has been experiencing an important process of transformation and renewal in response to the growing demand for sustainable built environments. The global challenges caused by climate and demographic changes, and by rapid urbanisation in many countries, highlight the need to train high-level professionals capable of offering effective and qualified responses to a constantly evolving framework which prioritises environmental sustainability and the well-being of people. In this context, the Master in Building and Architectural Engineering (BAE), offered entirely in English, trains engineers capable of contributing to the design, construction and long-term management of buildings, both new and renovated, with high energy and environmental performance. They will also be able to advance regeneration processes within the built environment, in almost all geographical locations, taking account of the significant strides made in European legislation and its practical implementation towards the goals of decarbonising the world economy by 2050. The BAE programme

is based on the understanding that the design, performance modelling, construction and management of an energy-efficient, zero emission building depend on a wide range of closely-related factors. In fact, there is a non-linear relationship between a building's behaviour and the combination of different parameters that act at different scales (from the external microclimate to the context and the single component of the building or system, without overlooking the behaviour of the users). In the engineering field, this translates into the learning and application of advanced methods and tools which, within a systemic conception of the building as an organism, allow us to evaluate how its various constituent elements can best work together to save energy, optimise the use of resources and reduce the impact on the environment during its life cycle. Graduates in Building and Architectural Engineering are therefore highly innovative professionals, able to manage the complexity that underpins the construction of high-performance buildings. They have the knowledge and tools necessary to manage an integrated design process between various disciplines (multidisciplinary) and at different scales (multiscalar) – the only possible approach for achieving economically sustainable buildings. In addition, they are able to model in detail the physical-technical and structural behaviour of building components and to predict their performance over time; a fundamental skill to support the design of efficient solutions throughout the life cycle of the building. In this regard, the degree programme offers two specific curricula:

- Architectural Engineering (at the Lecco Campus), aimed at providing graduates with the ability to manage multidisciplinary and multiscalar design processes and to participate in them effectively;
- Building Engineering (at the Milano Leonardo Campus), aimed at providing graduates with the ability to design, model and predict the physical, mechanical and energy behaviour of complex buildings, plants and structural systems and subsystems.

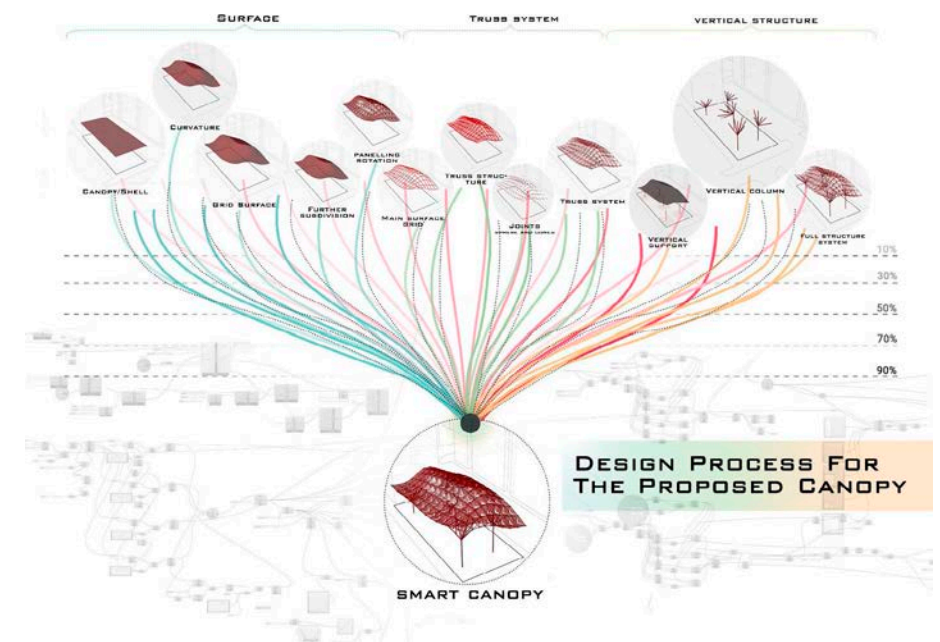
One of the strengths of the BAE programme is how its teaching is organised, on the basis of the immediate application of the knowledge acquired in the design exercises that students carry out, working in multidisciplinary and international teams. They will learn to manage complex and integrated design processes at different scales, both as a team leader and as a consultant to one of the disciplines involved. In addition, they will be able to apply energy-efficient design principles to complex, multiscalar projects or critically select construction technologies based on the project's architectural and engineering requirements. This type of experience allows students to strengthen not only their hard skills but also their soft skills (communication, collaboration and creativity skills and problem-solving aptitude), which are increasingly in demand in the construction sector.

ADVANCED DIGITAL TOOLS FOR DESIGN

As a result of the new digital age, the field of design has had to face several new challenges. The digitalisation process in engineering and architecture unlocks a wide range of possibilities in all the various phases of the construction process, from exploring alternative design solutions to optimisation, execution, management and inspection. Students are taught technologies and processes such as Computational Design and Building Information Modelling (BIM) and subsequently how to use them in a professional capacity. By emphasising the relationships between parametric and integrated design and digital

technologies, students acquire the ability to develop innovative, high-performance architectural solutions, from conceptual design to manufacturing, using advanced software and tools.

Building Information Modelling is included in the course so as to foster potential collaborative work environments, where teams are asked to produce information using standardised processes, standards and shared methods which ensure the same form and quality. Thus, information can be used and reused without modification or interpretation.



INTEGRATED MULTIDISCIPLINARY DESIGN

The programmes available in this area provide graduates with the theoretical and operational tools to understand the complex relationships between architecture, energy efficiency and technical-construction solutions, and to manage multidisciplinary design and construction processes effectively.

Students thus acquire a thorough understanding of the theoretical and practical implications of designing energy-efficient buildings and an integrated view of how the various disciplines involved in construction must interact during the design and construction process.

The programme provides the opportunity to explore innovative, integrated and multidisciplinary design approaches in order to re-imagine the future of our buildings and cities and encourage lasting change in the transition to a zero-emission society.

Through lectures and design exercises, students will have the opportunity to acquire a framework for understanding the discipline of architecture and environmental design and its relationships with other disciplines.

Furthermore, they will be able to understand that designing energy and technological solutions is often a creative activity, which involves the ability to choose between various strategies, climate-specific architectural languages and suitable materials, bringing them together and designing interface areas.

These outcomes are achieved through various teaching methods, including innovative learning in the form of flipped and blended learning, multimedia platforms, virtual exchange, seminars with external experts, guided exercises and design workshops.

The latter constitute the main way in which the concepts and models explained in the lectures are applied, and a fundamental opportunity for the practical implementation of multidisciplinary design principles through group work, applied to the analysis, interpretation and management of complex transformations.

These activities also enable students to

develop soft skills related to teamwork, communication and critical interpretation, synthesis and communication.

TERRACE ON HEATED ROOF

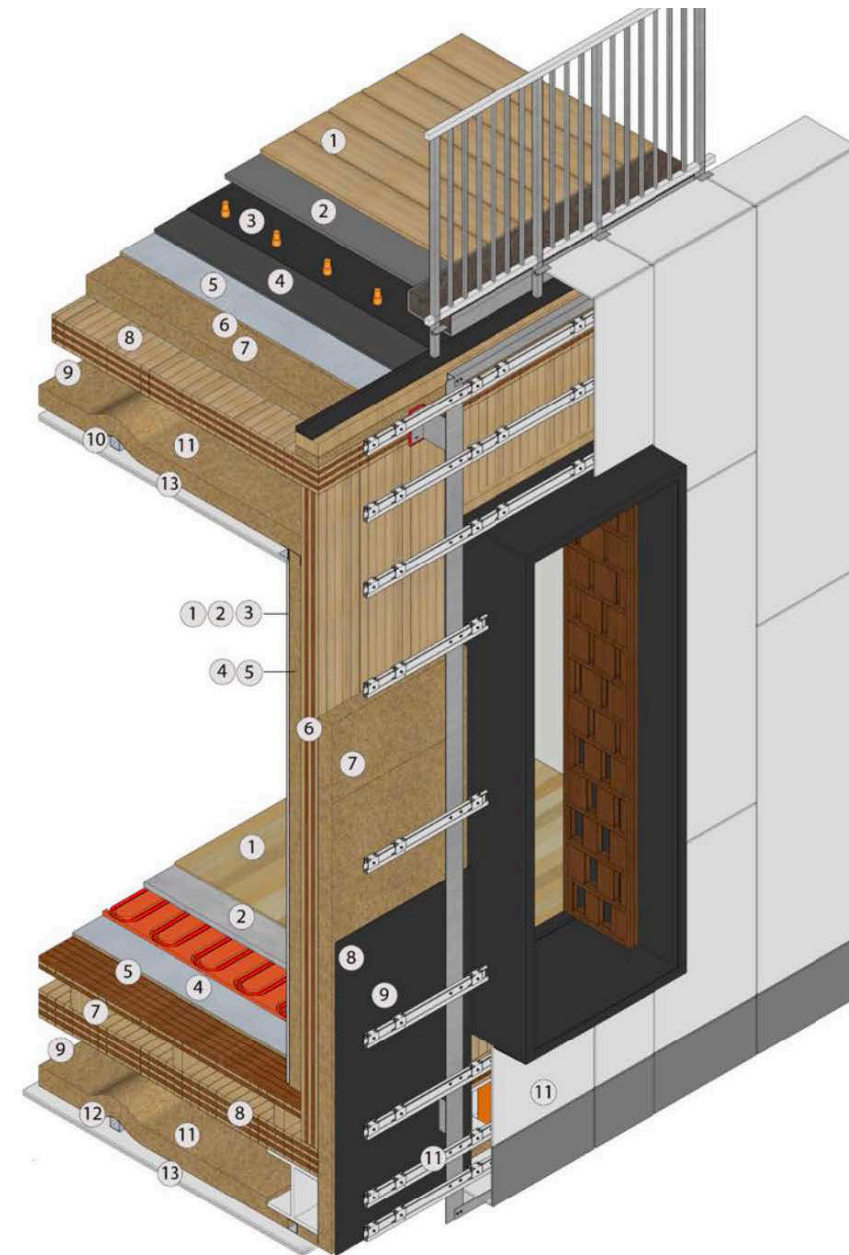
1. WPC Pavement 2.2 cm
2. Galvanized aluminium substructure 2 cm
3. Adjustable feet 3 cm to 10 cm
4. Waterproofing membrane (BPE) 0.4 cm / Bituver, Fleximat 4 mm
5. OSB Panel 2 cm
6. Rock wool Anti-crushing and acoustic insulation 2 cm
7. Rock wool thermo insulation 10 cm
8. Xlam Supporting panel 7 layers 14 cm
9. Air Cavity for air cooling 20 cm
10. Metal frame consisting of galvanized steel "C" profiles, type 27/50/27 0.06 cm
11. Glass wool thermo-acoustic insulation for false ceilings 2x4.5 cm
12. Pendini in cooked galvanized wire 0.4 cm
13. Knauf Plasterboard 2X1.25 cm

INTERNAL FLOOR

1. Parquet 1 cm
2. Self-levelling radiant screed 3 cm
3. Expanded polystyrene foam radiant panel 2.5 cm
4. Galvanized steel diffusion plate 0.1 cm
5. Rock wool anti-crushing and acoustic insulation 2 cm
6. Xlam 3 layers supporting panel 14 cm
7. Air Cavity 11 cm
8. Xlam 7 layers supporting panel 14 cm
9. Air Cavity for air cooling system 20 cm
10. Pendini in cooked galvanized wire 0.4 cm
11. Glass wool thermo-acoustic insulation for false ceilings 2x4.5 cm
12. Metal frame consisting of galvanized steel "C" profiles, type 27/50/27 0.06 cm
13. Knauf Plasterboard 2X1.25 cm

EXTERNAL WALL

1. Knauf Plasterboard 1.25 cm / Knauf Vidiwall
2. Steam barrier 0.0008 cm / ISOFOL
3. Knauf Plasterfiber sheet 1.25 cm / Knauf Vidiwall
4. Galvanized steel metal uprights "C" type 50/75/50 steel pitch 60cm
5. Rock wool Thermo-acoustic insulation 6cm
6. Xlam Supporting Panel 10 cm
7. Rock wool Fibertherm Dry Thermal insulation 10 cm
8. Waterproofing vapor brake membrane 0.04 cm / Rothoblass vaporlines 120
9. Aluminum substructure for cladding
10. Aluminum substructure for cladding
11. Laminated Cladding finishing 1 cm / MEG cellulose fibres and resins



DESIGN AND TRANSFORMATION OF THE BUILT ENVIRONMENT

The programmes in this area include subjects that provide students with the skills necessary for a proper understanding of the built environment, with particular regard to historic Italian and European cities, as well as the tools needed to operate in consolidated and multifaceted contexts in terms of their physical and cultural aspects.

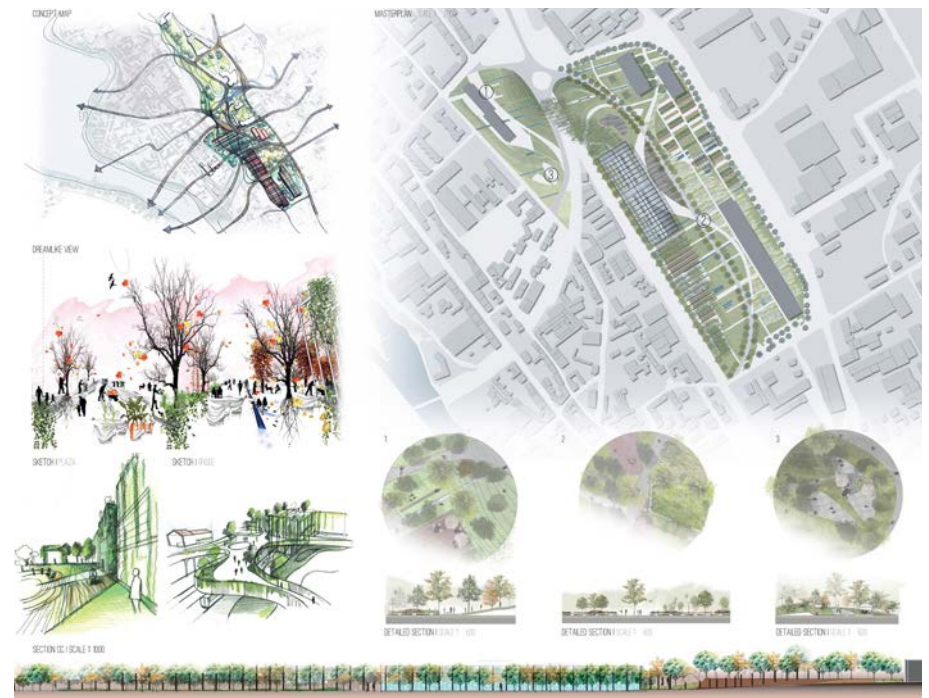
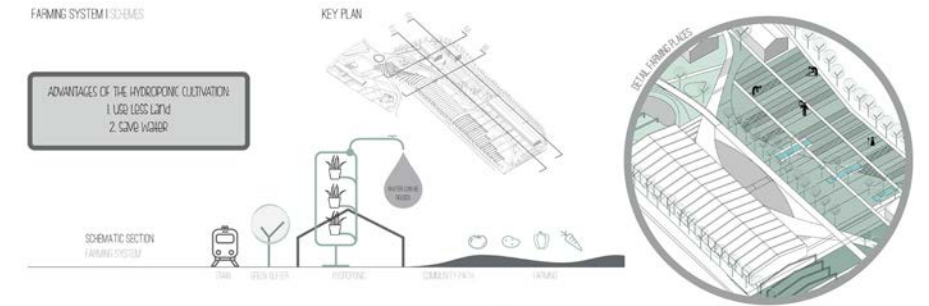
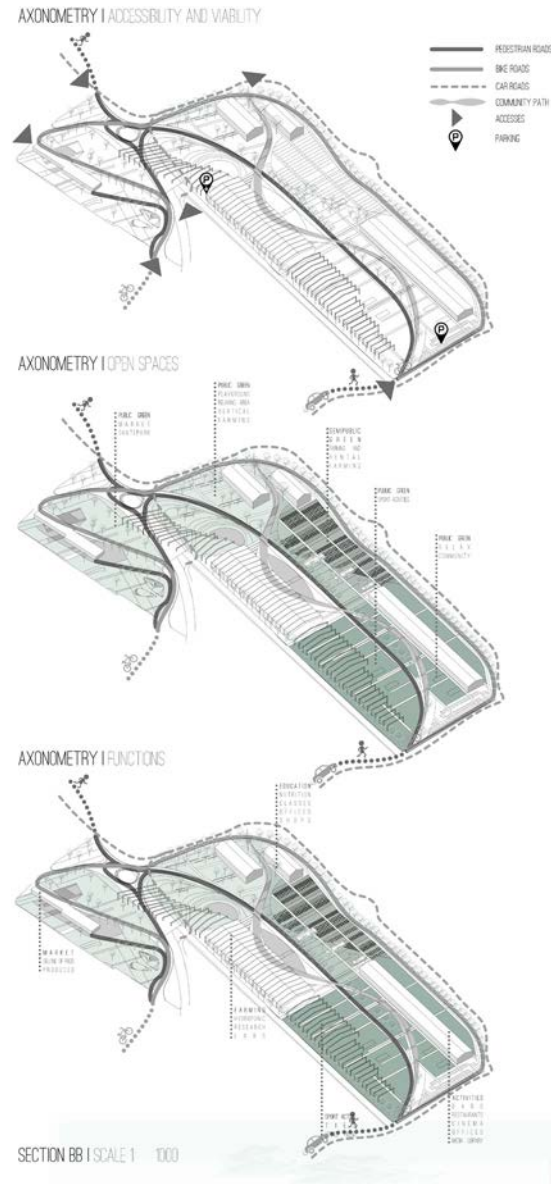
These courses deal with different scales, from the urban environment to the individual building, including the construction elements and materials that make up existing buildings. Students therefore acquire useful theoretical, methodological and operational skills for overseeing the processes of urban and building transformation, including in ancient and historical contexts.

They will be guided through the exploration of the concept of 'sustainability' as it evolves through time and space, understanding the different types of relationships between the built environment and nature that have developed in every context, from Japanese metabolism to contemporary biomimicry architecture, from Nordic sustainability to African resource-saving methods.

Sustainable urban design and the regeneration process are two central themes in this area. Urban resilience is a key concept that guides international policies and strategies: the approach to resilience requires profound innovation and a renewal of sustainable urban design in order to manage a complex process of urban transformation, integrating social, environmental, economic and organisational (governance) components.

The enhancement of resilient urban systems improves the adaptive capabilities needed in order to deal with environmental (climate change mitigation and adaptation to climate change), social and economic pressures and address the well-being of communities. Through a series of individual and group activities, students

will learn the fundamental principles of the architectural/urban design process geared towards sustainable development, as defined by the United Nations' SDGs.



ENERGY MODELLING

Through advanced energy modelling methods and tools, students are able to accurately simulate the energy behaviour of buildings to support decision-making processes in the various design phases, in order to ensure high performance in both new constructions and renovation projects. The goal is to understand the relationships between energy modelling, used to evaluate the conditions needed for thermal comfort within a building (and to calculate the energy needed to ensure comfortable conditions for the occupants), and the influence that climatic conditions and different uses have on final performance in order to optimise design and management choices. Students learn to control the

energy and mass transfers in buildings, the parameters that define the conditions required for the occupants to be comfortable and the performance of technological and mechanical systems. The concepts and modelling tools that students encounter in the two-year course are applied, on several occasions, to complex projects that all have different disciplines in common. At the end of the study programme, BAE graduates are able to address and manage design and modelling problems, with an awareness of the complex interactions between architectural, technological and energy aspects, by combining the knowledge acquired in the various courses.



STRUCTURAL MODELLING

In the area of structural modelling, students are equipped with advanced skills in terms of the analysis and design of structures, and their components, made of different materials. This knowledge allows them to monitor the design of structural elements when they are integrated into complex building organisms. Students also learn concepts related to the analysis and design of buildings in earthquake zones and the use of advanced materials for the seismic retrofitting of existing buildings. BAE graduates are therefore able to apply the knowledge and tools acquired in the relevant courses to the analysis, design and modelling of structural elements and frames in different use cases and levels of seismic activity, through the finite element method. (FEM). The theoretical knowledge of each course is complemented with the teaching on software tools applied in design exercises. Learning outcomes are achieved through various teaching methods, including innovative ones, which include lectures, seminars with external experts, design exercises and project work. The opportunity to apply the acquired knowledge to real cases is coordinated between the different courses, so that design and technical solutions can evolve together

with the student's ongoing learning of scientific and technical skills.

Loads Estimation

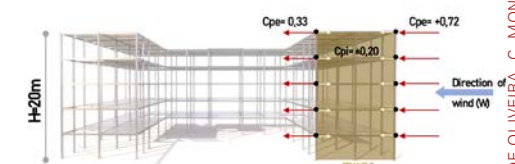


Site: Milan → Zone I
Altitude (a_s) = 120 m

$$S = \mu_i \times C_e \times C_t \times s_k = 0,8 \times 1 \times 1 \times 1,50 \text{ [kN/m}^2\text{]}$$

SNOW LOAD- Q_k (kN/m ²)	
• Snow load on roof	1,20

Wind Load



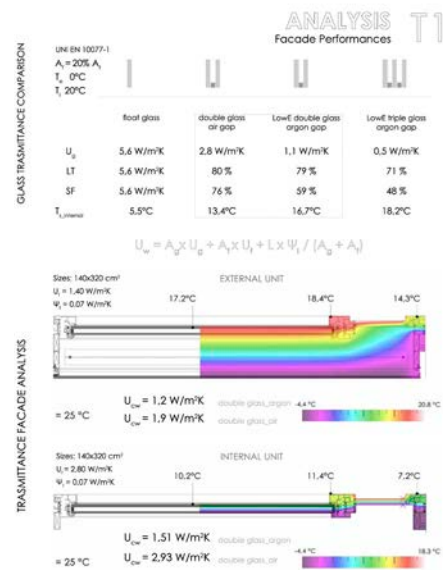
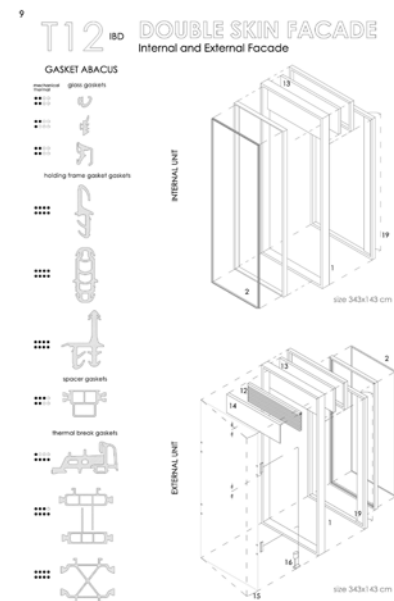
WIND LOAD- Q_k (kN/m ²)	
• W_{upwind}	0,61
• $W_{downwind}$	0,35

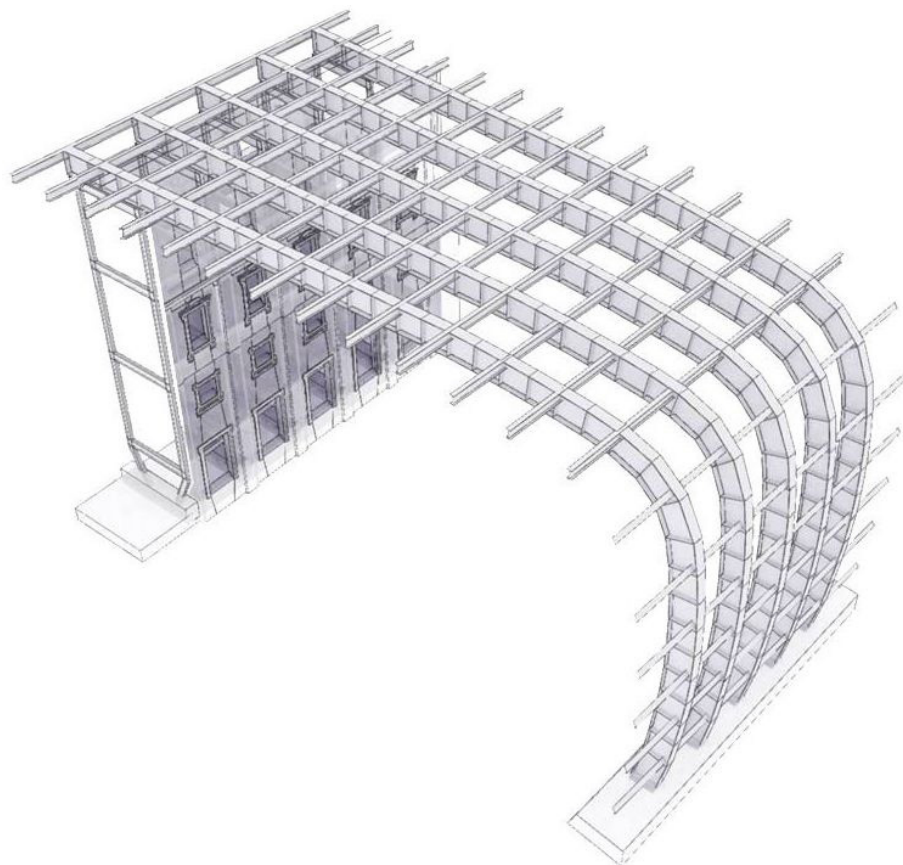


FAÇADE ENGINEERING

Courses in this area provide students with a wide range of skills and tools for the integrated design of building envelopes, materials and components, integrated into high-performance buildings. In addition to the basic principles of integrated design for resource efficiency, student acquire skills related to the technology behind, and the performance of materials and advanced components of the building envelope, learning to connect design ideas concepts with strategies for choosing materials and architectural technology. Basic and advanced design strategies for the building envelope are taught with a detailed focus on mechanical, thermal and safety performance. Students learn to design and manage the main technical interfaces between the building envelope and the other main parts of the building, such as its structure and systems. Technological knowledge is simultaneously supported by the acquisition of tools for the mechanical modelling of different façade systems and the control of energy phenomena related to both

the building envelope and visual comfort. Daylighting strategies are adopted to design building envelopes capable of coping with energy performance, user needs and architectural integration. Advanced computational tools are used to facilitate the link between digital design, thermal and daylight simulations, and physical construction. In this regard, students will learn to design advanced concepts for shading devices, considering their physical characteristics (geometry, kinematics and materials) and their effectiveness in various climatic contexts. Students will explore the design of dynamic, adaptive and reactive façades, including through the introduction of transdisciplinary principles of biomimicry, that have the potential to bring about a more efficient use of resources in building technologies and, at the same time, promote the ability to adapt to an ever-changing environment.





BUILDING SYSTEMS ENGINEERING

Laurea Magistrale (equivalent to Master of Science), Milan

COORDINATOR
Marco Andrea Pisani

2018-2020
Marco Andrea Pisani

2016-2017
Angelo Lucchini

DURATION
2 Years

LANGUAGE
Italian

ENROLLED STUDENTS
170

EXCHANGE STUDENTS
ERASMUS
12/year

DOUBLE DEGREE COURSE (EU
and NON-EU)
18

The complexity that characterises the construction sector in today's world requires an increasing number of graduate technicians and an organic diversification of their training courses in both Architecture and Engineering degrees. In this context, Construction Engineering has taken on a high degree of specialisation and teaching autonomy. Building Systems Engineering graduates are educated and critical technicians, with a solid scientific and technical background and professional skills that enable them to:

- *engineer the architectural design of buildings, with particular regard to those that are complex, large and/or intended, in whole or in part, for specialised activities;*
- *oversee the design integration of all technological and technical components (building, structural and plant);*
- *organise and control the construction and maintenance process, as well as the process related to any redevelopment and/or consolidation thereof;*
- *actively participate in the planning and management of the entire production and life*

cycle of buildings.

In fact, the current complexity of a building organism allows it to be compared to a machine in continuous motion, made up of multiple gears that must move in unison. Each element must be designed in such a way that it can function effectively and efficiently within its defined lifetime. The protagonist of this project is the building systems engineer who, given an architectural form, intervenes in the design of its operation, execution and maintenance. The building systems engineer is trained to have strong skills in systematising all the various components of a building organism. This competency allows him or her to be highly competitive in the job market. Today, engineering a building organism means having the strategic ability to optimise its design, execution and management.

The degree programme offers courses that allow students to acquire both managerial and specialist skills in the most important construction sectors:

- *performance and technological design. These skills enable the building systems engineer to define the way in which the building functions, in relation to both the needs of the user and the context, and to determine appropriate construction features;*
- *structural design, with the acquisition of in-depth skills concerning the behaviour of materials, their modelling, the structural analysis carried out by simulating the construction phases, the verification of structural safety and the adequacy of operational performance;*
- *production, management and execution, with the acquisition of skills concerning the entire field of knowledge of materials; production of components; management of the building process, from the initial stages to the operational phase; and, last but not least, the completion of specific training in the management and supervision of construction work.*

These issues are addressed both for new buildings and for existing ones, where a local or general redevelopment is to be undertaken in order to adapt the buildings to new market requirements and enable them to offer performance far superior to that which is considered at the design stage.

The many design studios enable students to acquire practical skills and develop high-level theses, both in direct relationship with construction and engineering companies, and in the Politecnico's workshops. Theses are developed in both the modelling and the experimental fields. The degree programme includes innovative teaching and courses taught in collaboration with companies and organisations such as, for example, the Order of Engineers of the Province of Milan (for fire safety courses).

BUILDING SYSTEM DESIGN

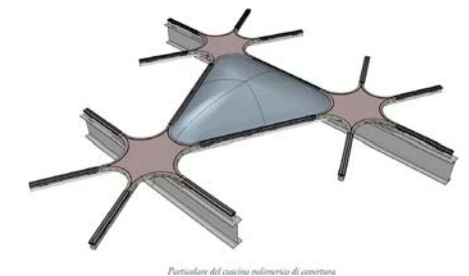
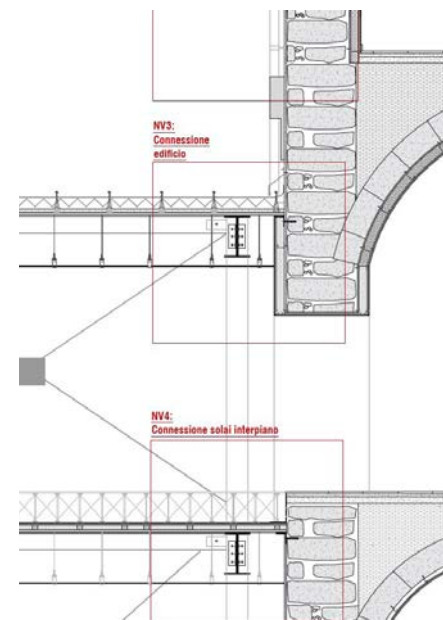
The complexity of the building system is present in all constructions, from the smallest to the largest.

Today the issue of complexity must be addressed not only with regard to classic operational issues, but also with regard to approaches arising from sustainability issues. There are various types of interactions in a building system:

- Intrinsic, in terms of use, performance and individual components and materials. The type of use and the intensity of use of an environment entail different actions and, therefore, specific attention when designing the correct performance levels. Performance levels closely interact with each other, and optimisation is always necessary. Equally, the level of design must extend to the individual and specific construction and functional details, in order to prevent even small gears from blocking, slowing down or making the entire system less efficient.
- Extrinsic, in terms of the climate and the urban context surrounding the building. Each building must behave in an 'active' manner

with respect to controlling both reuse/recycling and the urban climate, improving it as much as possible and avoiding negative contributions (in terms of heat, noise pollution, etc.) both during its construction and throughout its life cycle.

This type of approach must support both new construction projects and functional and performance redevelopment projects, which are increasingly common, starting with a precise knowledge of the existing state of the site, its defects and its potential. The skills that are offered within this degree programme are intended to train students to approach each project with attention and care dedicated both to overall functionality, and to the functioning of each individual detail. It will also teach them to apply the same attention and care to the complexity of today's systems, in order to create suitable prerequisites for embarking on the profession within design teams that will certainly involve interaction with specialists from other branches of engineering and/or architecture.



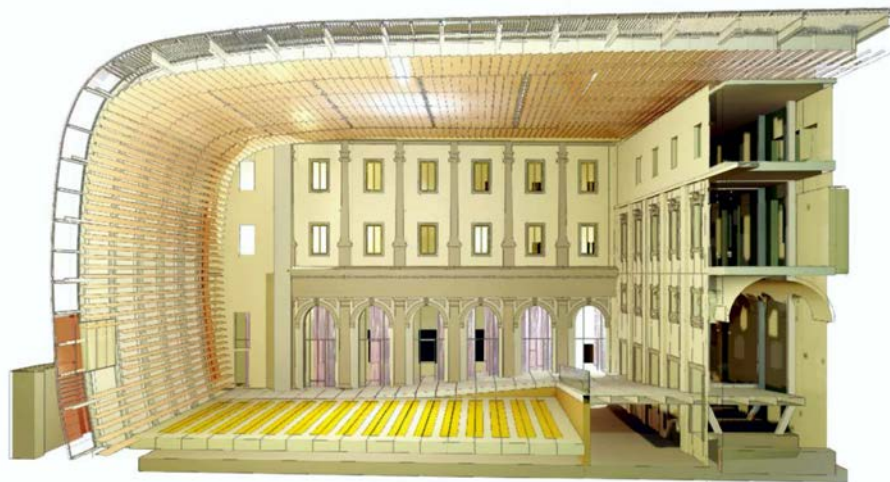
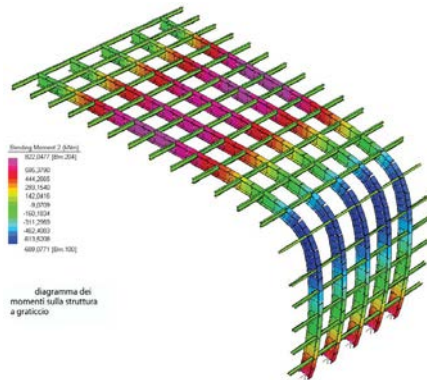
THE STRUCTURAL DESIGN OF NEW AND EXISTING BUILDINGS

Each student on the Laurea Magistrale (equivalent to Master of Science) programme is required to pass exams aimed at deepening their skills in Building Technology and Earthquake Engineering.

The Structural Track intends to further hone students' skills in the field of building frame design and the study of the construction phases necessary to achieve it. To this end, a quarter of the entire degree programme is devoted to the in-depth study of issues relating to the design of new buildings in steel, reinforced and prestressed concrete, wood and masonry, as well as the design of foundations. The structural consolidation of existing buildings is also considered alongside the abovementioned issues. These skills are further enhanced by the synergistic skills linked, for example, to the organisation of the construction site and its general and safety management.

The importance of fully ensuring that buildings are reliable, as well as the ever-increasing relevance of and attention to seismic issues

and the associated need for detailed risk prediction in the design, consolidation and repair of the existing building stock (dilapidated buildings, historical centres), create a wide and articulated field of intervention for graduates.



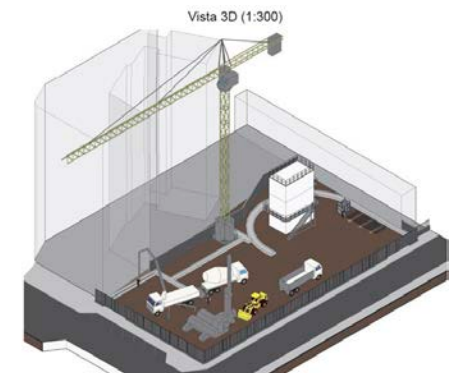
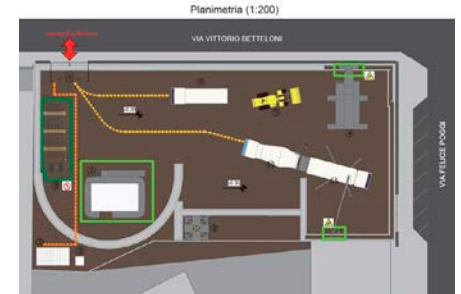
spaccato della corte-auditorium, configurazione piana

THE PRODUCTION AND CONSTRUCTION PROCESS USING INNOVATIVE SYSTEMS

The Production and Construction Track of the Laurea Magistrale (equivalent to Master of Science) in Building Systems Engineering aims to train engineers who are ready to enter the world of work related to the execution phase of a construction or building, as well as the civil maintenance process, starting with the ergo-technical design of the construction phase, developed using BIM techniques.

The engineering scope of the Production and Construction Track is broad, ranging from the construction of new (and potentially complex) buildings to the restoration of historical architectural heritage and the maintenance of built environments. It also offers some in-depth studies in the civil infrastructure sector, taught through seminars delivered by the degree programme in collaboration with Engineering Companies and relevant Institutions.

In particular, the course orients students towards understanding the productivity, profitability, sustainability and safety requirements that characterise the construction processes, whilst at the same time developing their design-based response to these processes, in terms of the choice of implementation techniques, the technologies to be applied, the materials, spatial and temporal planning of works and the respective advanced management systems that are at the service of both the client and the company.



STUDIO-BASED THESES

Many students choose to undertake a studio-based thesis in this Laurea Magistrale (equivalent to Master of Science). For this type of thesis the student does not work alone but instead joins a research group which includes members of the faculty. Whilst developing the thesis, he or she takes on a different position from that of the classic student, namely a more proactive and, if necessary, more controversial position, but always in constant dialogue with the other members of the group.

In order to be able to 'dialogue', the student must first acquire a wealth of experience and knowledge already available in specialist literature on the state of the art of the topic being researched.

Studio-based theses can be divided into two distinct sub-categories: experimental theses and numerical modelling theses, with the understanding that the two approaches often complement each other.

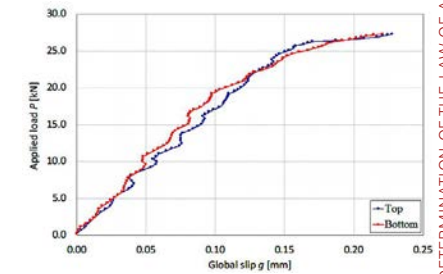
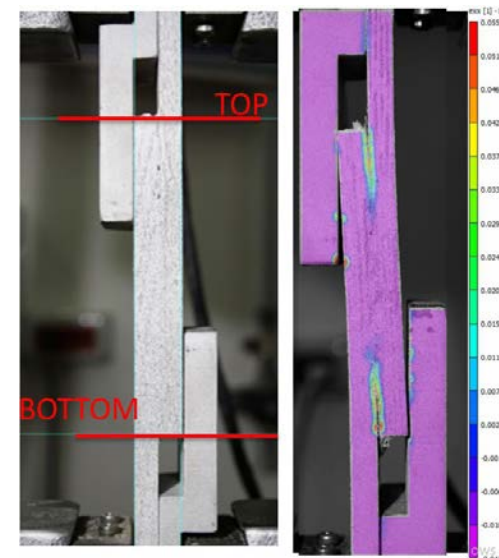
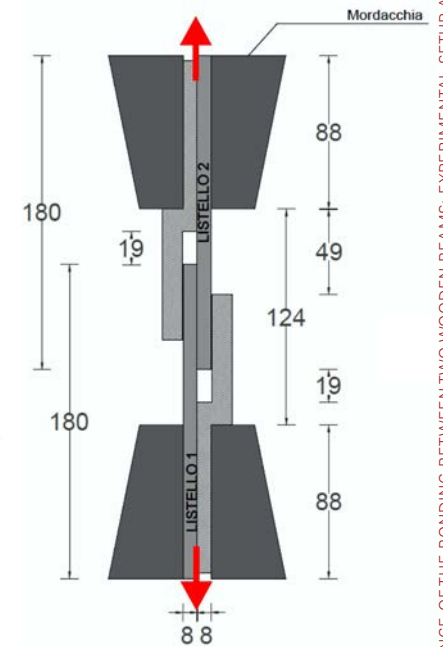
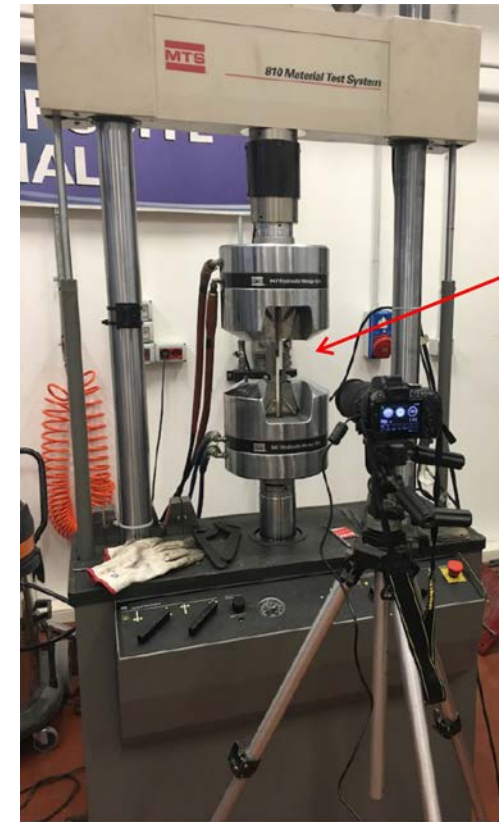
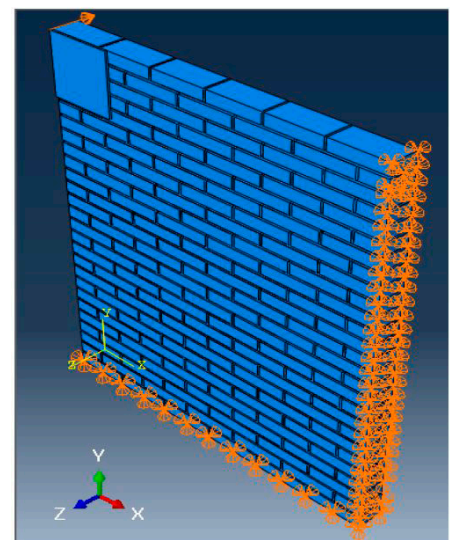
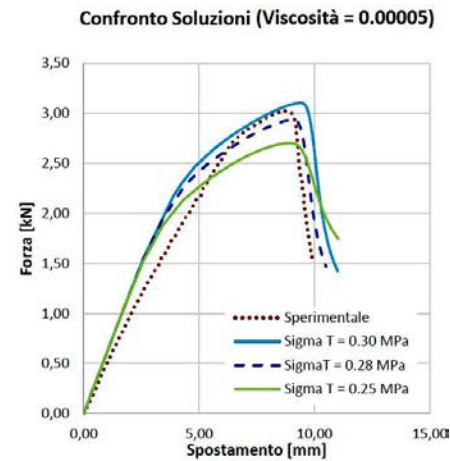
The salient points of an experimental thesis can be summarised as follows:

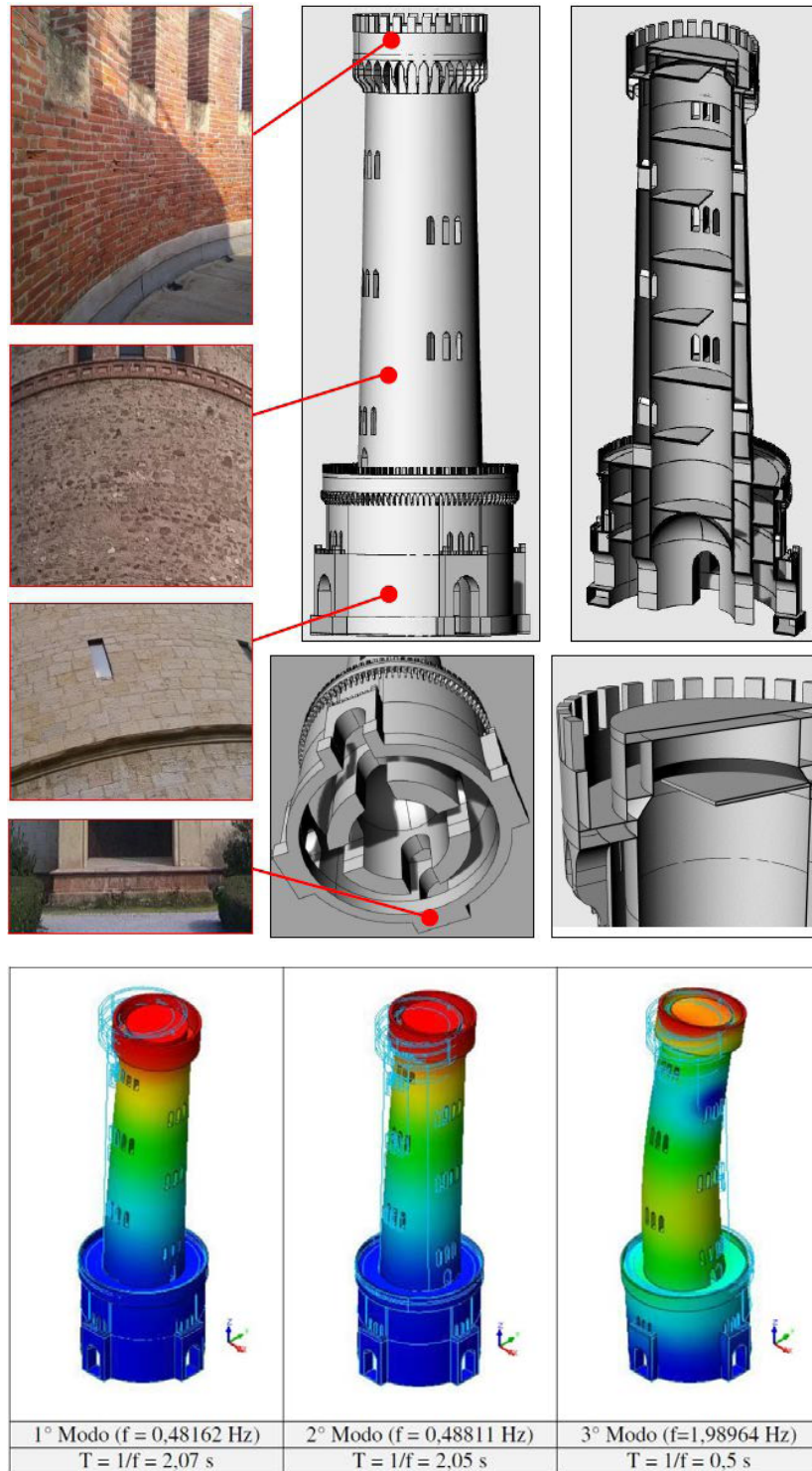
1. bibliographic research
2. conception, development and testing of the test system/facility (test setup)
3. preparation of test specimens
4. carrying out of experiments
5. analysis of the results obtained while for a numerical modelling thesis, points 2, 3 and 4 generally become:
 2. definition of the criteria and hypotheses that qualify the mathematical model under investigation
 3. qualification of the numerical model through comparison with experimental tests described in the scientific literature
 4. execution of numerical simulations

It should be noted that the thesis project should only engage the student full-time for a few months, and not longer, and that the research team should make steady progress on the project. Therefore, depending on the complexity and difficulty of the work to be done, there is the possibility that the candidate

may only be involved in a few of the phases outlined above, but not all of them.

Numerical modelling may concern both structural issues and issues concerning the energy behaviour of buildings or their components, but also fire behaviour, fluid dynamics applied to building elements or modelling relating to the planning or management of a construction site.

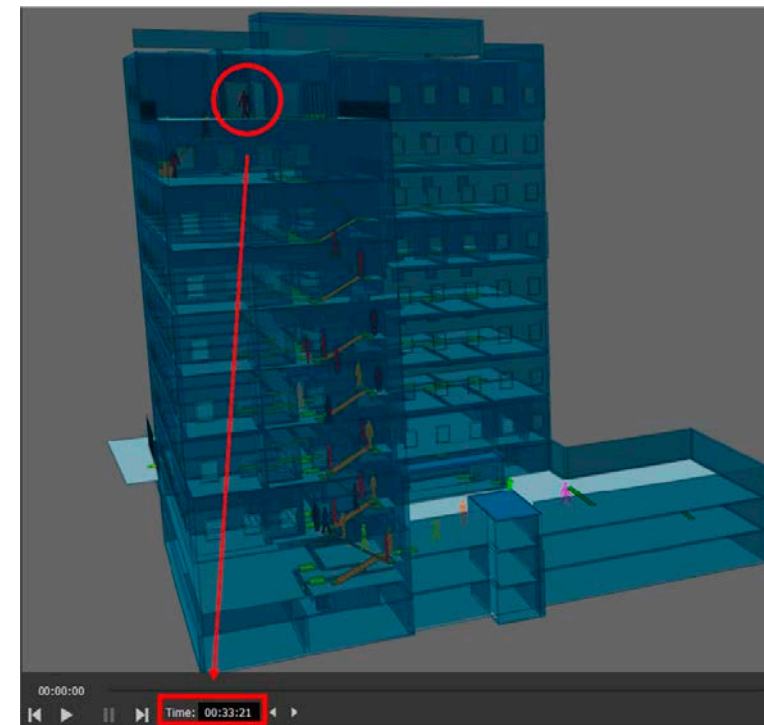


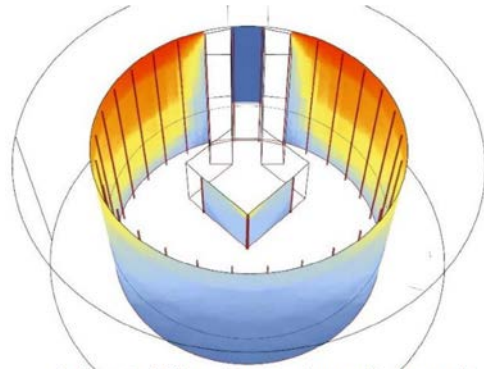


DESIGN-BASED THESES

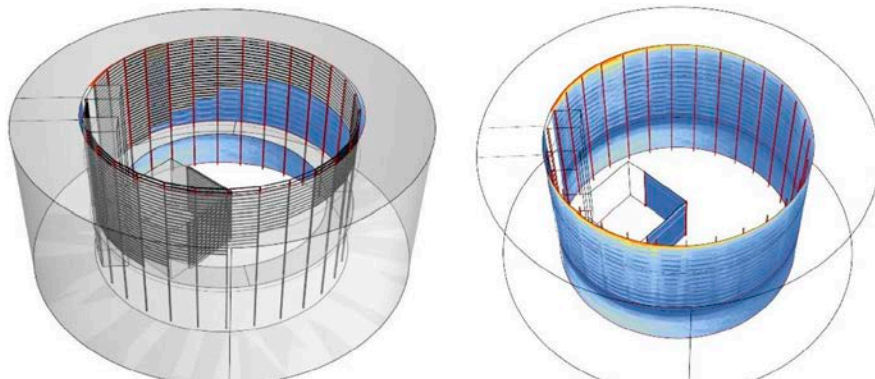
Design-based theses always start with a state-of-the-art study through bibliographic and regulatory research in order to comprehensively discover, to the best extent possible, the real and current level of knowledge, especially at the university research level, on a certain topic. Subsequently, the student may pursue various paths, always supported by the tutor, which lead him or her to develop a methodological innovation which is then very often also validated by experts in the field. The topics covered are very varied, in many cases new methodological approaches, or refinements thereof, are defined to guide the design engineer towards controlled design paths involving comparative analyses of different strategies, in order to optimise them, and of the behaviour of solutions over time, very often accompanied by the application of BIM. In many cases, these concern the definition of guidelines for the recovery and functional redevelopment of buildings or parts of

buildings with the application of case studies, in collaboration with businesses, construction companies, engineering firms or various other types of organisation. Therefore, the student can directly enter their 'field', in order to enable very close contact with the world of work. Very often this type of activity turns into a working relationship. In the Production and Construction Track, the student, at his or her discretion and subject to availability, can develop an independent thesis or choose to undertake a full-time internship, lasting several months, at a construction or engineering company, a design studio, for a manufacturer of building or construction components or by joining a research group at the Politecnico. The thesis thus originates from the student's direct experience in the construction sector – construction site, industry or tertiary sector – which facilitates his or her subsequent professional development.

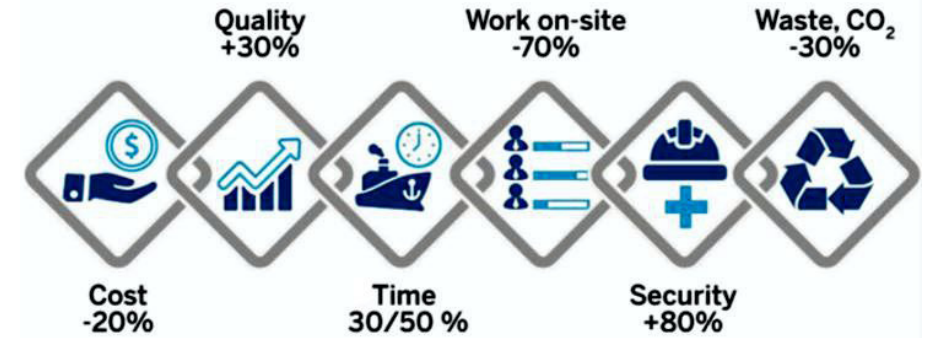
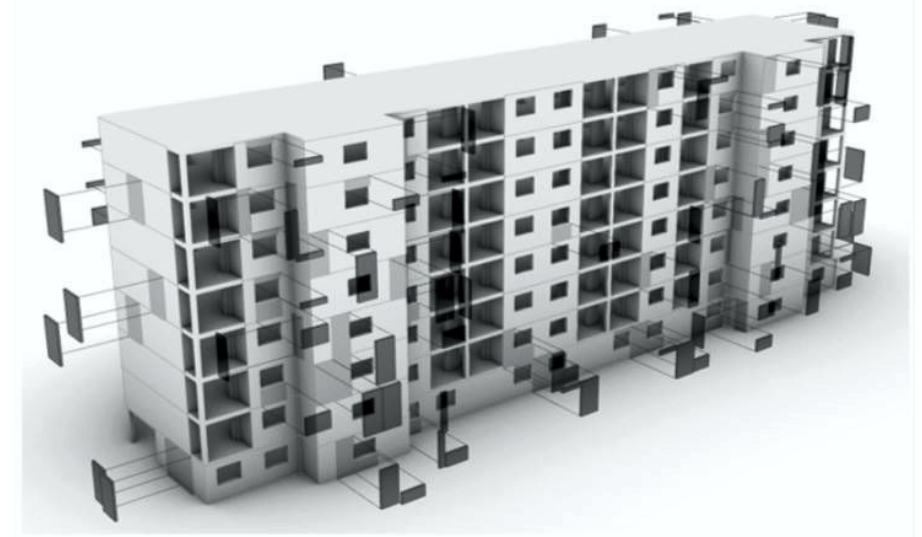




Andamento dell'irraggiamento solare medio annuo sulla superficie in oggetto senza schermature



Distribuzione dei frangisole sulla superficie e relativo andamento dell'irraggiamento

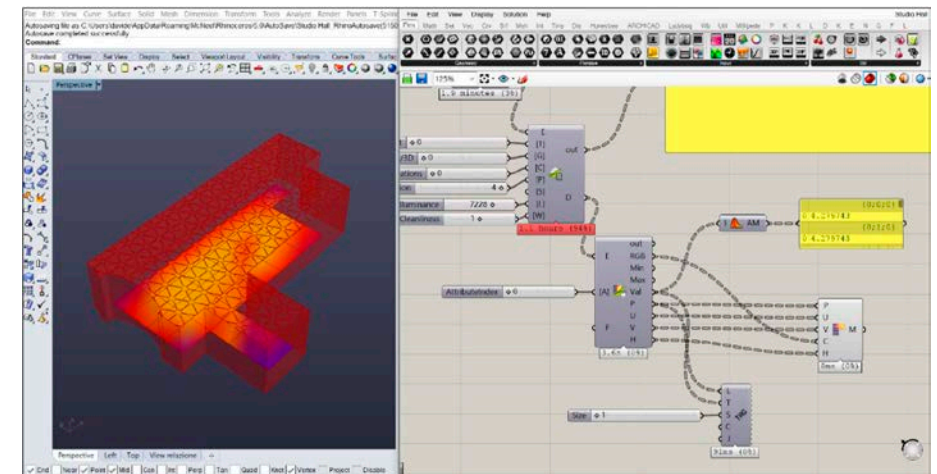
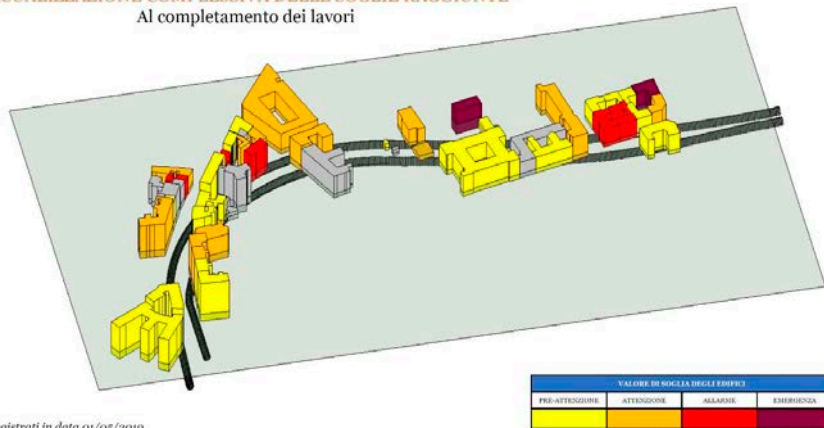


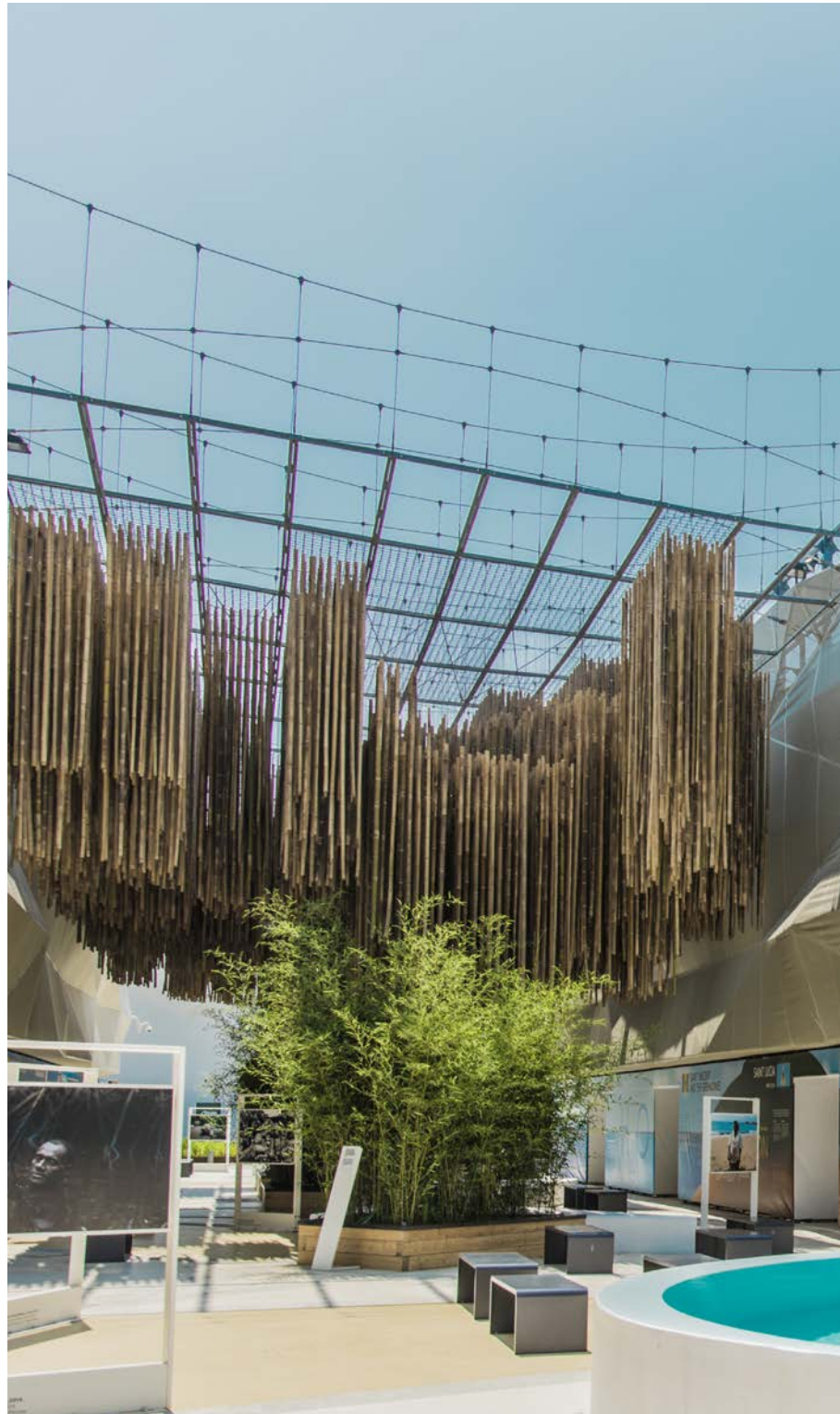
DfMA & BIM Approach (MMC).
 Source: Construction 4.0,
 Marco Cucuzza

TRATTA CENTRO
 da ST15 (Stazione Tricolore) a ST14 (San Babila)

APPLICAZIONE MODELLO BIM
 Al caso studio - esecuzione

VISUALIZZAZIONE COMPLESSIVA DELLE SOGLIE RAGGIUNTE
 Al completamento dei lavori





INGEGNERIA EDILE - ARCHITETTURA

COORDINATOR
Laura Elisabetta Malighetti

2019-2021
Matteo Francesco Ruta

2016-2018
Matteo Francesco Ruta

DURATION
5 years

PLACES AVAILABLE
110 per year, 2 of which are
reserved for non-EU students

LANGUAGE
Italian

DISCIPLINARY AREAS
Architectural design and Restoration
Construction technologies and building production
Structural Design
Urban planning
Mathematics and Physics
Architectural drawing, representation and surveying
History of architecture
Economics, Legal Sciences and Sociology
In-depth thematic studies of the student's choice

*5-Year Single-cycle Laurea Magistrale
(equivalent to Master of Science),
Lecco*

*The degree course in Building Engineering/
Architecture, established in 1998, was created
with the specific aim of moulding open-
minded graduates with a multidisciplinary
education, better equipped to enter complex
scenarios such as today's architectural and
building engineering processes and projects all
over the world.*

*In this regard, in a national and international
scenario in which the number and types of
people involved in each individual project
have been ever increasing in recent years, the
concept of Building Engineering/Architecture,
namely the supporting 'structure' and the
cultural and professional aspects identified
when the programme was designed, are
still relevant. Refinements and updates
implemented over the years have led the
degree programme to adapt to the changes and
innovations of the reference context.*

*During the conception of the degree
programme, as well as in subsequent years,
the main parties interested in the cultural/
professional profile of graduates who will
enter the world of work were identified
and consulted; in particular architectural*

design firms, engineering companies, construction companies, professional associations, scientific companies involved in the Scientific-Disciplinary Sectors relevant to the course and manufacturers of construction components. Said parties help to design the degree programme and attest to the importance of a complete, open and multidisciplinary professionals within the current scenarios of highly complex design and construction processes in the world of architecture and, more generally, construction.

The degree in Building Engineering/Architecture is a five-year programme with diversified courses, including 12 design studios.

The programme is based on a solid foundation of scientific, technical and design disciplines. In an integrated manner, it combines the classical architect's education with that of the building engineer, seeking to train professionals who are able to effectively manage the complexity of architectural projects and their construction, perfectly in line with today's emerging demands for environmental quality, energy control and sustainability.

Graduates of the five-year programme in Building Engineering/Architecture are able to critically interpret existing building systems, at a spatial, social and economic level and with regard to quantitative and qualitative aspects, having acquired this skill in the courses and studios that the programme offers. Furthermore, beyond the knowledge of practice and standards, graduates are able to make reasoned decisions on the basis of his or her own professionalism and engineering methodologies. In addition to this, graduates of the five-year Building Engineering/Architecture programme will have learnt to contextualise – in an appropriate way and with reference to the different design scales – design, recovery, managerial and organisational interventions, anticipating and predicting the repercussions that proposed transformations can have on urban, economic and social structures, as well as on product quality and energy and environmental impact.

The success of the Building Engineering/Architecture programme at the Politecnico di Milano is evidenced by the number of students from other universities, in Italy and around the world, who join its workshops. These workshops are organised with the aim of integrating multicultural skills and implementing skills in the international arena.

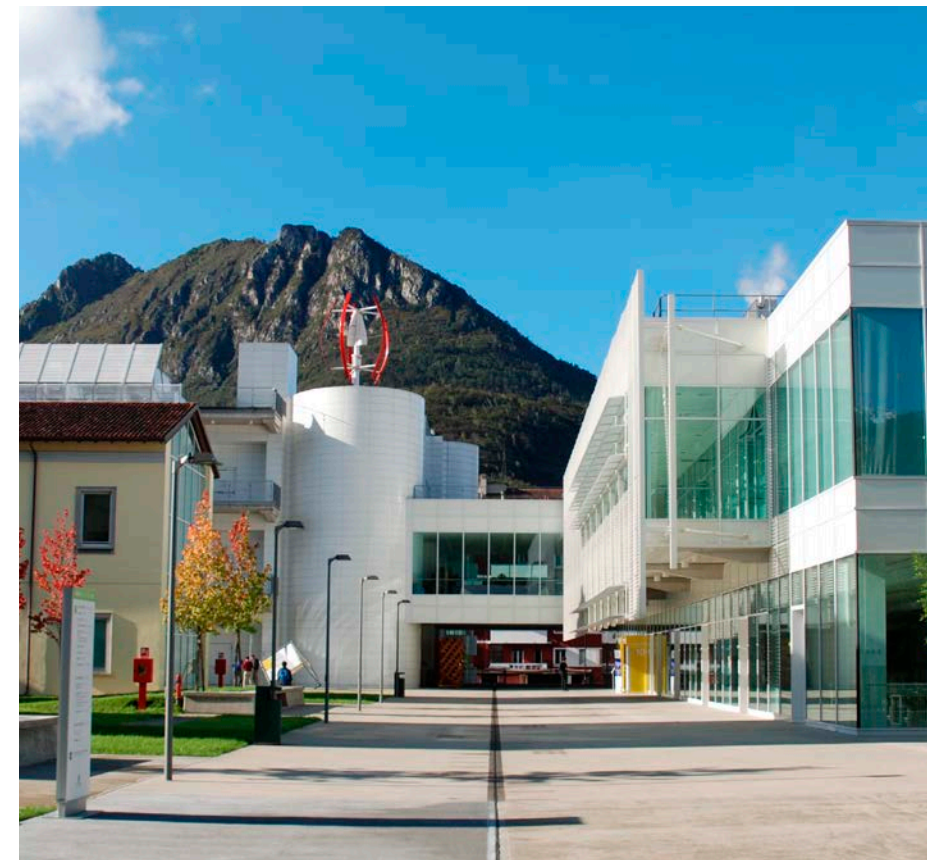
At the end of their studies, having passed the state exams, students can enrol in the professional registers of both engineers and architects. In addition, the qualification issued allows graduates to practise the architectural profession in other EU countries without having to request the recognition of the qualification in a foreign university under Directive 85/384/EEC.

The analysis of employment data, obtained from sector-specific studies and dialogue with the parties involved, shows that the employment opportunities and prospects are proportional to the annual number graduates of the degree programme.

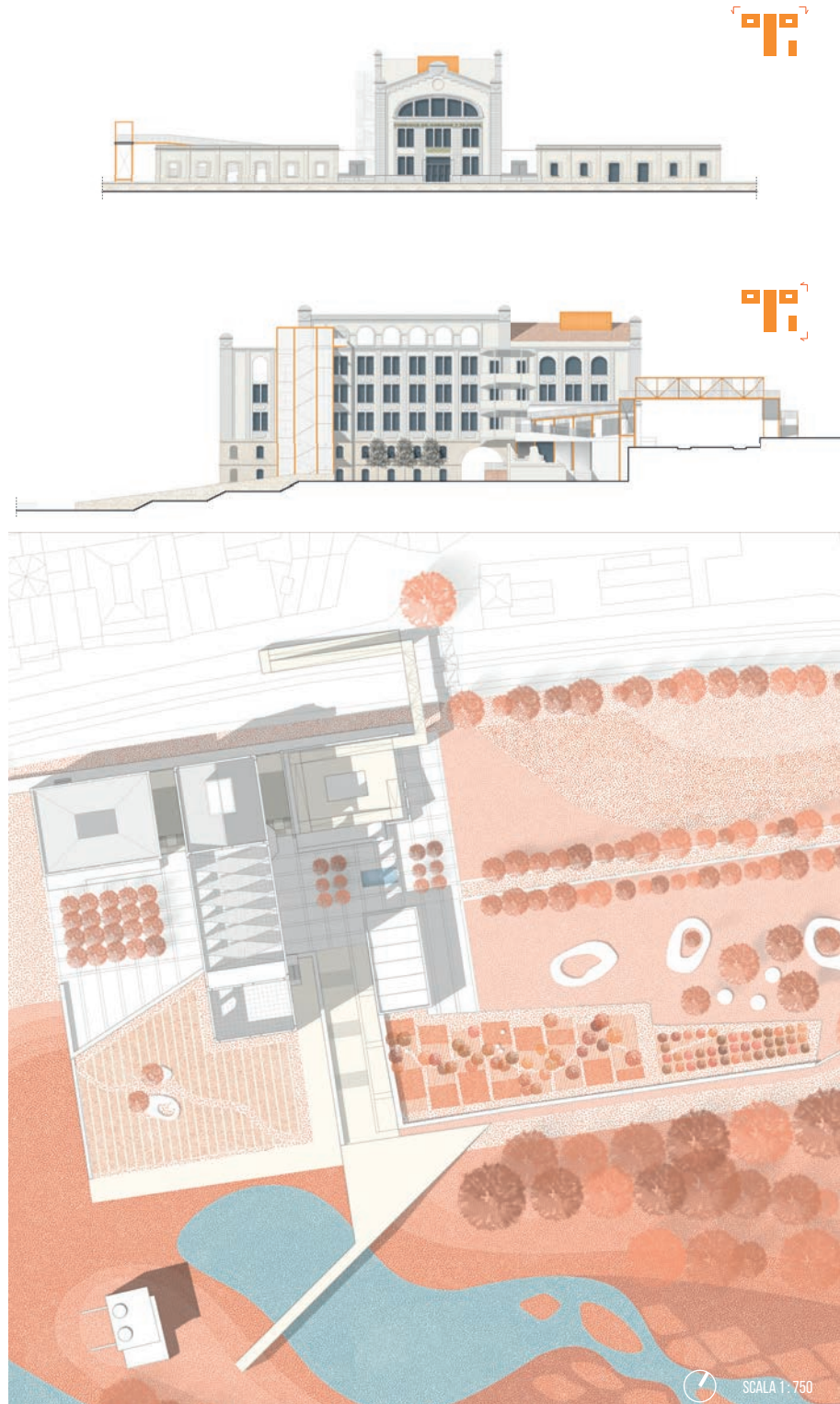
THE BUILDING ENGINEER/ARCHITECT'S TRADE

The complexity that today characterises the construction of architectural works and the challenges of sustainability and reduction of energy consumption require a comprehensive education that enables future graduates in Building Engineering/Architecture to compete on a national and international level. The Building Engineer/Architect is a professional capable of designing an architectural work, as the person responsible for the entire building process, from an architectural, technological, structural and environmental point of view, and of developing advanced skills both in the use of the most innovative construction technologies and in intervention on existing buildings to be recovered or restored. This is accompanied by

the ability to address the relationship between settlements and the context, within the framework of landscape and environmental assessment. The Building Engineer/Architect is able to operate effectively within the processes and activities of designing complex building systems, with skills to handle architectural, technological, structural and environmental quality aspects whilst paying particular attention to user wellbeing, service life and energy and environmental impact issues; recovery, redevelopment, maintenance and management of the existing building stock; development of the building process for construction site, management and economic aspects; design of innovative and experimental building components.

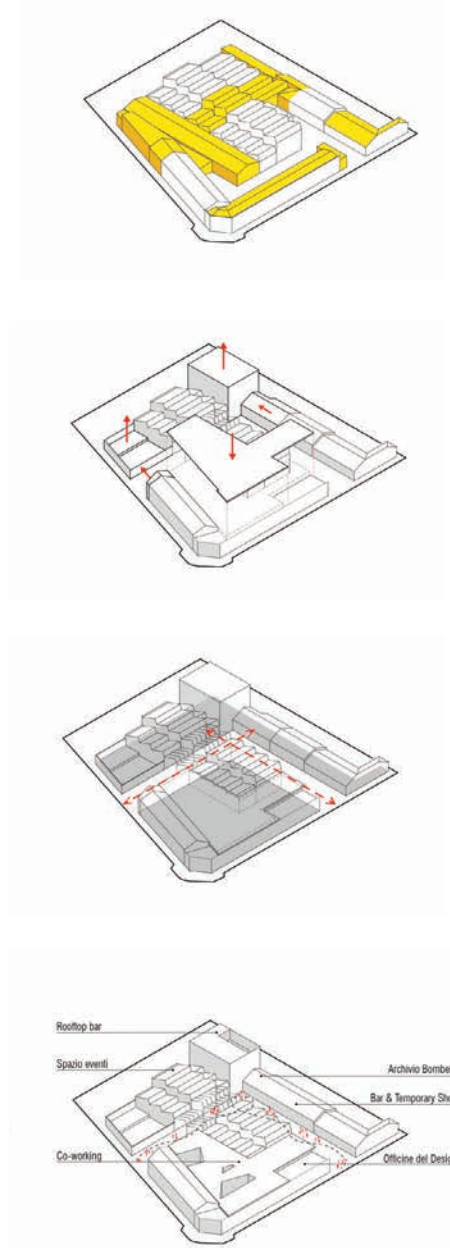


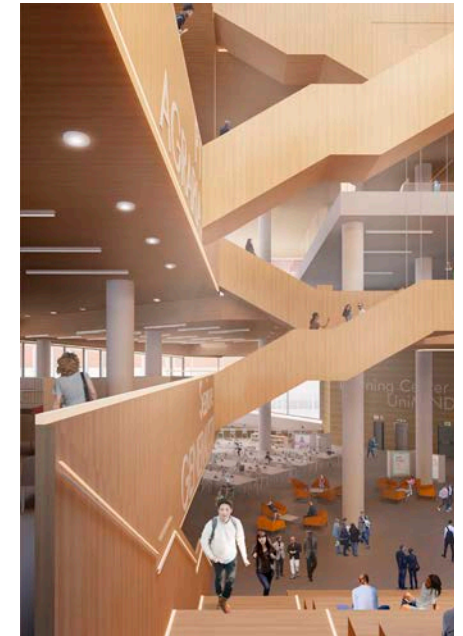
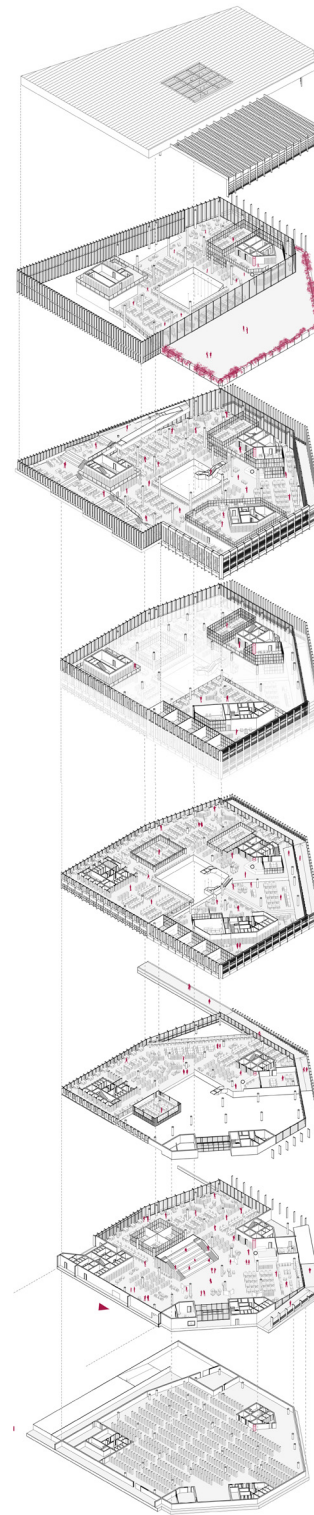
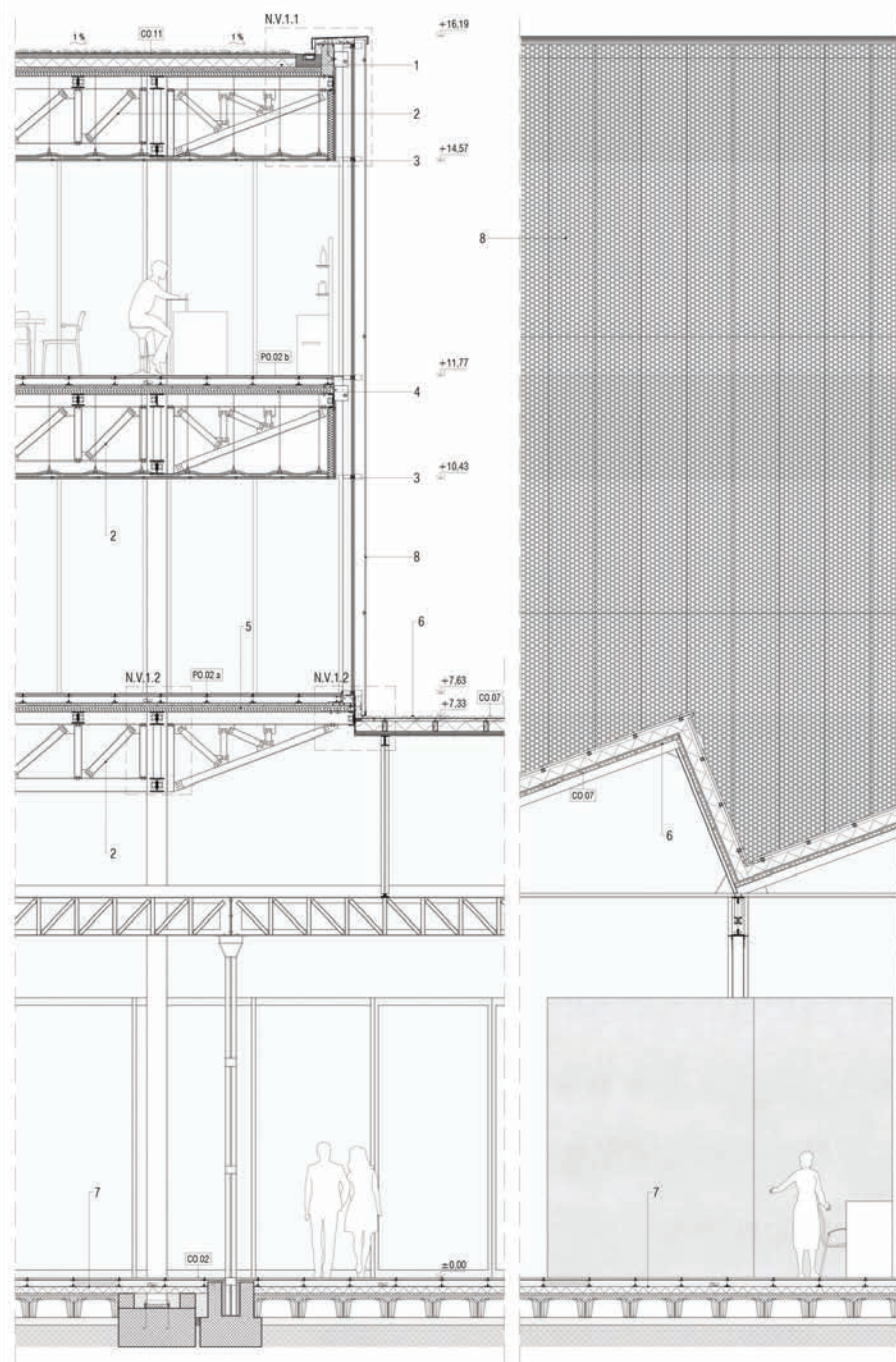
LECCO CAMPUS (2022). PHOTO BY S. BRAMBILLA



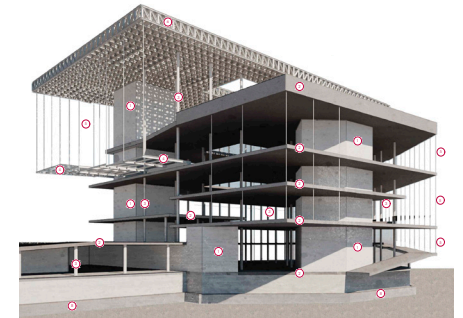
RETHINKING PLACES BY ENHANCING MEMORY

Recovery and redevelopment are central issues for the construction sector considering that three-fifths of the construction sector in our country concerns recovery processes, and in light of the knowledge that a significant reduction in polluting emissions can only be achieved by upgrading the built heritage of the last fifty years, much of which is obsolete in terms of energy performance. Recovery encompasses a highly variable range of interventions ranging from redevelopment to reuse, and concerns building heritage of lesser interest than that of pre-existing buildings of historical-artistic importance: ordinary buildings, minor (often abandoned) historic centres, disused industrial complexes and large social housing districts built after the war. It is a substantial and widespread heritage with technological, functional and - notably - figurative deficits. Transforming what already exists in a manner that respects the identity, including the social identity, of a consolidated building fabric often means performing 'microsurgical' operations instead of unlimited replacement construction. The goal of a recovery and repurposing project is to enhance not only the building itself, but often its surroundings. It therefore requires a careful reading and interpretation of buildings (typology, size and history) and their context, in terms of opportunities and limitations. A reading or knowledge to be interwoven with the assessment of the building's residual performance and its state of conservation, in order to identify indicators that show the direction in which to take the intervention and the compatible functions from which to select the desired repurpose. By identifying the context's requirements - in order to develop a functional programme in-keeping with the specific object of recovery's characteristics and in harmony with the specific features of the territory and the social and economic context of which it is a part - an enhancement process which is not limited to the object of recovery but spreads to its surroundings, thus benefiting the whole community, can begin.





①



①

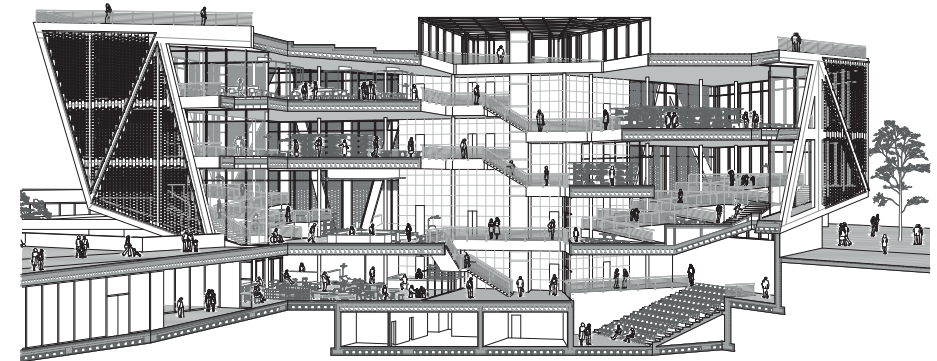
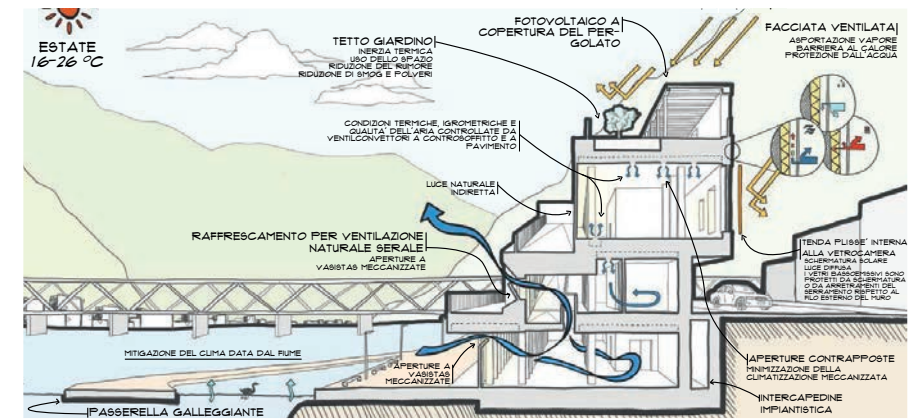
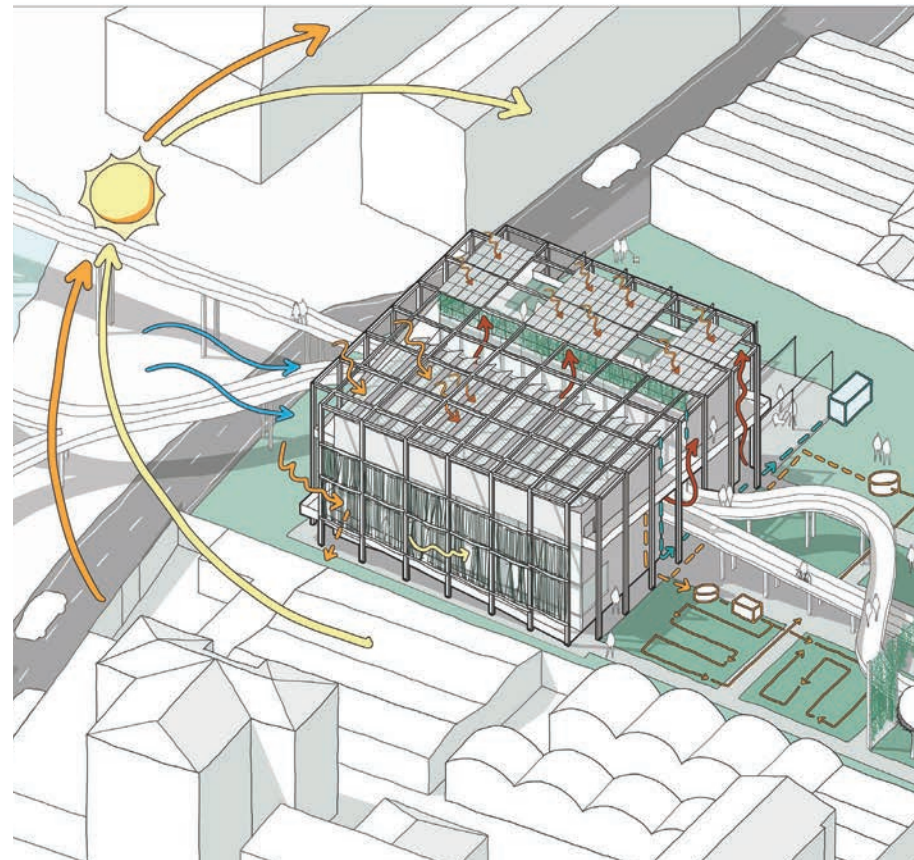
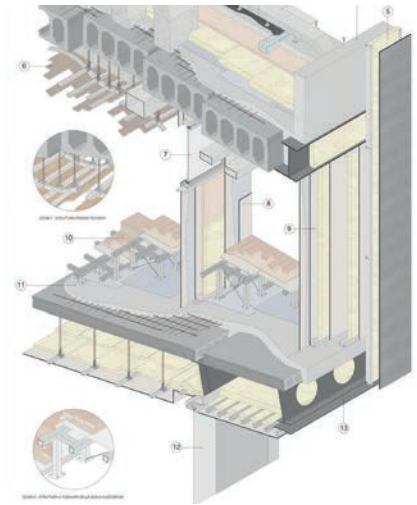
THE TRANSITION TO NET-ZERO BUILDINGS

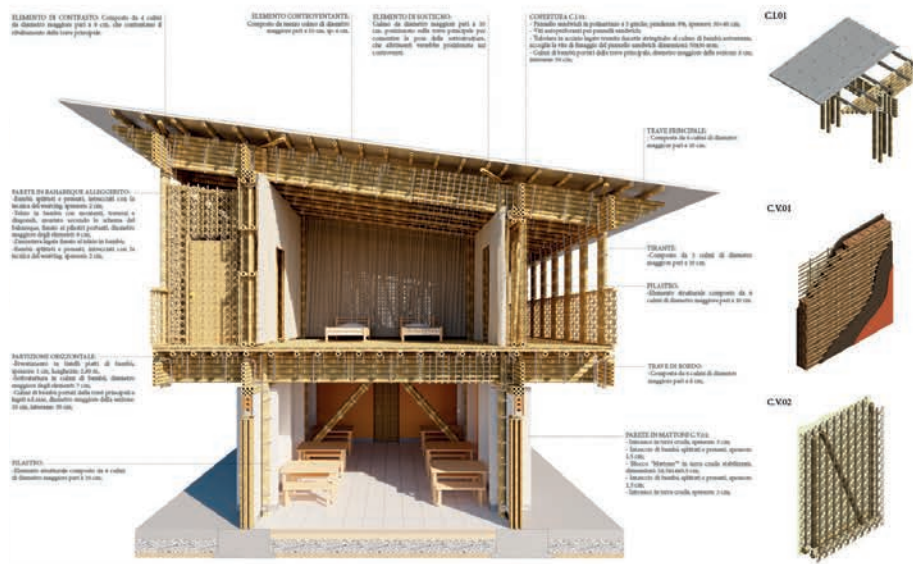
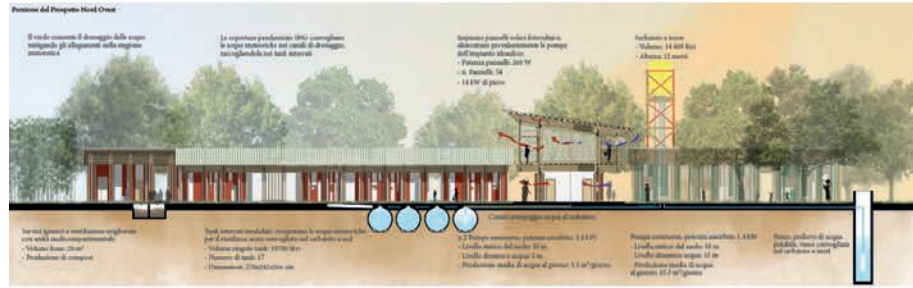
The built environment plays a crucial role in the ecological transition in this first half of the 21st century. In order to achieve the goals that the European Union has set to decarbonise the economy and society by 2050, a profound rethinking of cultural paradigms is essential: just as every architect knows he cannot circumvent the law of gravity, (environmental, social and economic) sustainability must also go from being a merely technical aspect to a constitutive and inescapable datum of every intervention. The Building Engineering/Architecture students' education has, for many years, been structured so as to integrate the environmental theme at different scales: from the urban to the building, up to the choice of materials and technical solutions. It highlights how energy efficiency,

the use of renewable sources and the reduction of harmful emissions require conscious decision-making right from the settlement-related and morphological aspects in the early stages of the project.

This integrated and multidisciplinary approach is essential for not only new buildings, which have already been regulated for some years according to increasingly stringent environmental standards (NZEB, or nearly zero-emission buildings), but also for the redevelopment and recovery of the existing building stock, whose consumption and emission levels must be swiftly reduced to those compatible with the vision of a Europe freed from dependence on fossil fuels. In the face of a significant reduction in the energy required for buildings

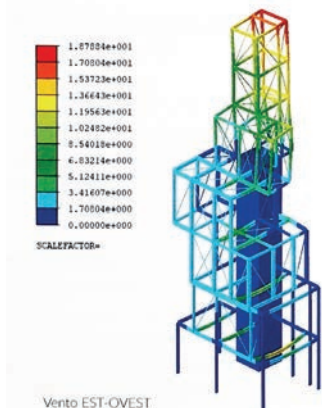
to function, the issue of the environmental impact of construction materials and products is becoming increasingly important, as they can play a central role in balancing the carbon emissions of interventions and in promoting circular economy in the construction sector. Lastly, we cannot neglect the fact that the green transition, with its design and technical implications, is made possible and facilitated by parallel phenomena of the digitisation of the building process: from the implementation of information structures (which are finally systematic thanks to the BIM approach), to widespread use of parametric design tools and phenomena modelling, up to the digital fabrication of custom-made components.





INNOVATIVE CONSTRUCTION: MATERIALS AND PROCESSES

The contemporary architectural language and the construction market itself (with its fast-paced dynamics often influenced by an ever-changing regulatory framework) are strong stimuli for technological innovation in both materials and operating practices. The three dimensions of Product, Project and Process are simultaneously affected by an evident 'Darwinian' evolution of the construction industry. Industrialised construction systems, based on metal, wood, cementitious materials, or bricks for ventilated façades, synthetic components, insulated cladding, highly advanced door and window frames, and so on (which increasingly use dry construction techniques and mechanical connections) enable the design of ever-more surprising living spaces and increasingly high-performance building envelopes. This technological process, of manufacturing on site by connection rather than by creation, is the basis of sustainable innovation. What the EU calls NZEB (Nearly Zero-Emission Buildings), which will be at the heart of the Green New Deal and the New Bauhaus, are buildings that are already possible today and will be standard practice in the future. Today's construction/production innovation process is much more intense than in the past. The Active House paradigm, which simultaneously controls Comfort, Energy and Environment, entails an interoperable BIM-based digital structuring of the project. This enables further development of monitoring and sensor technology on the real building that is able to communicate with the project model (Digital Twin) and with real information from the inhabited and external environment. Architecture is then designed with components that allow it to become 'cognitive' and 'interactive'. The connection between architecture and industry and the practices of operational and organisational rationalisation, in both the product and construction process stages, is possible, fully-developed and increasingly evident. No material is ruled out, and no form or technique prevails over the construction system, which is always reversible and a 'open', and has the most varied aesthetic-expressive potential that can also be optimised through parametric design.





LANDSCAPE ARCHITECTURE. LAND LANDSCAPE HERITAGE

COORDINATOR
Antonio Emilio Alvise Longo

2018-2020
Antonio Emilio Alvise Longo

INTERNATIONAL RELATIONS
Luca M.F. Fabris
Marialessandra Secchi

RELATIONS WITH
INSTITUTIONS AND
COMPANIES
Lionella Scazzosi - Andrea
Oldani - Alberta Cazzani

PROGRAMME DURATION
2 years

ENROLLED STUDENTS
80/year

LANGUAGE
English

KEYWORDS
landscape design, landscape
planning, ecology, agronomy,
infrastructure, history,
representation, map analysis,
conservation, management, built
environment, policies and projects,
metabolism.

PROFESSIONAL PROFILE
Landscape architects: graduates
in landscape architecture

SKILLS
landscape design, landscape
planning, landscape management,
landscape restoration,
landscape and environmental
impact assessments, project
coordination and management,
site management of landscape
works

*Laurea Magistrale (equivalent to Master of Science),
Milan*

*Since 2017 the programme in Landscape
Architecture. Land Landscape Heritage
has enriched the range of international
Laurea Magistrale (equivalent to Masters of
Science) programmes that the Politecnico di
Milano's AUIC school has on offer, attracting
international students with the aim of
differentiating and broadening the curricula.*

*It was conceived and subsequently offered
as a programme to train professionals and
researchers capable of responding, through
specific cultural and technical tools, to
the challenges posed by environmental,
settlement-related and social changes that
occur in contemporary landscapes.*

*At the core of the Laurea Magistrale
(equivalent to Master of Science) programme
is landscape design in its constituent elements:
natural and man-made open spaces and the
ecosystems that characterise them, the built
heritage and infrastructure, as a product of
established societies and their history. Land,
Landscape and Heritage, the three terms
from which the programme takes its name,
summarise its programmatic characteristics:*

land as a precious element, which requires protection, care and design; landscape – at the centre – as a cultural and scientific observation point; and heritage understood as a tangible and intangible inheritance of the past and a vital element of the history and evolution of the landscape.

Teaching is provided by numerous professors from the Politecnico's departments and, thanks to a specific agreement, colleagues in Agronomy from the University of Milan.

Landscape architects who graduate from the Politecnico di Milano have specific skills in the design and management of open spaces, soil and vegetation, drawing on various fields of knowledge: architecture, urban planning, agronomy and forestry sciences, hydraulic and infrastructure engineering, ecology, social sciences, history, law, economics and land management. Thus, they possess the ability to grasp the relevant phenomena, in their continuous evolution, and teach the techniques and skills needed on a case-by-case basis to care for, improve or innovate landscapes.

During the two years of the degree programme, students take courses and studios where they work around specific landscape issues from a constant perspective of research through design. Multiple themes addressed, and renewed from year to year: the recovery of agricultural landscapes and ancient centres; the regeneration of urban and peri-urban peripheral landscapes; the design of open space systems, parks and gardens and public spaces; and the analysis and design of the metabolism that characterises cycles of change and evolution of landscapes. In developing these themes, students can gain experience in the management of hydrogeological risks, the design of infrastructure in the landscape, the design of accessibility and sustainable touristic viability of a territory.

The AUIC school's Landscape Architecture programme is still young, but is inspired by long-established origins. One hundred and fifty years ago, at the Politecnico di Milano, Antonio Stoppani shed light on and narrated the Italian landscape, integrating technique and culture, paying constant attention to the beauty of places and the need for knowledge in order to care for them. Today the tradition continues in the form of a degree programme that is open to the international dimension and to the challenges posed by the major changes taking place on a global scale, without forgetting the Italian landscape and its qualities and fragility, which retains a central role in the teaching and design research. Five years on from its establishment, each year the Politecnico welcomes over 80 students from all over the world to the Landscape Architecture programme. Many of their theses have been recognised and awarded internationally and graduates work in some of the most renowned landscape architecture firms in the world.

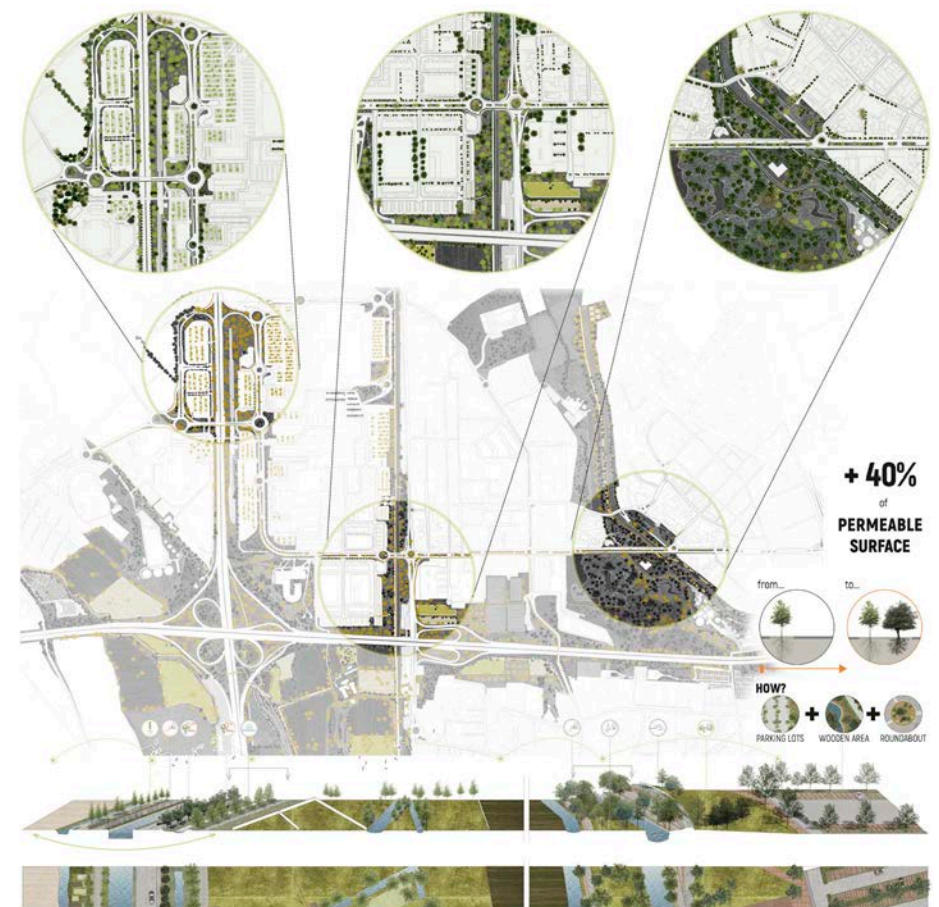
DESIGNS FOR THE LANDSCAPE, DESIGNS WITHIN THE LANDSCAPE

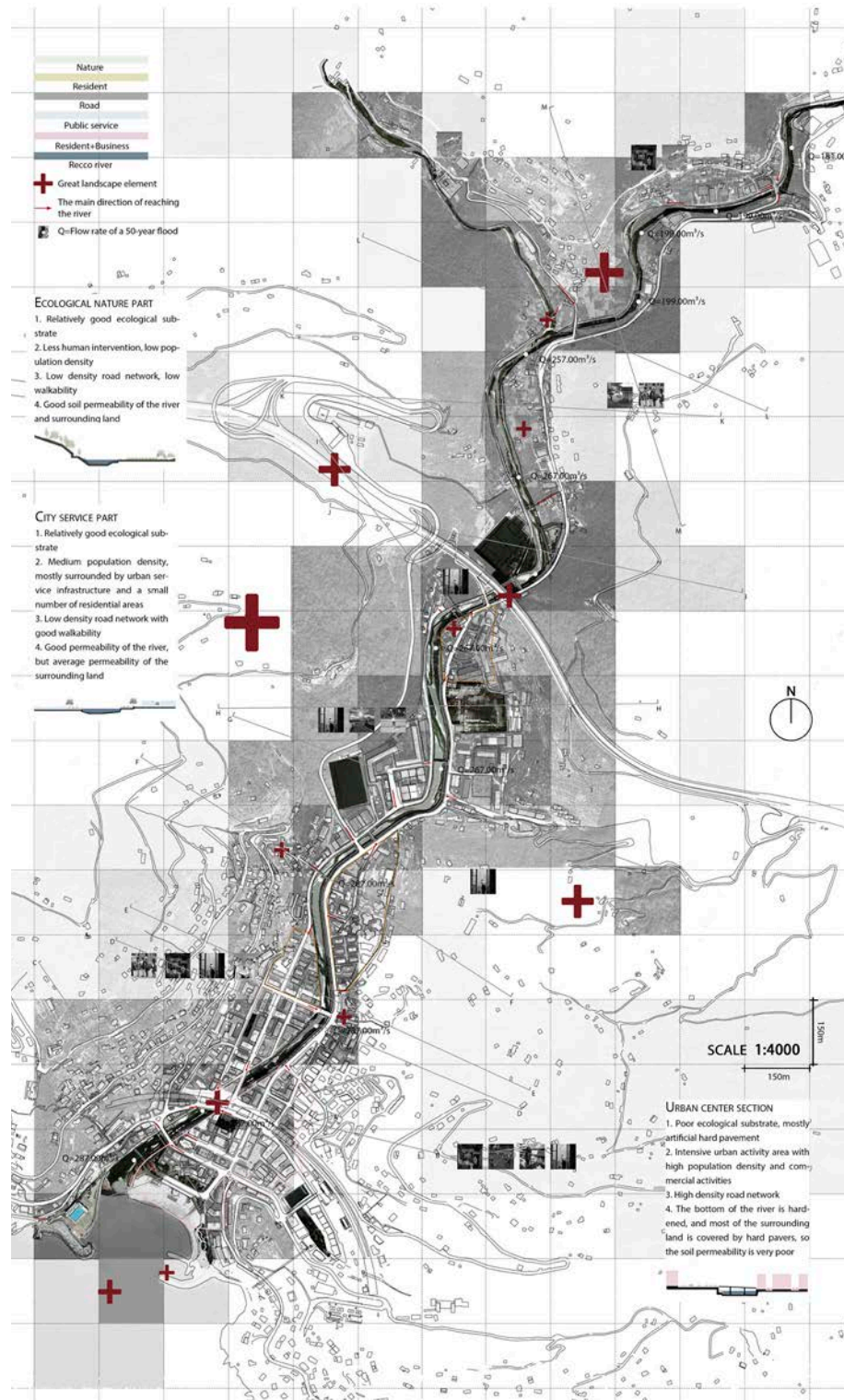
A Laurea Magistrale (equivalent to Master of Science) programme that focuses on the care and modification of urban, agricultural and natural landscapes.

A Laurea Magistrale (equivalent to Master of Science) programme that offers the landscape perspective as a reference for many other areas of design.

Landscape design is a point of view and a practical and conceptual tool: the design of landscapes requires highly cross-sectional knowledge, which involves structures and nature, and their evolution over time; it goes

beyond the limits of discipline and design and enables the landscape architect to deal with the complexity and fragmentation of cities and territories. Consequently, throughout the courses, studios and theses, students propose technically precise, localised projects that do not merely provide solutions to specific problems. Beyond problem solving, landscape design addresses the themes of the city and contemporary territories through generative problem setting activities whose effects are measured in an extended space and are designed to develop over time.





SUBLIME LANDSCAPE, DEGRADED BUILT HERITAGE

A Laurea Magistrale (equivalent to Master of Science) programme in which the safeguarding and transformation of landscapes is studied and designed, focusing on aesthetics, the sublime and the conditions for natural equilibrium.

The Laurea Magistrale (equivalent to Master of Science) programme concerns the recovery of the most degraded landscapes, abandoned places and the legacy of a century of often haphazard and destructive development. When training landscape architects it is essential to understand the territory and its characteristics and to listen to the interested parties and inhabitants.

Professors guide students to fully and

consciously understand each project site. In the studio activities, students analyse different landscapes: historical and established palimpsests, uncertain and unstable territories and evolving contexts subject to the contradictions of the Anthropocene.

Both situations need a new interpretation, a bold and radical new approach. The lectures and studios foster an understanding of the fragility and potential of the landscape, demonstrating how to enhance every opportunity in the operational space of landscape design.

The training activities encourage students to investigate the critical construction of the context, to practice mapping and surveying and to describe and design specific sites.



TODAY

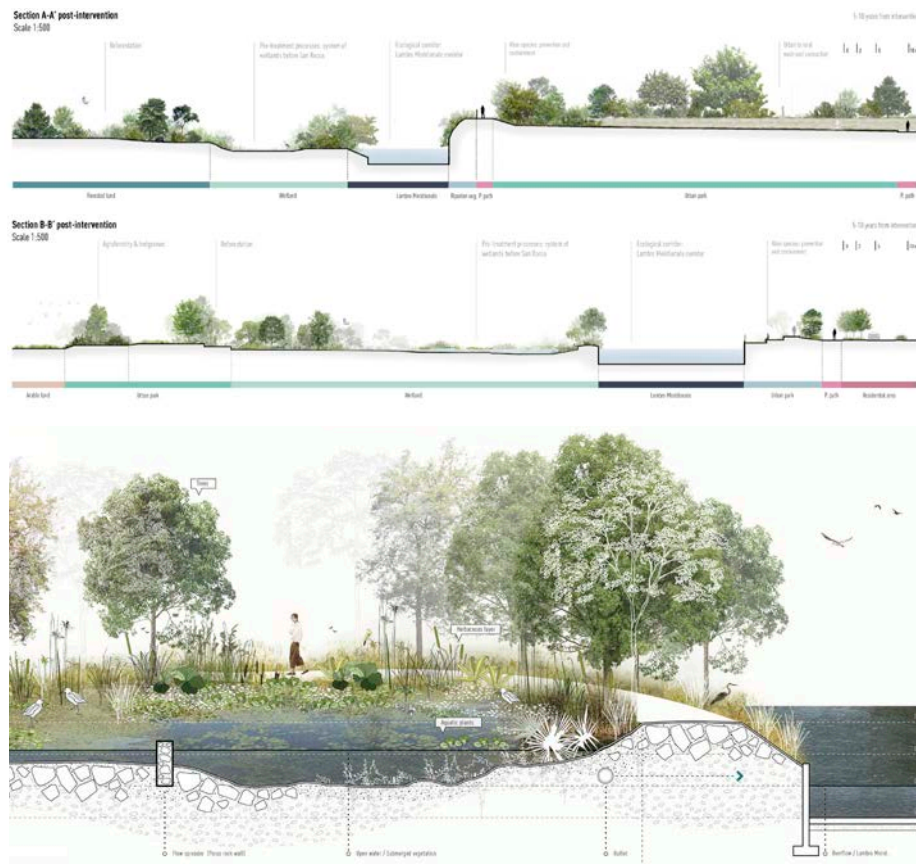


TOMORROW

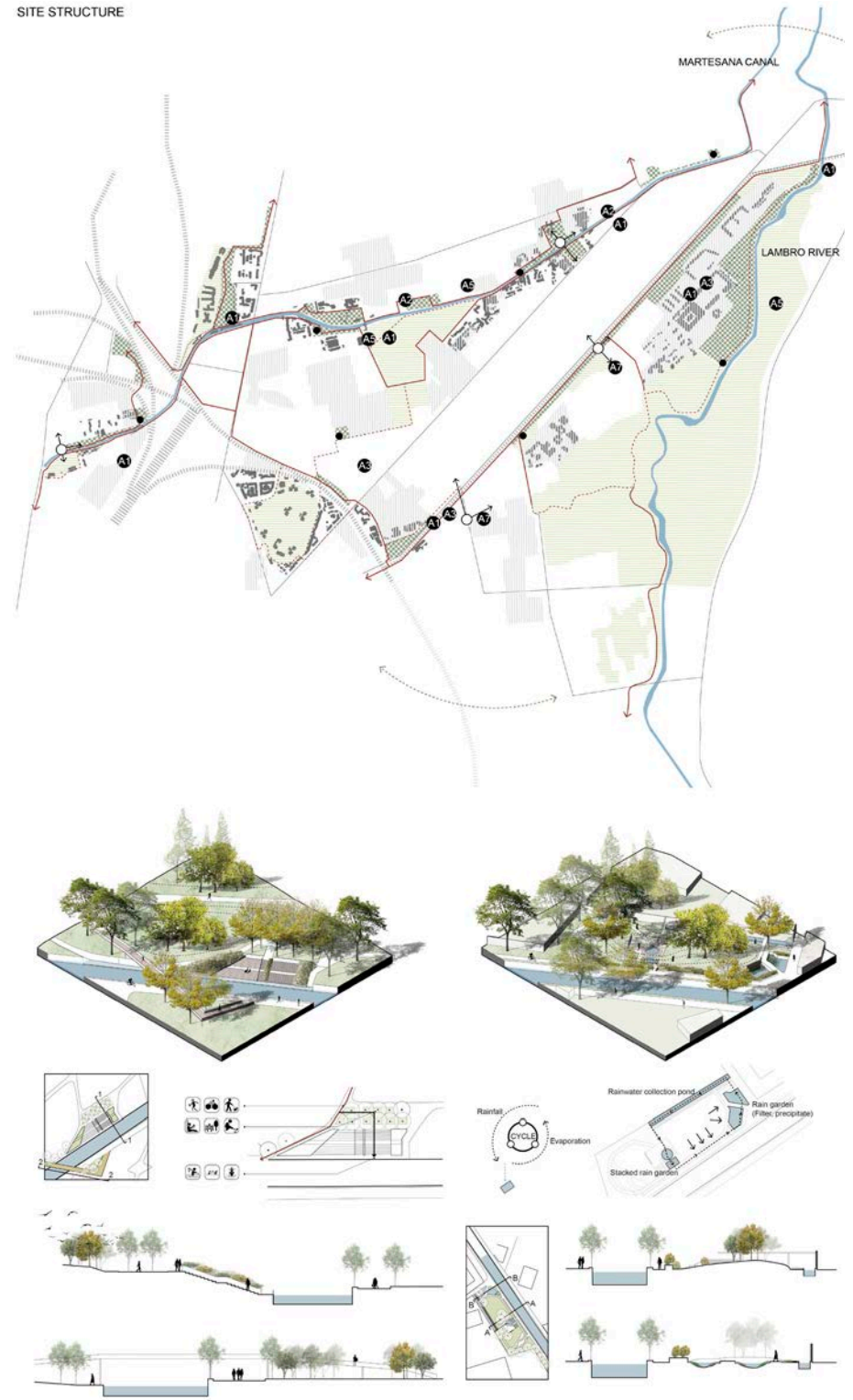
DESIGN CULTURE, POLYTECHNIC KNOWLEDGE

A Laurea Magistrale (equivalent to Master of Science) programme in which the student applies themselves critically and technically to landscape design and design in general. A Laurea Magistrale (equivalent to Master of Science) programme that integrates the technique and culture of various mutually complementary disciplines. Students, from all over the world and with different technical and cultural backgrounds, take this degree programme. The programme's key word is transdisciplinarity. The impetus comes from the contemporary model of professional organisation which requires an increasing integration of skills and knowledge. Consequently, the goal is to share answers

based on shared needs. In order to respond to complex issues (such as climate and social changes affecting our cities and territories, technical needs and specialist knowledge), the various disciplines integrate and implement knowledge, visions and answers to challenging questions. Therefore, students are encouraged to collaborate, share their knowledge and results, and understand the variety and role of the skills required for landscape design. This ability is a fundamental resource and a quality that is reflected in the outcomes of the courses and studios.



SITE STRUCTURE



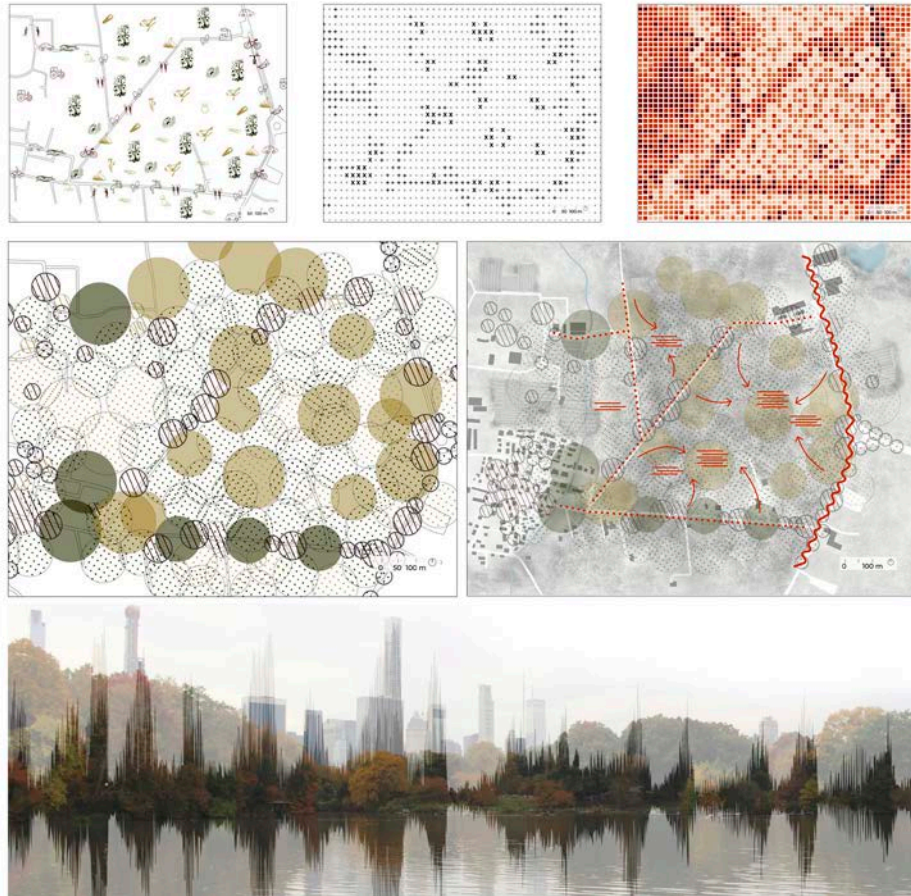
CONSERVATION AND RECOVERY, DESIGN AND INNOVATION

A Laurea Magistrale (equivalent to Master of Science) programme that places great emphasis on caring for the heritage of the past.

A Laurea Magistrale (equivalent to Master of Science) programme that looks to the future, to foster the ability to innovate in order to understand and interpret reality and its variation over time. The Laurea Magistrale (equivalent to Master of Science) offered by the Politecnico di Milano is one of the five landscape programmes available at Italian universities. Each of them is characterised by specific objectives. The Milanese programme focuses on the relationship between existing

landscapes, degraded landscapes and innovative and changing landscapes. For this reason, particular attention is paid to the relationship between infrastructure and design in fragile territories.

Landscape heritage is not considered an immutable and unchangeable condition, assumed to be frozen in time, but as the meaning of places that are in evolution, alive and, therefore, to be interpreted and guided through change. Therefore, by its very nature, landscape design is innovative and, at the same time, respectful of existing conditions involving structures, nature and society.



SOUNDSCAPE: A SOUNDMAP FOR A CONSCIOUS LISTENING OF THE LANDSCAPE. MASTER'S THESIS BY GIORGIA LENTINI - SUPERVISOR: PROF. L. SCAZZOSI

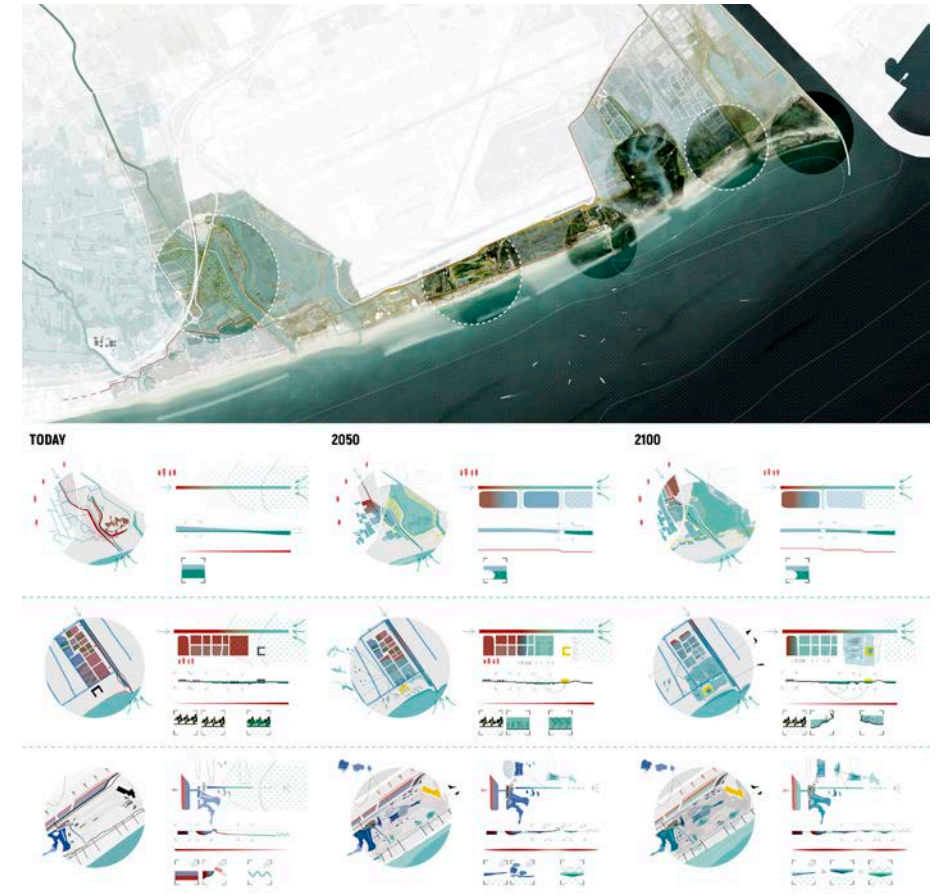
LONG-TERM VISION, STEP-BY-STEP MANAGEMENT

A programme that bravely faces the future and its possible conditions, while also accounting for the value of utopia.

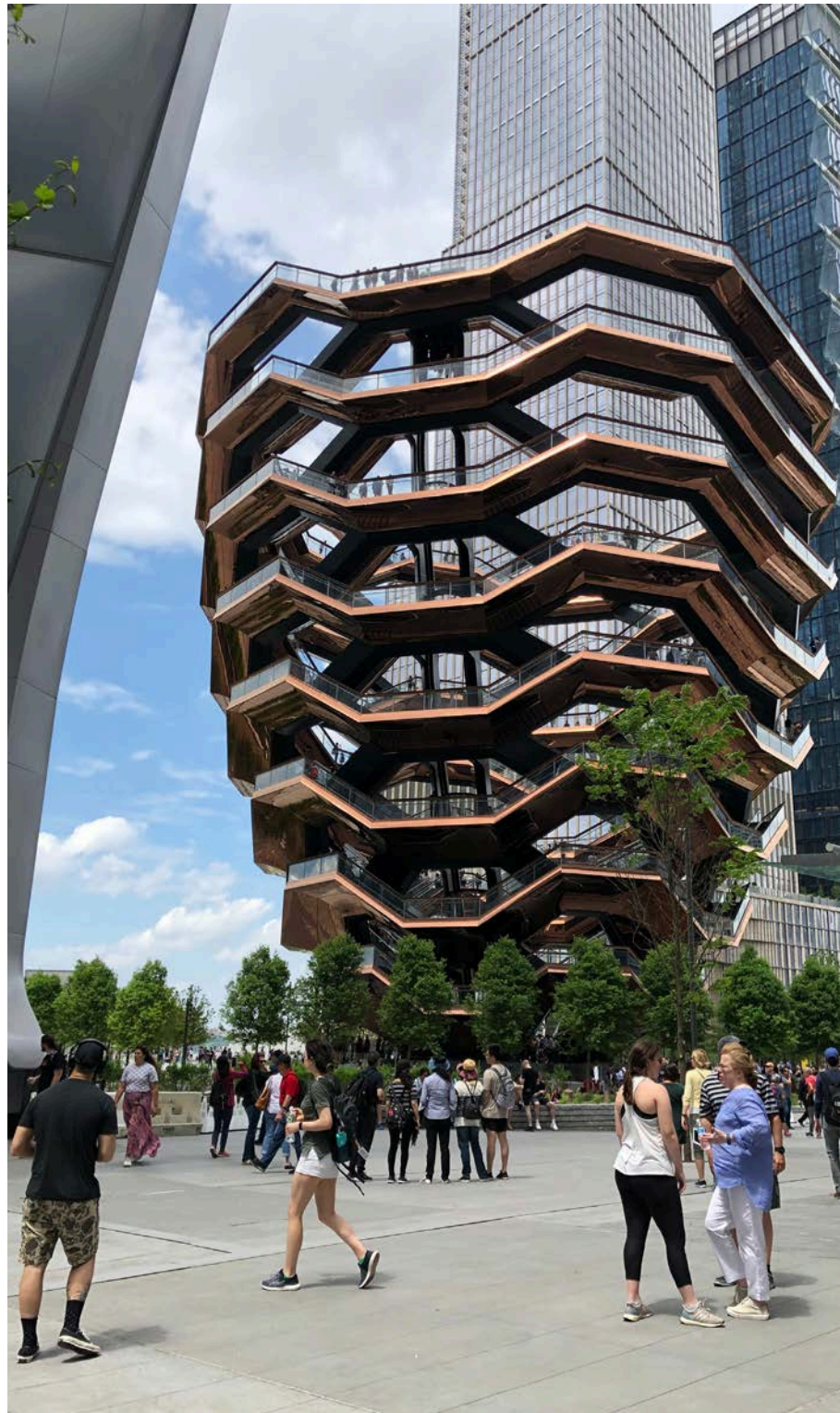
A programme that considers landscape management and care as an essential part of any project, in a realistic and pragmatic way. Practising landscape design can be considered a form of supervision. The safeguarding and transformation of the landscape over time is carefully prepared, rather than conceived as an impromptu form of design. The courses provide specific technical tools, ranging from agronomy, hydraulics and river management, to infrastructure design. The technical knowledge gained theoretically

is applied in the studios, where professors and professionals from various disciplines collaborate in the teaching. Here the practical and applied aspects make the proposals concrete and tangible, and, if necessary, also address the value of unpredictability (as in the case of climate change).

Each project is developed both as a vision or set of scenarios to be achieved in the long term, and as a succession of minute, precise and localised actions, implemented and managed step by step.



FORMES DE MAR - A MARITIME METROPOLITAN PARK FOR BARCELONA. MASTER'S THESIS BY SARA INGIGNOLI - SUPERVISOR: PROF. A. LONGO, CO-SUPERVISOR: PROF. M. GARCIA GARCIA



MANAGEMENT OF BUILT ENVIRONMENT - GESTIONE DEL COSTRUITO

Laurea Magistrale (equivalent to Master of Science), Milan

COORDINATOR
Gianandrea Ciaramella

2018-2020
Gianandrea Ciaramella

2016-2017
Roberta Capello

DURATION
2 years

ENROLLED STUDENTS
100

LANGUAGE
English

EXCHANGE STUDENTS
ERASMUS
6/year

DOUBLE DEGREE PROGRAMME
Management Engineering
- Urban Planning and Policy
Design

WORKSHOP
Summer School on Workplace Management/Project Management (International Project Management Association)/ Research Thesis Training Session - State of the Art in the field of Building Performance Engineering/Colonial-era religious buildings in Santiago de Cuba and its surroundings: a heritage to protect

As is well known, the construction sector plays a highly significant role in the economy of our country, and of Europe as a whole, due to the extent of the investments made, the mobilisation of material resources, employment opportunities, as well as what it has and can generate in other industrial sectors. Within this market, one of the most interesting areas in terms of the implications for employment, and due to the significance of the economic interests involved, is what is called management of the built environment, namely the combination of activities aimed at ensuring that a building's performance is maintained and enhanced over time in order to maximise its profitability and/or market value. A broad supply chain, in which the design and construction phases constitute only part of the complex mix of activities that characterise it. The Management of Built Environment Programme is a young course, launched in 2005 as a result of collaboration between two schools (the School of Architecture Urban Planning Construction Engineering and the School of Industrial and Information Engineering), to respond to the needs of this complex supply chain. New skills are required of those who work in the sector; management of the built environment is not a situational phenomenon, but takes the form of a strategic

development sector, defined by a heterogeneous set of technical, economic, organisational, social and cultural factors, such as: - structural transformations – both quantitative and qualitative – in relation to demand;

- the decline of the new-build sector and the growth in investment – both Italian and foreign – in pre-existing heritage. This is mainly due to the progressive ageing of the building stock (which is subject to both physical degradation and functional obsolescence) and the gradual saturation of the built area. In particular, most of the building stock constructed in the 1950s and 1960s, characterised by the use of low quality products and processes, is in growing need of intervention;

- changes in the user culture that concern the concept of environmental quality, the conservation of the existing heritage, energy and material savings, and a focus on materials that are harmful to health;

- the increasing attention paid by industrial and service companies to real estate development, evidenced by the increasingly significant weight of this type of component in planning and strategies aimed at creating economic value;

- the growing interest of the financial markets in real estate, as also shown by the spread of specific instruments, including real estate investment funds, with the consequent development of strategies for actively managing real estate assets according to logics that require an integrated approach (technical, economic and financial). The Management of Built Environment Programme is geared towards responding, with an integrated and highly multidisciplinary approach, to innovative phenomena and the modification of traditional organisational structures, including: - the appearance of new, integrable forms of management, such as facility management, asset management and property management, which see the emergence of new professional figures, new forms of subcontractor involvement and innovation in the contractual mechanisms for regulating the customer-supplier relationship;

- the maturation of the traditional institutions/companies which manage real estate assets and are transforming their activity profiles from simple operational management to strategic management, in a shift from corrective maintenance logics to planned maintenance logics and practices;

- the appearance of new providers of integrated real estate management services, with a managerial culture, as a result of increasingly frequent outsourcing policies.

- the growth in skills geared towards the complex mix of activities that characterise real estate development processes, including the recognition of cultural values, in terms of both opportunities and safeguarding duties; analysis and evaluation of costs and benefits and the definition of operational lines for the transformation of intended uses or the redefinition of property lines; the operational and financial planning of the identified operations; and the organisation of real estate transformations, through the setting-up and coordination of a series of technical-legal procedures.

THE INDUSTRIAL APPROACH: SUPPLY CHAIN, TECHNOLOGY AND PRODUCTION MANAGEMENT

Operations and Supply Chain management plays a central role in improving the productivity of companies worldwide. The most relevant issues at the moment are sustainability, lean management, risk and resilience, the alignment of the new product development process and the improvement of planning on a global scale. The best operations and supply chain managers in the world are analytical in their approach to decisions, define the best strategy and then implement it with very well-structured processes. The reality of global customers, global suppliers and global supply chains has prompted companies to recognise the importance of being lean and sustainable in order to ensure competitiveness. Operations and supply chain managers look at the entire supply chain, upstream and downstream, adopting both a short- and a long-term approach. They solve problems and respond smoothly to unforeseen events. They combine technical and market knowledge with the ability to collaborate and communicate with a wide range of stakeholders, from operatives

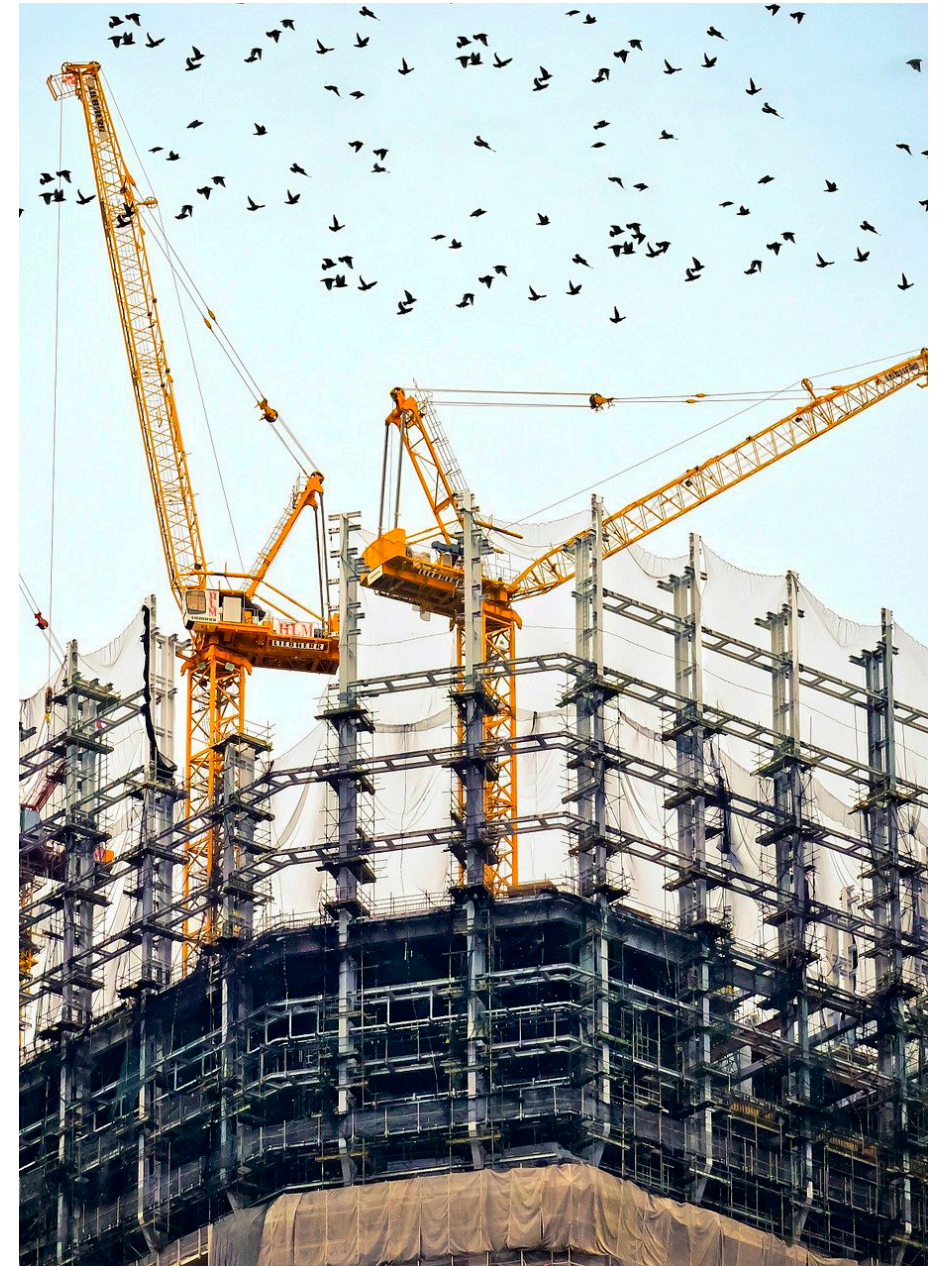
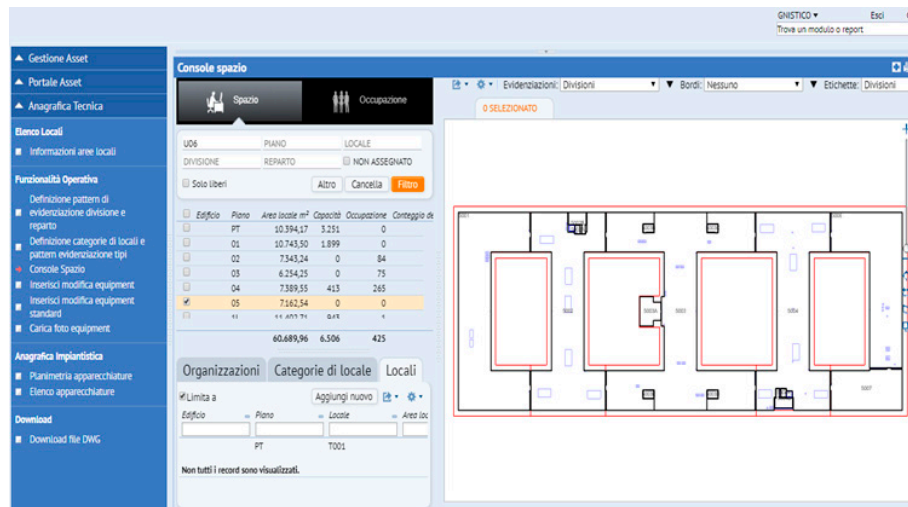
to executives to entrepreneurs. They don't wait for someone else to do what needs to be done. They are proactive and instil the same attitude in others. They are leaders – in the original sense of the word – of people. They make others willing to embark on a journey with them: they show themselves and others the way.



LIFE CYCLE COST AND SCHEDULED MAINTENANCE: TOWARDS A MANAGERIAL APPROACH

In the management of real estate assets, there is an increasingly widespread awareness of the importance of maintaining the quality of properties over time by controlling and counteracting degradation phenomena that generate a progressive decline in performance and the proliferation of breakdowns and consequent risks for users. Over time, these phenomena lead to an often exponential growth in management costs and the emergence of additional costs as necessary to cope with the consequences of breakdowns and malfunctions: the result of these increased costs is the erosion of the profitability and economic value of buildings. The sharp growth in new organisational and contractual forms of outsourcing maintenance services certainly testifies to this awareness and the desire to move away from the traditional practice of episodic and emergency-driven corrective maintenance. Modern approaches to building maintenance management adopt the principles of strategic planning and scheduling of maintenance activities whilst also introducing risk management techniques and methods

to manage overall cost across the life cycle. Effective management cannot ignore the development of technological solutions capable of supporting the decision-making process: scheduling interventions, monitoring/inspection, and execution. Knowledge of the relevant tools and the ability to mindfully manage them make it possible to evaluate strategies for intervening on the built environment, including in terms of cost/opportunity. This highlights the need for building management with an approach that is not only technical but rather geared towards integrated monitoring, through what is termed a 'management centre', which is called upon to carry out planning and coordination at both strategic and operating levels. At a strategic level, the management centre should develop a general service plan that reflects user-orientation; at the operational level, it can initiate intervention planning and coordination on the basis of a single plan (e.g. maintenance plan) drawn up at the central level, from which it can then prepare a programme of interventions (time schedule).

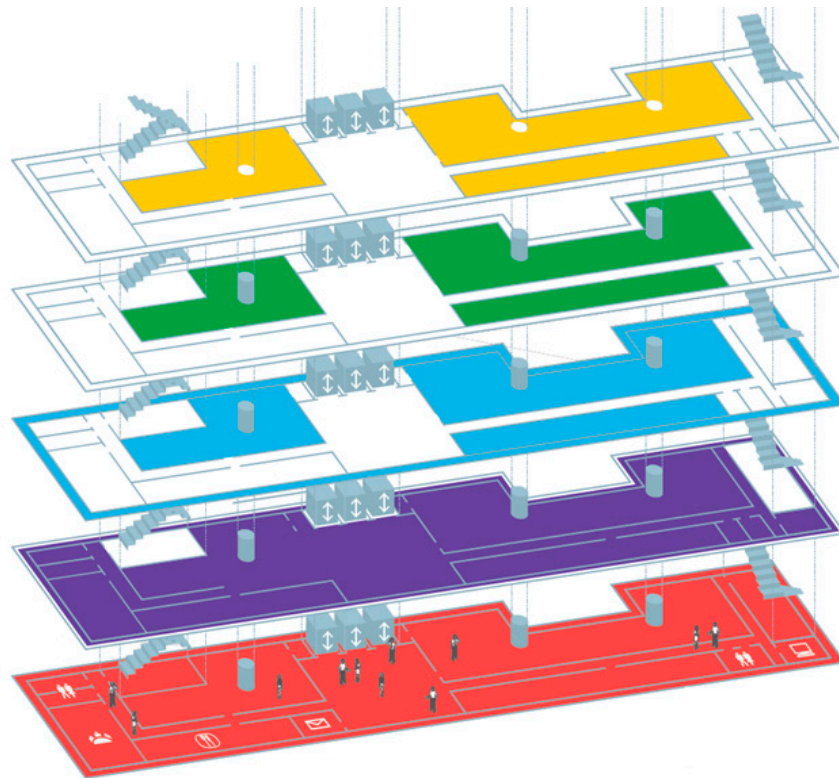


ECONOMIC AND FINANCIAL MANAGEMENT OF BUILDINGS AND REAL ESTATE ASSETS

Economic and technological globalisation has generated connections that have allowed for the development of a global market and the dissemination of good practice, new tools and organisational models. This phenomenon has also affected the world of the built environment. In fact, based on experience gained in the USA over 50 years ago, financial instruments dedicated to indirect real estate investment have also been developed in Europe since the second half of the 1990s. This brings with it the growth of a professional demand that has a significant impact on the conception, design, construction and enhancement of buildings; but above all it entails active management that

cannot disregard financial objectives. The active management of a real estate portfolio may entail multiple activities that require a strong interdisciplinary orientation and coordination skills, such as:

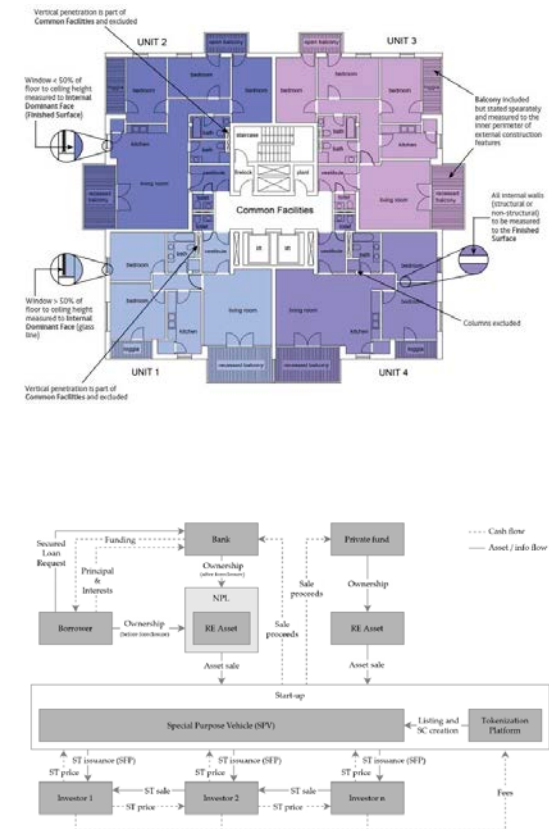
- Portfolio analysis aimed at identifying the characteristics and potential of each individual asset and segmentation of the portfolio based on the specific strategies adopted: disposal of non-strategic properties, enhancement processes, and redevelopment activities in order to reposition the property on the market;
- Determination of the market value of buildings, according to international standards that define shared methodologies and criteria



as good practice.

- Detailed analysis and construction of the evolving scenarios of the real estate market segments in which the buildings are located;
- Analysis of the possibilities/opportunities for enhancement (change of intended use) and development, carried out through the study of urban, technological and economic/commercial aspects;
- Planning and management of all activities in the field: design and maintenance/redevelopment, changes of intended use, management and maintenance service procurement.
- Planning of commercial and communication

activities and the necessary information tools: offering memorandum web platforms, information prospectuses, and sales assignments.



ECONOMICS OF THE TERRITORY AND URBAN SYSTEMS ANALYSIS: UNDERSTANDING AND ANTICIPATING TRANSFORMATIONS

The real estate market is one of the most efficient places of exchange and thus offers economists and planners an excellent opportunity to study the localised behaviour of individuals and businesses. This statement is corroborated by empirical evidence, which suggests that the localisation component plays an increasingly important role within the mechanism of real estate price formation, while construction costs may remain constant. Within this supply chain, students have access to a series of both theoretical and practical tools, relating to economic and urban planning disciplines, which facilitate an in-depth analysis and understanding of the territory

that will house the urban transformations that they will manage in the future, from both a technical and an economic point of view. The supply chain contains theoretical and practical knowledge ranging from proper business management to understanding the territorial micro-foundations of location choices and regional development, to the theory of urban land rent formation, from the most widely-used economic methodologies for capturing the economic value generated by an urban transformation to the most widespread analytical methodologies for the interpretation of the urban transformation trends affecting the territory.



CONSTRUCTION AND MANAGEMENT: MANAGERIAL MODELS, TECHNOLOGIES AND TOOLS

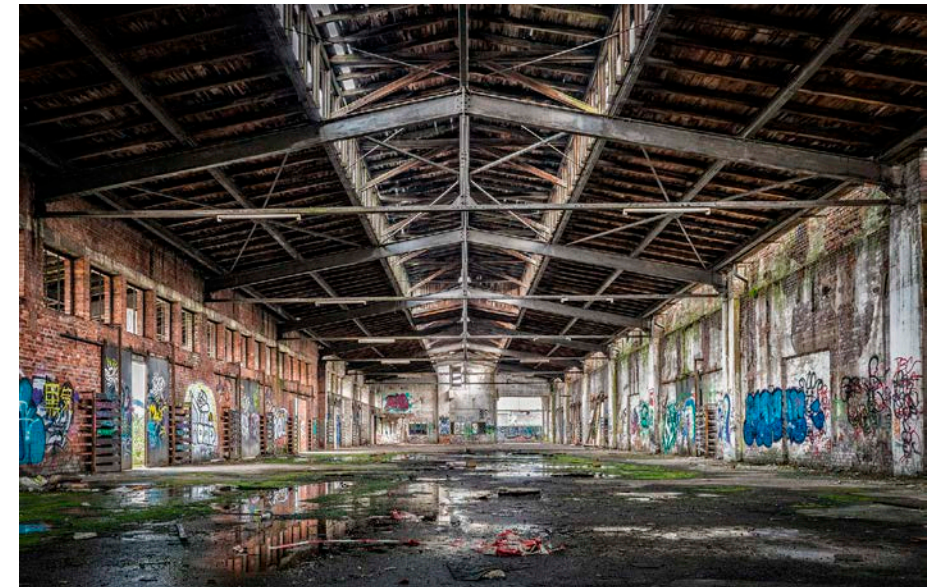
For several years, particularly in European countries, there has been a significant increase in investment in existing heritage. This is mainly due to the progressive ageing of the building stock (which is subject to both physical degradation and functional obsolescence) and the gradual saturation of the built area. In addition to this, the growing complexity of the work required to ensure that the building stock meets standards, regulations and efficiency levels is evident; the evolution of management-based models is a natural consequence of this. Construction management and project management support the construction phase by ensuring time, cost and quality control in

the management of processes and resources, both technical and human. Facility and building management oversees the functionality of buildings throughout their entire life cycle, ensuring the necessary quality of services for people, buildings and the organisation. The integration of management with the design phase (BIM) is now inevitable. Managerial approaches do not only require training in technical skills, but also in the soft skills necessary for the management of human resources.

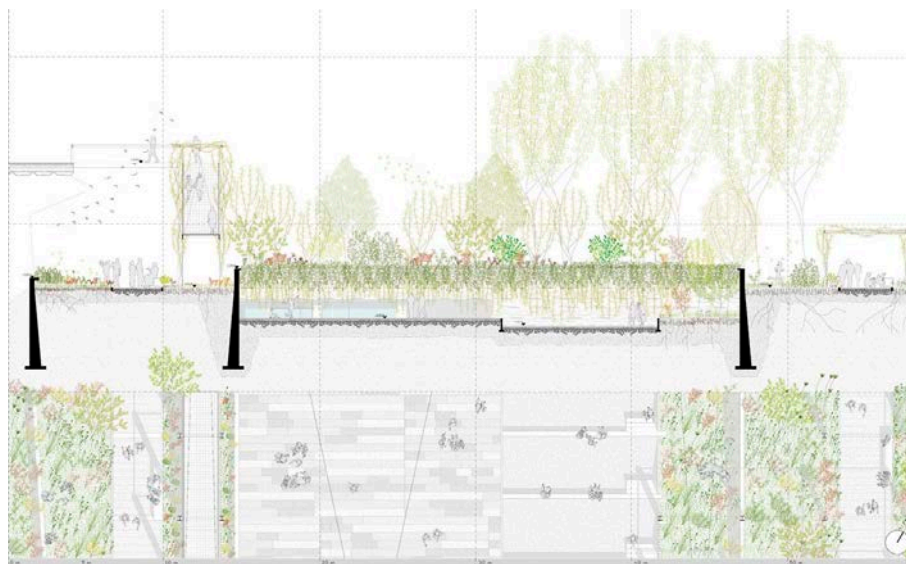
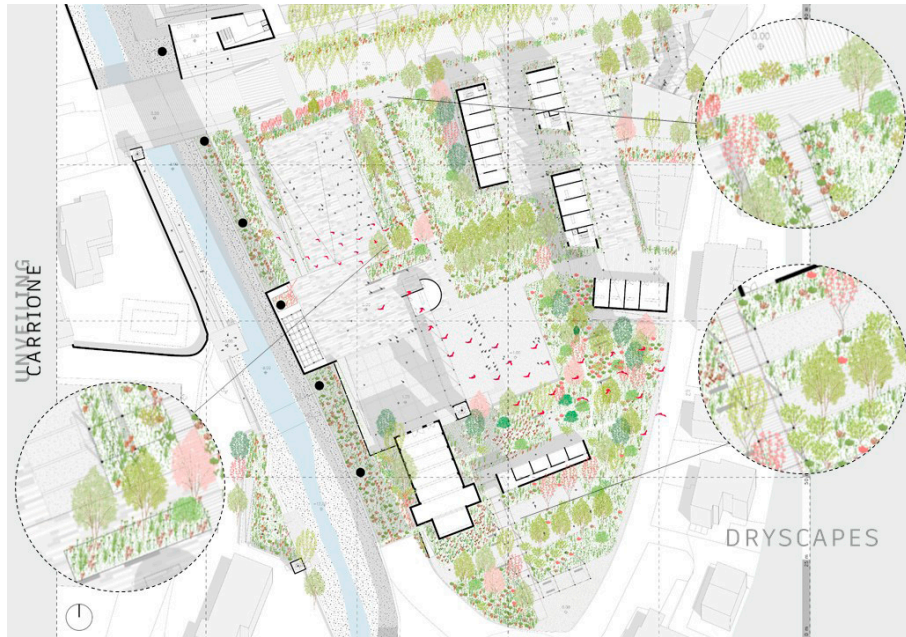


REAL ESTATE ENHANCEMENT PROCESSES: MULTIDISCIPLINARITY AND INTEGRATION OF SKILLS

Capital is like potential energy: a dormant value. Awakening it requires a process that allows its economic potential to be fixed in a form that can be used to promote additional productive activity. To trigger this process, a number of conditions must be established: first, that it can be formally represented by a property right and that all the information that contributes to the representation of this dormant capital, in terms of all its characteristics, can be determined. The process of enhancing real estate asset seeks to identify and determine the unexpressed part of value, i.e. that which can only be identified by fully grasping its characteristics and potential, in relation to market demand, in a specific context. Many buildings, at some stage of their life cycle, find themselves in a position in which they can no longer meet the needs of the original demand; to rectify this, a highly multidisciplinary transformation process, one which must reconcile various constraints and points of view, is required. The actions and strategies undertaken must include the recognition of cultural values, in terms of both opportunities and safeguarding duties; consider costs and benefits, consequently defining the operational lines for the transformation of the intended uses or the redefinition of property lines; operationally and financially plan the identified operations; organise transformations and interventions on the asset, through the setting up and coordination of technical, urban and legal procedures. Particular attention should be paid to public real estate, in relation to which governance cannot be disregarded. This governance is characterised by a clear division of functions and roles of the institutional actors involved and an organic coordination, combined with an overarching and integrated vision/management, as necessary to foster complex processes of urban enhancement and regeneration and to encourage institutional cooperation through the involvement of all relevant actors.



	INFORMATION MANAGEMENT SYSTEMS IN PUBLIC STOCK: MILAN MUNICIPALITY			
	1) OPENDATA MEF	2) DIREZIONE CASA	3) OPENDEMANIO	
FORMAT	CSV FILE (EXCEL)	CSV FILE (EXCEL)	WEB-MAP SERVICE	CSV FILE (EXC)
DATABASE DESCRIPTION	Developed with the project "Patrimonio della P.A." promoted by MEF	Data refers to part of houses owned by the municipality and managed by DC	All properties are owned by the State and managed by Agenzia del Demanio. Only "available properties" (producing income) have been selected for the current study	
TYPE OF PROPERTY	Dwelling	Dwelling	Dwelling	
PUBLIC ENTITY OWNER	Aler Milano	Municipality of Milano	State	
FREQUENCY UPDATES	Annual	Annual	Real-time	Annual
MOST RECENT DATA	2015	2018	Real-time	2018
TYPE OF DATA				
GEOGR. POSITION	✓	✓	✓	✓
FULL ADDRESS	✓	✓	-	✓
GEOGR. COORDINATES	-	-	-	-
GEO-LOCATION SERVICE	-	-	✓	-
ID CODES	✓	-	-	-
MAP, DIVISION, SUBDIV.	✓	-	-	-
TYPE OF ASSET	✓	-	✓	✓
OCCUPANCY STATUS	✓	-	✓	-
LEGAL NATURE	✓	-	✓	✓
FUNCTION	✓	-	✓	✓
BUILDING PERIOD	✓	-	-	-
URBAN RESTRICTIONS	✓	-	-	-
DIMENSION	✓	-	✓	✓
RENT VALUE	✓	✓	-	-



LANDSCAPE DESIGN STUDIO 2, SECTION A (S. PROTASONI, F. PERGALANI)

SUSTAINABLE ARCHITECTURE AND LANDSCAPE DESIGN ARCHITETTURA SOSTENIBILE E PROGETTO DEL PAESAGGIO

COORDINATOR
Sara Protasoni

2019-2021
Sara Protasoni

2016-2018
Guya Grazia Bertelli

ENROLLED STUDENTS
120 students

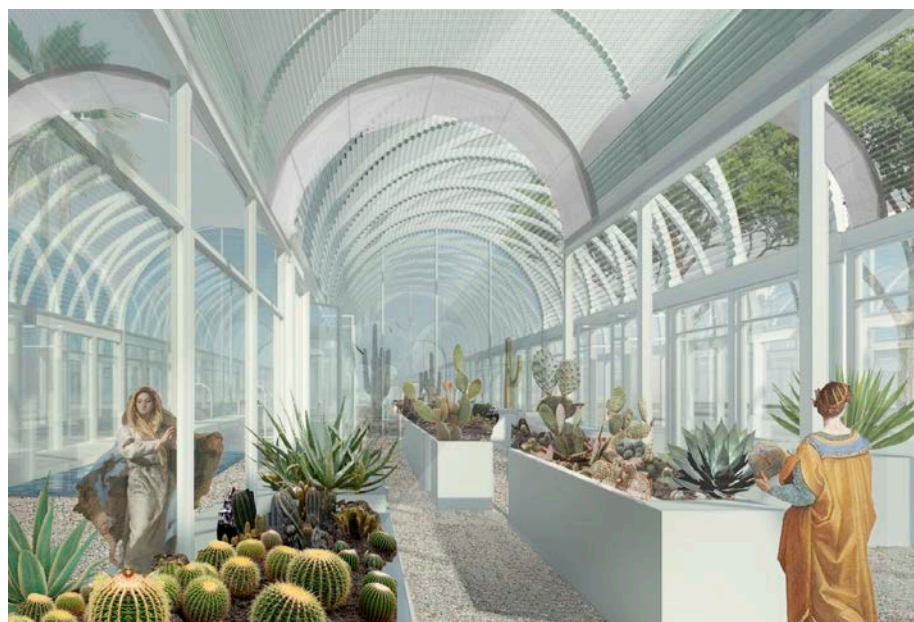
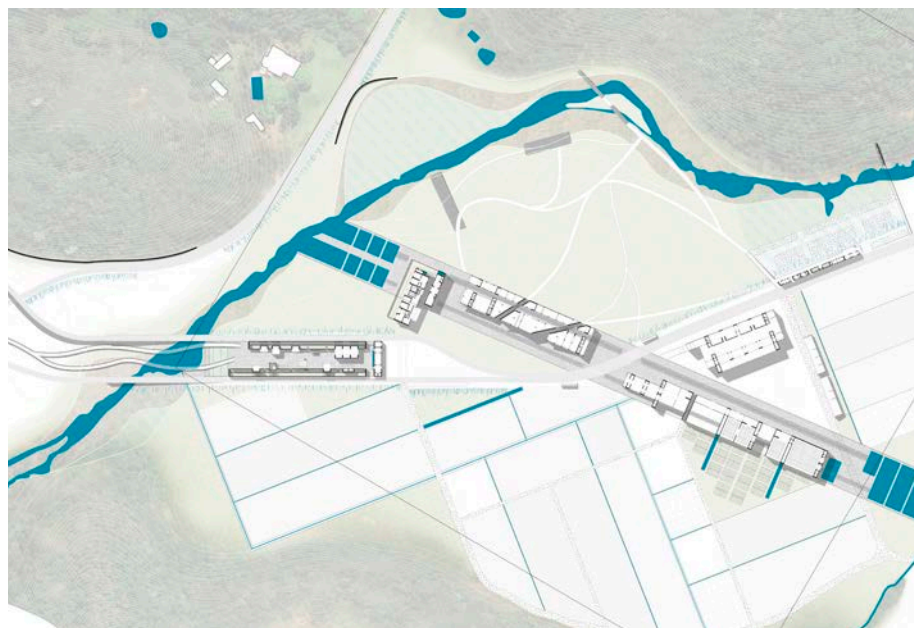
LANGUAGE
English.

*Laurea Magistrale (equivalent to Master of Science),
Piacenza*

This is a Laurea Magistrale (equivalent to Master of Science) programme in architecture (which awards a qualification in architecture that is recognised at the European level) focusing on the relationship between the sustainability of transformations that affect the built environment (as defined by the 2030 Agenda for Sustainable Development) and landscape quality, understood as a spatial, environmental, social and cultural entity.

The world around us needs future architects who are capable of responding to rapidly changing conditions with new concepts, forms and methods of intervention. The programme is therefore aimed at providing advanced tools for an innovative multiscale and multidisciplinary architectural and landscape design. It integrates theoretical and application skills from the disciplinary fields of ecology, construction technology, new digital tools for analysis and representation, contemporary urban planning, and the history of ideas. In the design studios, students are encouraged to explore and expand the limits and potentials of the creative process whilst simultaneously learning how to use the conceptual and operational tools that are essential for the visualisation and representation of the project. Courses in theory and history, technology, ecology, botany, geology, structures,

plants, and economic evaluation of the project are integrated into the various studios. Advanced theoretical-applicative assignments are set in the final year, guiding students to start their own personal research journey in preparation for the final thesis. The teaching staff includes numerous internationally renowned designers and academics. Renowned designers and theorists are invited to give lectures and run design workshops, in particular the LOL (Landscape Of[f] Limits) International Summer School, currently in its thirteenth year.

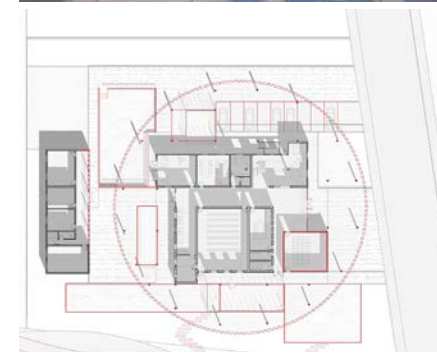


ARCHITECTURAL DESIGN STUDIO 1, SECTION A (A. CONTIN, A. PANDOLFI)
ARCHITECTURAL DESIGN STUDIO 1, SECTION B (S. ATTIA, M. DELLOVO)

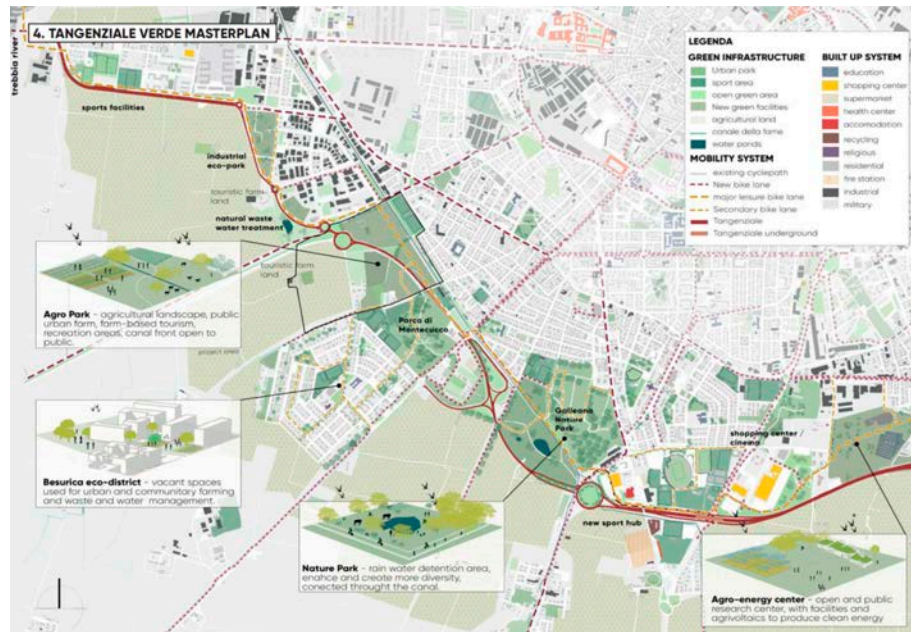
ARCHITECTURAL DESIGN STUDIO 1 - SUSTAINABLE ARCHITECTURE + MULTI CRITERIA ANALYSIS AND PROJECT

The studio work is geared towards architectural design at various scales of intervention and focuses on the spatial, typological and infrastructural aspects of urban phenomena. Architectural projects are developed in several stages, linked to the description, interpretation and transformation of contemporary contexts, and is interpreted as a dynamic process aimed at providing adequate solutions to complex problems, especially in relation to the Sustainable Development Goals (SDGs). The studio is organised around two main fields of investigation: on the one hand, the theoretical and methodological aspects, concerning the problems and techniques of contemporary design and the transformation of the built environment; on the other hand the applicative and experimental aspects, aimed at controlling certain typological and spatial characteristics, as well as structural and construction problems.

The learning outcome is the development of tools for design practice, namely principles, criteria and strategies for modifying contemporary settlements in their relationships with the territory, the environment and the landscape. The complexity of this type of decision-making requires an evaluation framework capable of integrating information on the effects and impacts of the design alternatives in question, with the values and preferences of the interested parties. Multi-Criteria Analysis (MCA) provides such a framework and is increasingly used in combination with various evaluation techniques. Given the above, the aim of the Multi-Criteria Analysis and Project Evaluation studio is to provide students with theoretical principles and methodologies for evaluating the (economic, social and environmental) sustainability of projects.



01. ARCHITECTURAL DESIGN STUDIO 1, SECTION A (A. CONTIN, A. PANDOLFI)
02. ARCHITECTURAL DESIGN STUDIO 1, SECTION C (A. COPPETTI, A. POLETTI)
03. ARCHITECTURAL DESIGN STUDIO 1, SECTION B (S. ATTIA, M. DELLOVO)
04. ARCHITECTURAL DESIGN STUDIO 1, SECTION B (S. ATTIA, M. DELLOVO)



URBAN AND ENVIRONMENTAL DESIGN STUDIO DESIGN OF PUBLIC SPACES AND INFRASTRUCTURES + AGRONOMY

Today, planning for climate change events and social transformations is an urgent activity. For this reason, major environmental and economic challenges require new models for the built landscape that are adaptive and able to respond to change. Given the need for cities to give space to both human needs and non-human life, whilst reducing the impact of our presence on the planet, it is essential to develop an integrated and systemic approach to planning that is capable of generating innovative and greener urban environments. The current understanding of cities as a set of significant places for the integration of ecological and socio-cultural systems shows how the urban form is the decisive element in helping or hindering this relationship. The studio offers an effective interdisciplinary approach that includes agronomic and environmental knowledge and tools which are useful for understanding and adequately assessing the role of agricultural practices in peri-urban and rural landscape dynamics. This role is essential for guiding design and management choices. The studio therefore proposes an approach to the planning of peri-urban areas that focuses on the importance of open and agricultural spaces, taking account of the importance of multifunctional agriculture in peri-urban areas as a result of the social and lifestyle transformations taking place there. By addressing the urban and the rural in a manner that is neither dualistic nor oppositional, the studio offers analytical and design tools with which to tackle the hybrid forms of the landscapes that characterise the peri-urban fringes. Thus, the role of agriculture as a producer of goods and services for citizens is redefined.

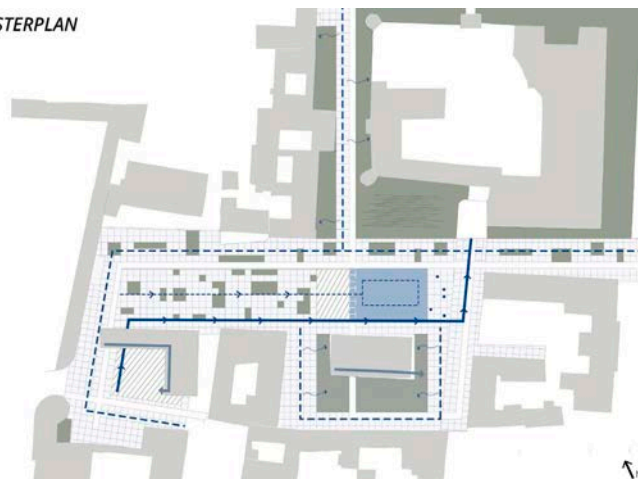
Sez. A_Paola Pucci + Stefano Amaducci
 Sez. B_Matteo Motti + Giovanna Fontana
 Sez. C_Fabiano Lemes de Oliveira + Emanuela Torrighiani



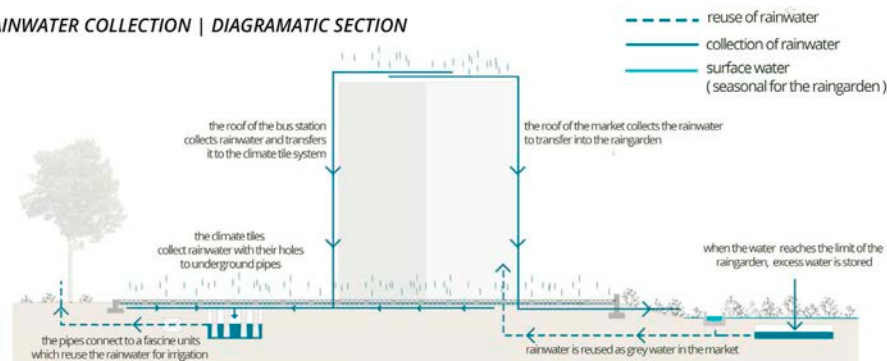


RAINWATER COLLECTION | MASTERPLAN

- WATER COLLECTING PAVEMENT
CLIMATE TILES
 - PERMANENT SURFACE WATER
MIRROR OF WATER
 - SEASONAL WETLAND
RAINGARDENS
 - GREENERY WATERED BY
THE UNDERGROUND SYSTEM
- THE WATERWAY**
- PIPE SYSTEM with fascine units
 - STORAGE TANK
for the mirror of water
 - RAINWATER COLLECTING ROOF
 - FLOOR FOUNTAINS



RAINWATER COLLECTION | DIAGRAMATIC SECTION

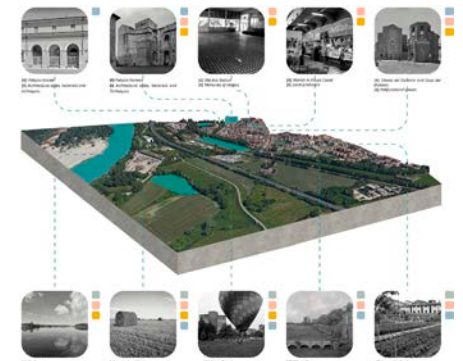
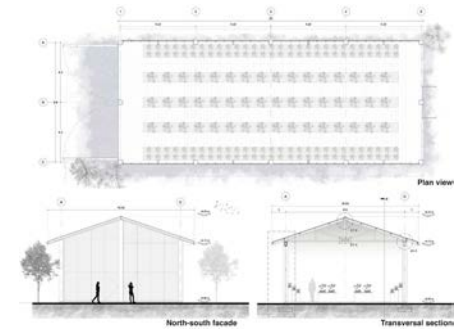
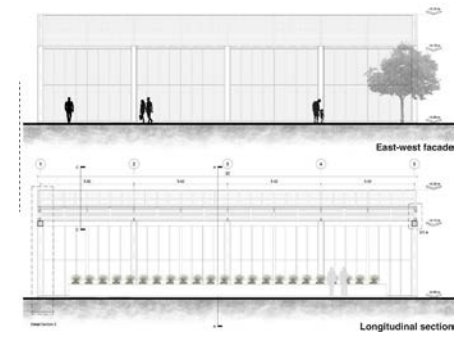


**URBAN AND LANDSCAPE REGENERATION STUDIO
 ENVIRONMENTAL TECHNOLOGY + LANDSCAPE AS HERITAGE +
 GENERAL ECOLOGY**

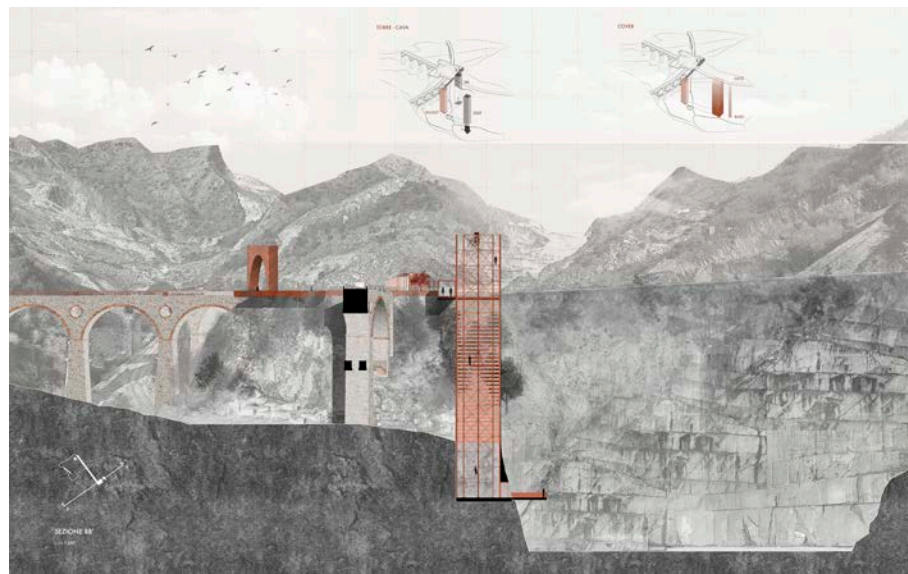
This studio aims to foster environmental awareness and analytical and design skills for regeneration interventions, where the values of heritage and landscape protection prevail based on the assumption that making the best possible use of existing resources is a fundamental strategy for sustainability in all construction activities. The goal is to define a solid approach to sustainable design and construction in architecture at different scales (from the environment to the building), focusing on people's comfort, safety and wellbeing in open spaces, the reduction of energy consumption, and the construction and improvement of blue and green urban infrastructure.

The integrated teaching modules provided in the Environmental Technology, Landscape as Heritage and General Ecology course will jointly develop crucial conservation and sustainability issues, focusing on their mutual relationship in the approach to historical sites and offering specific tools for environmental design.

The programme is closely linked to several of the Sustainable Development Goals established by the United Nations. The primary point of reference is Goal 11 – Sustainable Cities and Communities – with particular attention being paid to inclusive and sustainable green public spaces, the protection and safeguarding of cultural and natural heritage, the mitigation of and adaptation to climate change, public transport and pedestrian safety for all, and the management of waste water. It also explores the urban design implications of: Goal 9 - Industry, Innovation and Infrastructure; Goal 12 - Responsible Consumption and Production; and Goal 13 - Climate Action.



- Sez. A_Carlotta Fontana + Cinzia Robbiati + Lorenzo Mari
- Sez. B_Paolo Debiaggi + Paola Branduini + Paco Melià
- Sez. C_Emanuela Dentis + Raffaella Laviscio + Rossano Bolpagni

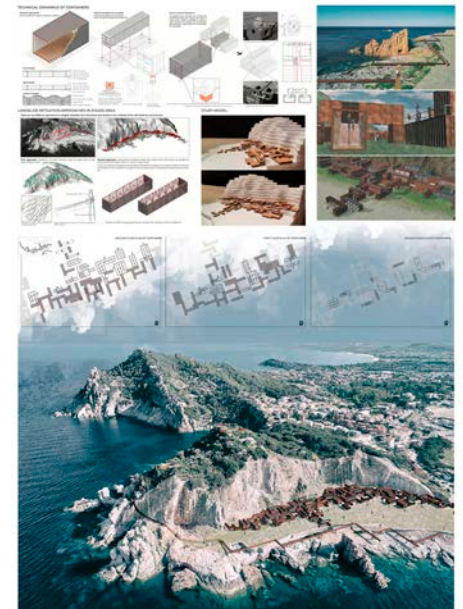
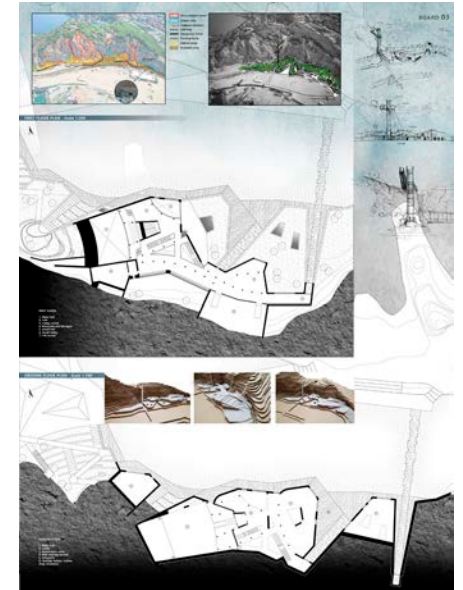


LANDSCAPE DESIGN STUDIO ADVANCED LANDSCAPE DESIGN + GEOLOGY

This studio aims to build an understanding of landscapes as physical spaces and as cultural media and constructions suspended between art and science, which contribute to the understanding of humankind's relationship with non-human nature.

The Landscape Design Studio addresses design problems in which soil, terrain, geology, mineral resources, climate, water, plants, wildlife and the interactions between living systems are key factors. Studio projects explore one or more of these dimensions in depth to achieve high levels of design exploration, strategic thinking, technical resolution and physical expression. The studio's topics intersect with a broader universe of practical concerns, including land use, local and regional economies, real estate development and public policy, as well as theoretical and artistic questions about nature and ecology. The intent is to create new connections between the landscape material and the economic, infrastructural, scientific, social, cultural and creative attributes of a site. The studio also explores important topics in ecological design and new technologies in relation to contemporary landscape architecture: ecology, sustainability, habitat restoration, hydrology, green roofing and green architecture technology, soil technology and other techniques relevant to building ecologically dynamic and functioning landscapes.

Sez. A_Sara Protasoni + Floriana Pergalani
Sez. B_Matteo Poli + Floriana Pergalani
Sez. C_Henrique Pessoa + Floriana Pergalani



01. ARCHITECTURAL DESIGN STUDIO 2, SEZ. C (C. REBELO, A. ALISON)
 02. ARCHITECTURAL DESIGN STUDIO 2, SEZ. B (A. ARRIOLA MADORELL, A. ALISON)
 03. ARCHITECTURAL DESIGN STUDIO 2, SEZ. A (J. M. GARCIA FUENTES, A. ALISON)

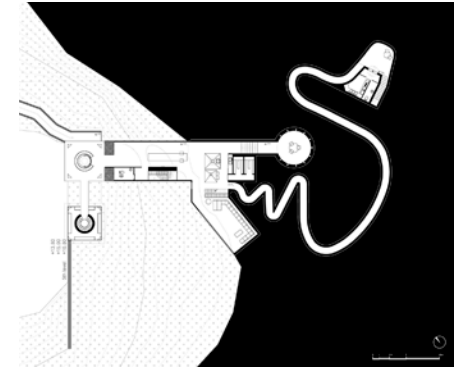
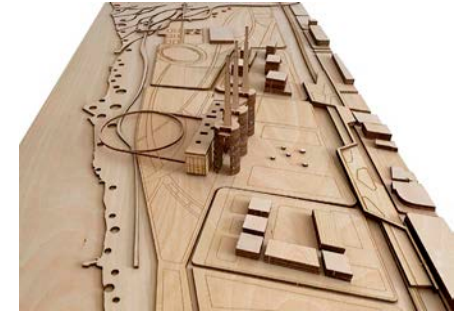


ARCHITECTURAL DESIGN STUDIO 2 ADVANCED ARCHITECTURAL DESIGN + LANDSCAPE AESTHETICS

In this studio, which integrates Architectural Design with Landscape Aesthetics, students are asked to prepare a complex and innovative project using the tools of architecture and urban design, whilst developing an awareness of the project's feasibility. The student undergoes an in-depth study of issues related to innovative and advanced research topics in the specific disciplinary field of reference, reflecting on paradigms, problems and techniques of advanced design in relation to environmental transformations.

Particular attention will be given to the formal structure of the landscape and to its constituent elements, recognising the characteristics that guarantee the sustainability of the transformations in the geographical and topographical conditions, in the environmental diversity and in the historical pre-existence. Particular attention is paid to infrastructure, public spaces, abandoned and degraded areas and the design of open spaces in general. The Landscape Aesthetics module aims to investigate the problematic relationship between the use of the natural landscape and human activity. The module is divided into three parts. The first part provides a series of basic modern aesthetics tools, such as the debate surrounding the concept of beauty and the relationship between beauty and nature. In the second part, these tools are made to interact with twentieth-century problems pertaining to the human exploitation of nature. In the third part, students will be encouraged to propose their own solutions for the aesthetic use of nature. The main topics that will be addressed are the aesthetics of nature, land art and landscape modification.

Sez. A_José Maria Garcia Fuentes + Aurorarosa Alison
 Sez. B_Andreu Arriola Madorell + Aurorarosa Alison
 Sez. C_Camilo Da Cunha Bastos Rodrigues Rebelo + Aurorarosa Alison



01. ARCHITECTURAL DESIGN STUDIO 2, SEZ. A (J. M. GARCIA FUENTES, A. ALISON)
 02. ARCHITECTURAL DESIGN STUDIO 2, SEZ. B (A. ARRIOLA MADORELL, A. ALISON)
 03. ARCHITECTURAL DESIGN STUDIO 2, SEZ. C (C. REBELO, A. ALISON)
 04. ARCHITECTURAL DESIGN STUDIO 2, SEZ. C (C. REBELO, A. ALISON)



COORDINATOR
Carolina Pacchi

2018-2020
Bertrando Giuseppe Bonfantini

2016-2017
Bertrando Giuseppe Bonfantini

DURATION
2 years

ENROLLED STUDENTS 2020-21
243 enrolled students
78 Italian Students
165 International Students

LANGUAGE
English

URBAN PLANNING AND POLICY DESIGN - PIANIFICAZIONE URBANA E POLITICHE TERRITORIALI

Laurea Magistrale (equivalent to Master of Science), Milan

The Laurea Magistrale (equivalent to Master of Science) Programme in Urban Planning and Policy Design offers an advanced training course in the field of spatial arrangement and territorial policy design through plans, projects and programmes on different scales.

The programme trains professionals who are specialists in the field of spatial arrangement and policy design at an urban and territorial scale, as well as in the construction, assessment and management of complex government programmes and projects and transformation of the city and territory.

The design of policies and the definition of spatial arrangements through plans, projects and programmes on different scales is a sector that in recent years has undergone profound transformations from the point of view of both regulation and professional demand. It is also increasingly characterised by new requirements: the definition of feasible and sustainable urban and territorial projects; the construction and management of complex programmes and projects; the renewal of urban planning tools and infrastructural, housing, transport, service and environmental policies; strategies for responding to the climate crisis and growing social and spatial inequalities.

In the face of these changes, the Laurea Magistrale (equivalent to Master of Science) Programme in Urban Planning and Policy Design aims to offer students from different educational backgrounds a rich and transdisciplinary curriculum. The curriculum centres around complex design experiences (established in particular in the studios) and advanced training activities that are capable of enriching analytical and critical-interpretative skills with a view to training designers and managers of plans, programmes and policies.

The training objectives include: providing an essential framework for certain central structures and cultural backgrounds typical of the Italian and European context, and deepening international dialogue by highlighting the most relevant intersections in the global scientific, disciplinary and professional debate; carrying out, through rich and complex studio work, design exercises that are able to produce technical products of a high standard; allowing students to undertake independent learning in areas of their choice with useful blending between subject areas and approaches.

These three priorities are achieved through a single curriculum, specifically: the essential framework and cultural backgrounds are introduced through a limited number of compulsory modules for all students of urban design, planning, territorial policies and social sciences, taught over the first and second years; the design exercises are carried out in the three studios (two in the first year, one in the second), which bear great importance on the entire curriculum and constitute the main training experience for each of the first three semesters; independent learning is developed through a choice of elective courses and the development of the final assessment. The latter is an important moment for students to undertake independent study. They have the opportunity to propose: design explorations at different scales; analyses of public policies, which may be comparative; and theoretical insights.

Graduates in Urban Planning and Policy Design will be well equipped, having the fundamental disciplinary, technical and IT-based skills, to work at various levels of the public administration; public and private companies in Italy, Europe and globally; research institutions; and professional firms that deal with policies, design and planning of interventions in the territory. The experience gained throughout the studio work, the internship and the period of study abroad will be a certain advantage for an attractive professional placement after the Laurea Magistrale.

URBAN PLANNING AND URBAN DESIGN

One of the two polarities on which the Urban Planning and Policy Design programme organises and structures its curriculum is the modes and forms of urban planning and urban design, i.e. the methods and contents of urban design in terms of its physical and spatial dimensions.

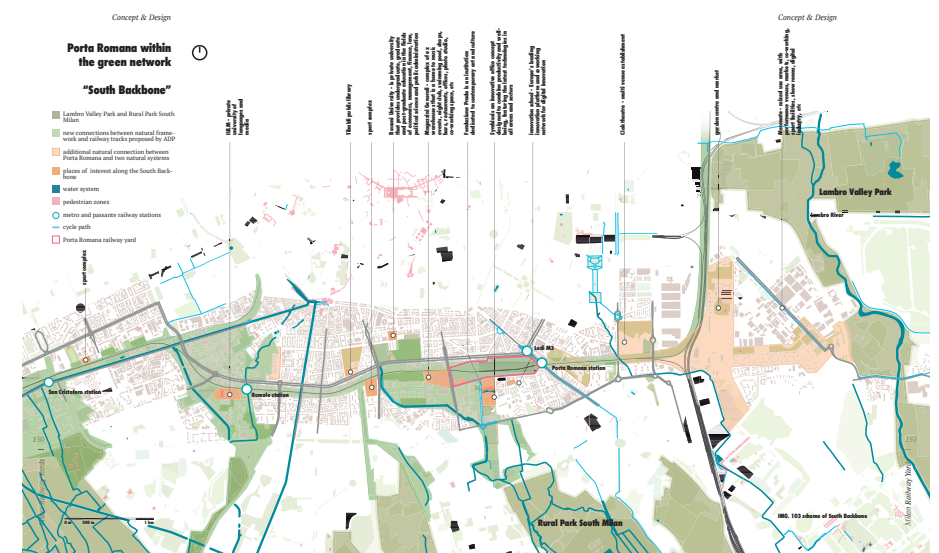
The potential of grey, green and blue infrastructures in the restructuring of cities and territories is explored in the design exercises that are carried out from the outset of the programme.

In view of the 'exploded' and discontinuous manifestations of contemporary urbanisation, a focus on this area is particularly needed today. It is an area which, in a patchwork of fragments and pieces, finds the elements for possible reconfigurations in open space, in its various articulations.

In the face of the challenges brought about by the environmental crisis and global warming, attention is also paid to the 'urban materials' that make up the settlement landscape and to the performance requirements demanded of

them from a perspective of the sustainability, regeneration and resilience of settlement environments. More generally, however, the focus is on operational strategies capable of increasing the quality of urban habitats and improving their liveability in a situation where resources are scarce.

The themes and issues that make up the current urban and territorial agendas constitute a further focus of study, in an international comparison that brings into play the different contextual situations in the various parts of the world and the different settlement conditions. In this framework, the exploration and updating of the forms and techniques of master planning represents a specific space for the critical discussion of the contents, methods and design processes targeting the sustainability and regeneration of settlement quality, even in significant discontinuity and contrast with the ways in which urban redevelopment was characteristically designed in the last decades of the previous century.



POLICY DESIGN AND DECISION-MAKING PROCESSES

Public policy-making in metropolitan regions today faces unprecedented challenges, linked to the complexity and difficulty of dealing with many emerging issues, as well as the inherently controversial nature of any decision concerning space. Furthermore, decisions on complex and interconnected issues such as the climate crisis, the pace of global urbanisation, and growing social and spatial inequalities, require a system of expertise not only in terms of content, but also in terms of process, in relation to networks of actors and decision-making mechanisms at different scales. Thus, the ability to design, implement

and evaluate local policies becomes crucial in order to have a positive impact on urban and regional development and transformation processes.

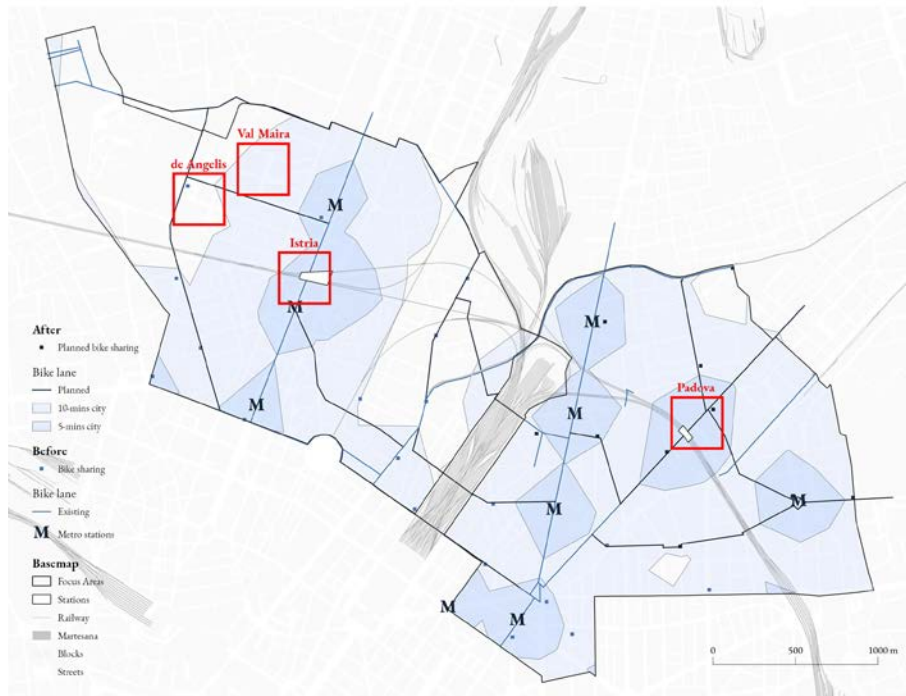
On the other hand, the democratic potential of local governance structures is constantly threatened by growing social polarisation and inequality, which make pluralistic decision-making environments increasingly unbalanced and difficult to achieve.

Faced with these challenges, the training of planners requires a multifaceted approach to policy-making issues, encompassing a solid foundation of policy analysis, a specific

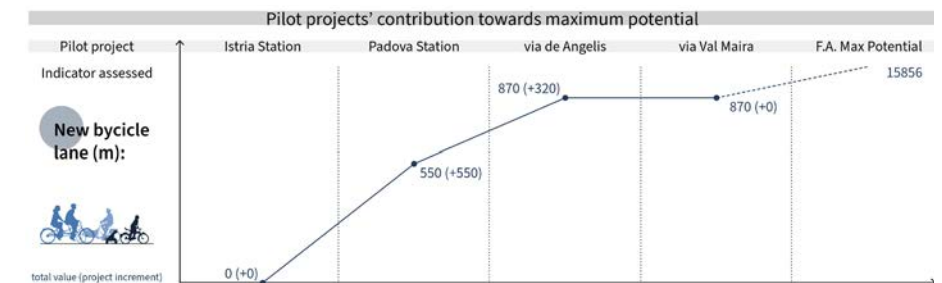
focus on the networks of actors and decision-making processes in actual urban and regional contexts, and the ability to combine various public policy tools.

The first issue revolves around the focus on the identification of actors and networks of actors; the second element is the ability, on this basis, to correctly identify complex governance structures, placing them in their cultural, political and institutional context, and understanding their relative degree of openness or closedness, in relation to the political dimension and the dynamics of local democracy. Furthermore, these structures

can be critically related to public rhetoric and discourse, in order to fully understand the underlying dynamics. Building on this complex background, students have the opportunity to carry out various policy design exercises, by combining and assembling the most appropriate tools.



Related SDGs	Related DPs	Actions (NBS)	Indicators
	DP1 DP2 DP3 DP4 DP5 DP6 DP7 DP8 DP9 DP10		<p>New bicycle lane (m):</p> <ul style="list-style-type: none"> 8830 in Istria's system 6896 in Padova's system <p>New sharing station (#):</p> <ul style="list-style-type: none"> 0 in Istria's system 10 in Padova's system <p>Increase 5-mins accessibility (%): <small>% increase of residents within a 5-mins buffer by metro train station</small></p> <ul style="list-style-type: none"> 0 in Istria's system 65 in Padova's system



Masterplan



CLASSIFICATION OF DESIGN STRATEGIES

- Mobility
- Environment, Climate
- Community
- Energy

- Proposed pedestrian paths
- Proposed bike paths
- Proposed bike stands/e-bike charging points
- Proposed tram lines
- Proposed green parking lots
- Proposed crossings
- Retrofitting existing pedestrian crossings and intersections
- Proposed forestation
- Proposed green roofs
- Proposed community gardens
- Proposed island of coolness
- Proposed re-designing of streets
- Proposed depaving of streets
- Buildings of Class E energy
- Buildings of Class F energy
- Buildings of Class G energy
- PGT area under environmental rejuvenation

LA GOCCIA
De-contaminate and develop areas around La-Goccia with public parks, urban farms, water features to serve as a new urban centrality in the neighborhood

BOVISASCA URBAN CENTRE
The Bovisasca circle line station is proposed to be developed not just as a transit node, but also as a multi-use urban center with an adjacent public plaza and commercial developments to serve as a new centrality in the neighborhood



ISLAND OF COOLNESS **GARDEN OF SENSES**

RETROFITTING EXISTING IDENTIFIED PEDESTRIAN CROSSINGS and INTERSECTIONS
Improve the quality of identified pedestrian crossings for better accessibility, security and create green intersections.

URBAN PARK + CARBON SINK
Development of an Urban park and carbon sink in area under transformation around the Bovisasca station.

URBAN FARMS
Develop community gardens/ urban farms around cascina Albana and improve the existing gardens.

ADAPTIVE RE-USE OF CASCINA ALBANA
Retrofit Cascina Albana and develop as a cultural/heritage polarity in the neighborhood.

ISLAND OF COOLNESS
A temporary, reusable outdoor space providing shelter from heatwaves.

RE-DESIGN OF PIAZZALE DURANDO
Re-design areas around Polimi Durando campus using nature based solutions and place making techniques.

GREEN ROOFS AND NANO GARDENS
Develop green roofs in Polimi Durando campus as part of climate hazard mitigation strategies.

GARDEN OF SENSES
Create a Garden of senses (urban park) providing a break from the built urban fabric.

RE-DESIGN STREET EDGES AND AMENITIES
Re-design street edges by removing blind walls and improve quality of streetscape by providing amenities like benches, smart street lighting and trash cans.

CARBON SINK
Creating an urban forest to act as a carbon sink in areas under transformation as part of Nodo Bovisa.

GREEN PARKING
De-pave and re-pave parking lots with permeable pavers and increased green cover.

ENERGY RETROFITTING OF E, F, G CLASS BUILDINGS
Energy retrofit identified E, F and G class buildings using PV panels, insulated wall cladding and integrating District heating system to improve energy efficiency.

VILLAPIZZONE COMMUNITY HUB
Develop a mixed use outdoor community hub promoting community engagement.

ECO-URBAN FURNITURE
Improve street amenities using sustainable eco-friendly furniture

PROPOSED PEDESTRIAN CROSSING
Develop footover bridges to reduce spatial fragmentation.

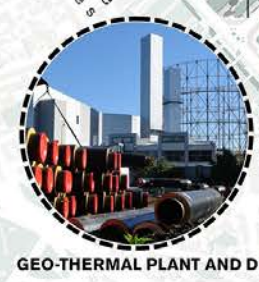
REGENERATION OF MILANO VILLAPIZZONE STATION
Improve the quality of space around station and re-design access points using place making techniques.



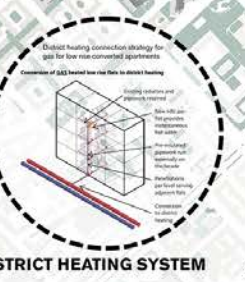
STREETS FOR TREE LINES



INTERSECTION TO BE DEPAVED



GEO-THERMAL PLANT AND DISTRICT HEATING SYSTEM



AREA UNDER TRANSFORMATION NODO BOVISA



GREEN PARKING



URBAN FARMS



GREEN ROOFS



REINVENTING CITIES

ACCOMMODATION AND NEIGHBOURHOODS: AT THE INTERSECTION BETWEEN CURRENT POLICIES AND PROJECTS, INNOVATIVE PRACTICES AND UNMET NEEDS

Developing skills and expertise in designing policy actions and programmes for innovative housing projects and the integrated regeneration of neighbourhoods is crucial for future planners.

In addressing these issues, it is very important to take account of the profound socio-economic transformations affecting contemporary societies as a fundamental context in which to identify new challenges for housing and neighbourhood policies and projects. A constant gap can be observed between structural changes of a socio-economic nature (such as industrial relocation, flexibility of the labour market, intense migratory flows, an ageing population,

diversification of family models, etc.) and the public actions undertaken in response to the new social risks that derive from them. On the other hand, social practices tend to be more reactive, and to change gradually, in search of adaptations and new solutions, for example in housing proposals, with an increase in multi-residential living, shared housing, and the ways of living in one's neighbourhood, among other things.

The Great Recession that began in 2008 worsened working and income conditions for many, and had negative impacts on social cohesion, especially in urban areas, subject to an accumulation of serious social issues, such as social and ethnic segregation, economic

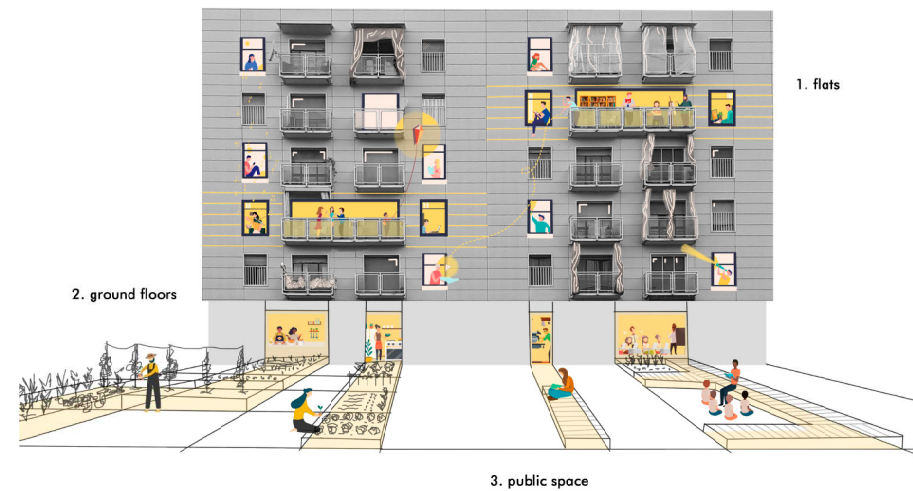
deprivation and deterioration of social housing and public spaces. In this context, the great shock caused by the Covid-19 pandemic, firstly with closures and physical distancing, and later with the enormous funds allocated to help the economy recover, are having and will have socio-economic and political impacts that are yet to be seen and understood in their complexity and magnitude.

Within this framework, Southern European cities represent an interesting study context. They are characterised by a traditionally minimal public intervention in housing and neighbourhood policies and by a complex model of multilevel governance in which local responsibilities are not always combined with

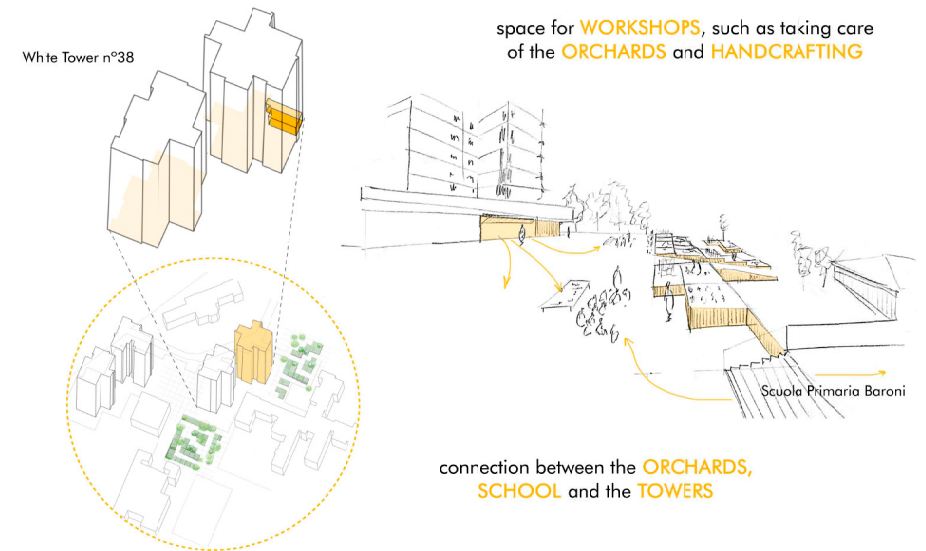
adequate resources and leeway.

Given this context, it is essential that future planners learn to combine social policy and urban planning approaches, and to work on the intersections between current policies and projects and emerging innovative practices as a way to identify emerging social issues and uncover unmet demands.

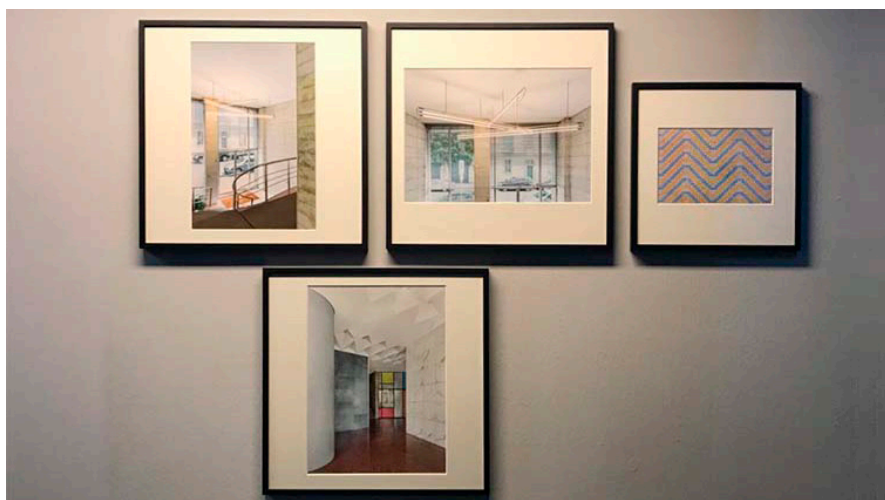
COMMUNITY SPREAD



**THE GROUND FLOORS - LOCAL 7606
HORTICULTURE AND HANDCRAFT WORKSHOPS**



EXHIBITIONS AND EVENTS



EXHIBITIONS DISPLAYED
FROM 2017 TO 2020: 25

VISITORS: 10,000 in the last
4 years with an average of
300/400 visitors per exhibition

CATALOGUES PUBLISHED
FROM 2017 TO 2020: 10

SEMINARS AND EVENTS
CONNECTED TO THE EX-
HIBITIONS: an average of 3
seminars per exhibition and
25 openings with national and
international guests

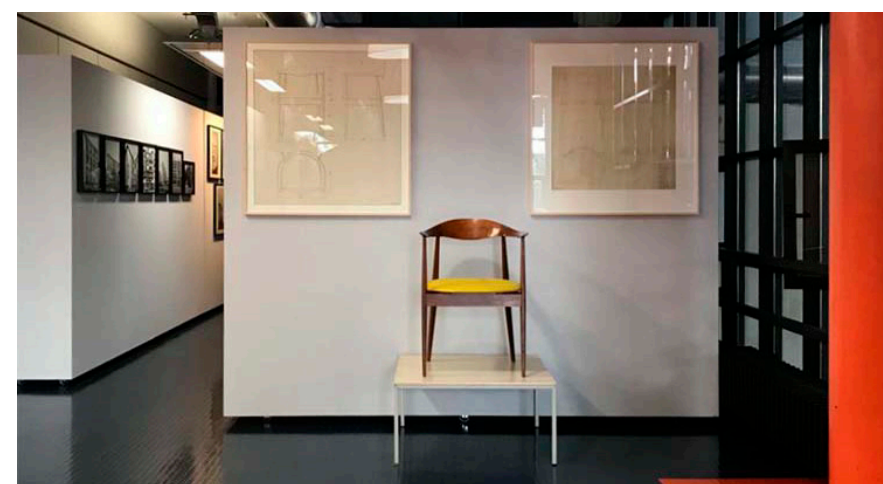
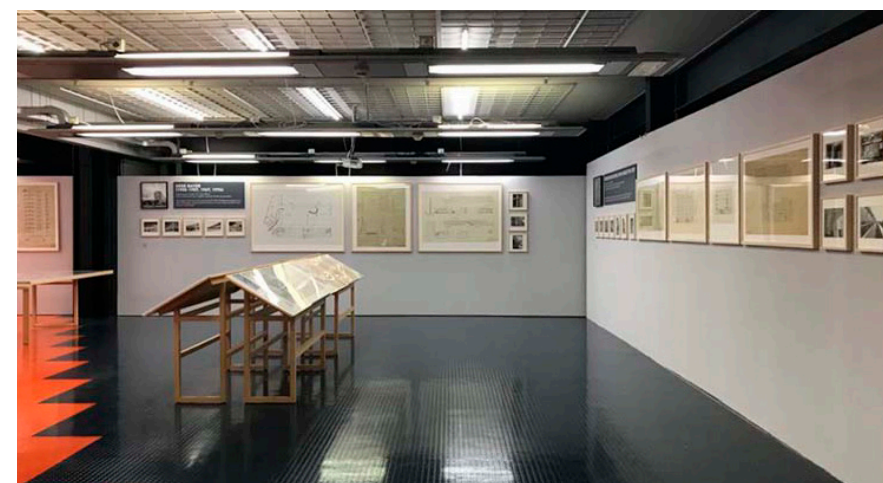
The Galleria del Progetto (formerly the Guido Nardi Exhibition Space), located in the historical headquarters designed by Vittoriano Viganò, within the School of Architecture, Urban Planning and Construction Engineering, has sought over the last three years to offer a programme of exhibitions that seeks to outline the broadest and most diverse panorama of the concept and practices of design. For this reason, the exhibitions have spanned all disciplines that have design at their core; first and foremost architecture, in its various forms, alongside urban planning, structural engineering and industrial design. Particular attention was also paid to drawing, not only in terms of its technical aspects, as a tool for the analytical definition of design, but also as a free expression of design thinking that is produced and manifested directly through the action of the hand. Following the path of the Galleria del Progetto, an attempt was made to adopt an equally pluralist stance towards various historical periods and different geographical and cultural areas. In this regard, there have been exhibitions dedicated to indisputably central figures

in 20th century architectural culture, such as the German architect Ludwig Mies van der Rohe (held on the fiftieth anniversary of his death, with his tall buildings taking centre stage) and exhibitions focusing on equally important figures, even if less well-known to the general public, such as the French architect Fernand Pouillon. Furthermore, there have been exhibitions on contexts with strong cultural and architectural overtones and others which focused on the detailed exploration of a single, extremely 'eccentric' place. The former can be exemplified by the exhibition on Sardinia, seen through the eyes of architect and architectural historian Vico Mossa, who is attentive to the relationship between modern construction and decorative and artisan traditions, and the latter by the exhibition dedicated to the projects carried out under the supervision of Kazuyo Sejima on the tiny Japanese island of Inujima.

Some of the leading figures of Italian architecture also received particular attention. After the previous years' important exhibitions on the works of Aldo Rossi and Pier Luigi Nervi, the Galleria del Progetto has housed exhibitions on the works of Antonio Monestiroli, one of the most important protagonists of the Milanese architectural tradition; Mario Bellini, a recognised master of architecture and design; and Giangiacomo d'Ardia, an architect from Rome capable of combining – at different times in his career – various design and drawing experiments.

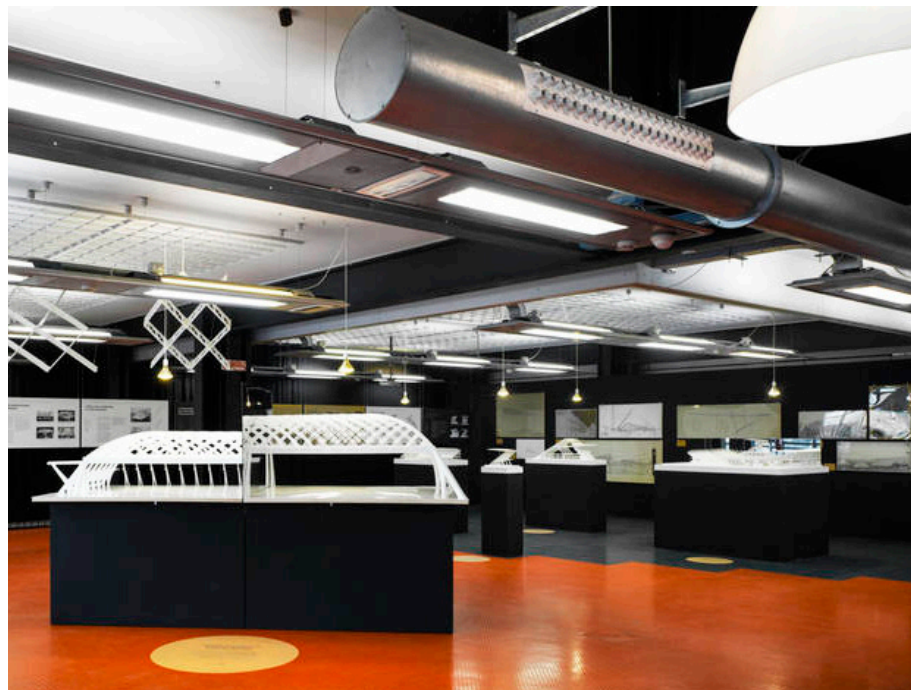
All this reflects the intrinsically educational nature of an exhibition space which, although open to the city (including by virtue of its location which places it in a close relationship with the urban context), is nevertheless part of a large university such as the Politecnico di Milano. As such, its primary goal is the knowledge and dissemination of architecture and other design disciplines amongst a public composed, not exclusively but at least predominantly, of students. This factor not only guided the choice of exhibitions but also strongly influenced the critical slant that the various curators gave them. In this regard, despite the diversity of themes and approaches, in all its exhibitions the Galleria del Progetto has always sought to emphasise this didactic nature as much as possible, highlighting the entire design process with the utmost clarity.

Finally, many of the exhibitions have been accompanied by a catalogue which constitutes a lasting vestige of the work carried out, and bears witness to the critical effort that they have always offered, in the belief that cultural activity should not be limited to the mere presentation of materials whose interpretation is entrusted to the observer, but that the function of an exhibition must be to guide and help visitors achieve critical awareness. This has been the Galleria del Progetto's mission for the past three years.



01. ENTRANCE TO THE GIGI GHO EXHIBITION: COLOPHON AND PRESENTATION AT THE GALLERIA DEL PROGETTO/GUIDO NARDI EXHIBITION SPACE
 02. PHOTOS, DRAWINGS AND DESIGNS BY GIGI GHO © GIGI GHO ARCHIVE MILAN
 03. CHAIR AND DRAWINGS BY GIGI GHO © GIGI GHO ARCHIVE MILAN

01. EXHIBITION OF THE RECONSTRUCTION OF THE ORBETELLO HANGAR MODEL DESIGNED BY P. L. NERVI (MODEL DEVELOPED BY THE POLITECNICO DI MILANO'S DASTU-ABC INTERDEPARTMENTAL MODELS LABORATORY)
 02. LOGO OF THE EXHIBITION DEDICATED TO P. L. NERVI



PIER LUIGI NERVI. THE MODEL AS A DESIGN AND CONSTRUCTION TOOL,
 curated by Giulio Barazzetta

This exhibition brings together three different manifestations of the architectural 'model' as a tool for representing architecture, in order to share and compare recent research developed around this theme. In particular, the models on display are those for the airports of Orvieto (1935-38) and Orbetello (1939-41) and for the Palazzetto dello Sport in Rome (1956-57).

The exhibition is part of the ongoing studies in Italian and European polytechnic schools which, by investigating exemplary works such as those of Pier Luigi Nervi, have launched a substantial revision of the relationships between the disciplines of engineering and architecture within the scope of design and construction tools and techniques.

The Politecnico di Milano's AUIC School (Architecture, Urban Planning and Construction Engineering), ABC Department (Architecture, Built Environment and Construction Engineering), and Materials Testing Laboratory produced and promoted the exhibition in close coordination with the Schools of Architecture and Engineering of the Alma Mater Studiorum University of Bologna and the Tor Vergata University of Rome. It is evident that this initiative coincides with the current rethinking of the scientific and educational project of the schools of architecture and engineering. The focus on the themes of what is known as complex design is particularly apparent. A line of research that addresses the use and meaning of the same term in contemporary building design techniques.

Brought together in this way, the three universities propose that the discourse on the research and teaching of integrated architecture and engineering design for construction should converge.

The exhibition gave the Politecnico di Milano an experience of concrete reflection on themes specific to the schools of engineering and architecture. The theme of the exhibition is in fact the current situation of architectural design and an improved focus on its objectives for the fundamental shift in current university education.



ENTRANCE TO THE EXHIBITION AND MODELS OF THE PALAZZETTO DELLO SPORT IN ROME, THE HANGAR IN ORBETELLO AND RECONSTRUCTION OF STRUCTURAL DETAILS OF P. L. NERVI'S WORKS



ALDO ROSSI. THE GRAND THEATRE OF ARCHITECTURE, curated by Marco Biraghi and Giani Braghieri

Twenty years after Aldo Rossi's death, this exhibition aims to commemorate a fundamental figure of contemporary Italian and international architectural culture who studied and taught at the Politecnico di Milano' Faculty of Architecture.

The exhibition, coordinated together with other initiatives that will take place at the same time at the IUAV University of Venice and the University of Bologna's Department of Architecture, consists of three sections: the first section, dedicated to Aldo Rossi's work at the Politecnico di Milano, exhibits unpublished materials and projects, educational writings and written lecture notes. The second section, dedicated to a selection of projects relating to works constructed both in Italy and abroad, exhibits original drawings, sketches, models, photographs and reproductions of architectural drawings, with the explicit intention of showcasing some of Rossi's main works—academically and in other ways: the Monte Amiata Housing in the Gallarate district, Milan; the Fagnano Olona Elementary School, Varese; the Deutsches Historisches Museum, Berlin; the "Il Palazzo" Hotel and Restaurant Complex, Fukuoka; the Centre international d'art et du paysage on the island of Vassivière; and the residential complex in Schützenstrasse, Berlin.

The third section consists of an illustrated sheet of Aldo Rossi's works – paying particular attention to those in countries other than Italy – consisting of a sort of world map showing the location of his projects and buildings on the globe, accompanied by a picture.





**ANTONIO MONESTIROLI. ARCHITECTURE.
THE REASON FOR BUILDINGS, curated by
Raffaella Neri and Tomaso Monestiroli**

Antonio Monestiroli's architecture is driven by reason. This is to be understood in a completely different sense from the usual meaning of the term. Not as something linked to this or that function, nor to an 'external' reason whose cause precedes it, but in the sense that his architecture incorporates its own intrinsic reason. It is an architecture deeply rooted in a theory, or perhaps it would be better to say in an idea. What is fascinating in Monestiroli's architecture, therefore, has nothing to do with 'creativity' or 'imagination'; that is, with the attractions and seductions of today's 'fashionable' architecture. Its one and only 'weapon' is the fascination of pure reason.

The exhibition, curated by Raffaella Neri, displayed works that include, among others, the design for the competition for the new theatre in Udine (1974), the design for the competition for the Les Halles complex in Paris (1979), the design for the church in the Gallarate neighbourhood of Milan (1989), the design for the New Politecnico di Milano campus at Bovisa (1990), the fifth extension of the Maggiore cemetery in Voghera (1995-2003), the Planetarium of Cosenza (2001), and the church of San Carlo Borromeo in Rome (2005).



GIANGIACOMO D'ARDIA/DIACHRONIES. ARCHITECTURE PROJECTS (1967- 2017), curated by Emilia Corradi and Giulia Setti

Giangiaco­mo d'Ardia is an architect who has gone through many seasons of Italian and international architecture, starting from the second half of the 1960s, when he graduated from the Faculty of Architecture in Rome with Ludovico Quaroni. But D'Ardia's ability to embrace different and unexpected directions (he is the only "Rossiano" architect in Rome!) is matched only by his ability to absorb and transform them. Indeed, in d'Ardia's reinterpretation of neo-rationalism, Rossi's elementary approach – which has its roots in the modern tradition no less than in that of Lombard neoclassicism – is hybridised with a richness and complexity deriving instead from a reinterpretation of the Roman historical stratification.

FERNAND POUILLON, CONSTRUCTION, CITY, LANDSCAPE: SELECTED WORKS 1948-1968, curated by Giulio Barazzetta and Martina Landsberger

In addition to his work as an architect, Fernand Pouillon was a scholar and essayist, collector and publisher. The exhibition explores this inextricable link, in particular between his architectural work and his cultural references. As Pouillon himself said, "this adventure has made me a publisher and an architect of books". Investigating the relationship between works and references, figures and text, themes, problems and representations leads to the roots of his imagination on works of architecture and the city. The exhibition brings together texts and studies published and edited by Pouillon himself. It is promoted by the ABC Department of the Politecnico di Milano together with DiARC, the University of Naples Federico II and the Les Pierres sauvages de Belcastel Association of Toulouse.

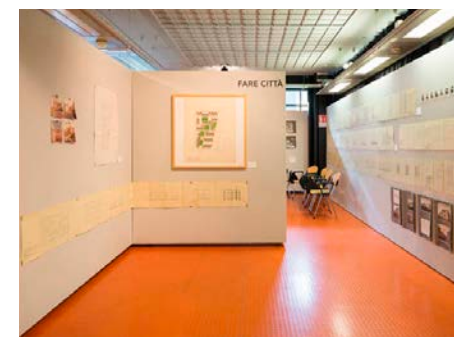
KAZUYO SEJIMA / INUJIMA, curated by Francesca Singer and Giulia Setti

Professor of Architectural Design at the Politecnico di Milano since 2015, Kazuyo Sejima teaches a studio in which she has decided to assign her students the island of Inujima, including several small pavilions installed in its territory, as the subject of their designs. Perhaps, it might seem a strange choice to give young students from all corners of the world (but probably not from Japan), studying in a school located in a metropolis, a design exercise based on a small island. What understanding can they gain from that remote context? Yet as the exercise is completed, the island slowly opens up. And in the end it turns out that Sejima herself is an island (and in fact the word 'island' - 島 - also resonates in her surname). A little island, that little island.

I LAUGH BECAUSE I FEAR. VICO MOSSA: SARDINIAN ARCHITECTURE BETWEEN RURALITY AND MODERNITY, curated by Roberto Podda, Paola Gambero and Marco Biraghi

Vico Mossa (1914-2003), architect and architectural historian, published volumes dedicated to domestic architecture in Sardinia throughout his life, thus seeking to contribute to the knowledge of an oft-forgotten heritage on the island. But on the professional front, Mossa also tried to oppose the work carried out in Costa Smeralda and elsewhere by operators and architects 'from outside', without any prior knowledge of Sardinia, which 'falsified' the Sardinian spirit: 'The architecture of the Renaissance must therefore be both Sardinian and modern at the same time: but the reconciliation between these terms will certainly only take place on the land of a culture that is itself universal and modern'

01. DRAWINGS BY GIANGIACOMO D'ARDIA
02. DETAIL OF A PHOTO OF THE ELEVATIONS OF A WORK BY FERNAND POUILLON



01. EXHIBITION OF MODELS AND WORKS BY THE STUDENTS OF THE INUJIMA STUDIOWORKSHOP
02. DRAWINGS, DETAILS AND SKETCHES OF VICO MOSSA'S PROJECTS