



POLITECNICO
MILANO 1863

DIPARTIMENTO DI ARCHITETTURA,
INGEGNERIA DELLE COSTRUZIONI
E AMBIENTE COSTRUITO

MASTER
I and II level

MATERIAL BALANCE DESIGN

DIGITAL TECHNIQUES AND CIRCULAR INNOVATIONS IN ARCHITECTURE

MATERIALBALANCE



RESEARCH



MASTER

MATERIAL BALANCE DESIGN

DIGITAL TECHNIQUES AND CIRCULAR INNOVATIONS IN ARCHITECTURE

Considering the growing interest and the increasingly recurring demand for figures capable of managing complex projects, we are pleased to offer the I edition of the Master Material Balance Design, Digital Techniques and Circular innovations in Architecture Level I and II. The Master aims to train professionals to become unique and anticipatory figures in the evolving context of architecture. It will develop skills in digital techniques and strategies for circular innovation that are increasingly in demand in the national and international construction market that needs regeneration.

The Master's program is in blended mode with online theoretical sessions and in-person practical sessions at the ABC Department's Maba. SAPERLab. The academic sessions aim to acquire basic technical-scientific knowledge that will be further applied during the practical sessions. The most advanced and sustainable methodologies of design, fabrication, and prototyping of architectural components will be explored. The course concludes with individual thesis that anticipate future scenarios for experimentation on architectural design, also developed through the internship experience.

EDUCATIONAL OBJECTIVES

The Master "Material Balance Design. Digital Techniques and Circular Innovations in Architecture" proposes to train new professionals capable of facing and managing multidisciplinary projects through the synergy between digital technologies' potential and environmental balance needs. The course represents an opportunity to acquire knowledge based on a new "material balance" from concept design to construction details, to design the transformation of our future environment with a renewed awareness. Students will actively contribute to the study and creation of new principles, tools, processes, and innovative products that rethink the contemporary role of the designer.

EMPLOYMENT OPPORTUNITIES

The Master aims to produce a professional figure capable of managing with transversal skills different activities concerning new technologies for design and construction, combining digital technologies and principles of the circular economy. Prestigious institutional and industrial partners will support the Master.

Occupational sectors:

- architectural firms
- engineering companies
- manufacturing industries of bio-based components and materials
- robotics companies
- cutting-edge start-ups

Profile expertise:

- cutting-edge technology consultant
- architectural entrepreneur
- expert in digital technologies
- expert in circular innovations
- computational designer
- bio-based materials strategy specialist
- expert in innovative facades
- project manager

THEORETICAL BACKGROUND

WHAT IS MATERIAL BALANCE?

Focus on the research for a new approach that aims to rebalance our relationship with the environment

ALGORITHMIC DESIGN

allows to optimize material use and the design process linking it to the specific site requirements and design needs. The module covers:

- PERFORMANCE-BASED DESIGN
- GENERAL TOPIC
- SUSTAINABLE ACOUSTIC MATERIALS
- THERMIC SIMULATIONS MATERIALS
- LIGHT FILTERING MATERIALS

EXECUTIVE DESIGN DEVELOPMENT

FACADE TECHNOLOGIES

PUBLIC SPACE EXPERIMENTAL DEMONSTRATOR

yearly installation built in POLIMI campus

DIGITAL FABRICATION

as a computer-controlled digital production process, capable to produce solid and three-dimensional shapes starting from digital drawings. Deep analysis and study of innovative manufacturing techniques.

- GENERAL TOPIC
- ARCHITECTURAL DEMONSTRATOR
- ROBOTIC MANUFACTURING
- WOOD TECHNOLOGIES
- BESPOKE TEXTILE TECHNOLOGIES

PROJECT COMMUNICATION

CIRCULAR MATERIALS SCOUTING

Research of materials and products that are wholly or partially derived from plants and vegetables

- GENERAL TOPIC
- BIO-BASED MATERIALS
- NATURE BASE SOLUTION

FUTURE SCENARIOS

tools to anticipate trends in architecture

MATERIAL BALANCE PROTOCOL

STUDY PLAN

The course will be held from **March 2023** till **February 2024**. Until **October 2023** the classes will be held **every Monday and Thursday remotely (5:00 p.m. - 9:00 p.m.)** and **one weekend per month in-person (Thursday, Friday, and Saturday (9:00 a.m. - 6:00 p.m.))** at Politecnico di Milano - Leonardo campus and/or remotely.



from March 2023
to February 2024

The training concludes with in-depth activities:

Workshop. Design exercise integrated on themes identified during the training process

Internship. To be carried out at one of the partner/sponsor companies.

Final exam. Public discussion of the final paper based on the contents of the Master's program and the activities carried out as part of the internship

60 CFU

300 hours of **classroom training**

600 hours of **formative internship**

600 hours of **in-depth activities** (individual study, workshops, technical visits, group activities)





COMMITTEE

Director:

Prof.ssa Ingrid Maria Paoletti

Technical Director:

Prof. Massimiliano Nastri

Members of the master's Scientific Committee:

Prof. Massimiliano Bocciarelli

Prof. Stefano Capolongo

Prof. Emilio Faroldi

Prof.ssa Laura Elisabetta Malighetti

Prof. Francesco Pittau

Prof.ssa Tiziana Poli

Prof.ssa Valentina Rognoli

Prof.ssa Cinzia Maria Luisa Talamo

Prof.ssa Maria Pilar Vettori

Prof.ssa Alessandra Zanelli

Members of the master's Technical Committee:

Andrea D'Antrassi - Associate partner | MAD Architects

Tommaso Maserati - Architect | Snøhetta

Nicholas Bewick - Art Director, Project Director | AMDL Circle

Francesco Forcella - Architect | AMDL Circle

Tommaso Pagnacco - Italian Branch Manager | Bollinger+Grohmann

Stefano Converso | Università Roma Tre

Lorenzo Pirone - Team Coordinator, Computational Designer | Rimond

Piero Fioretti - CEO & Founder | Versy

Francesco Perego - Founder | Matera

Partners:

mad architects

Snøhetta 

 **AMDL CIRCLE**

BOLLINGER+GROHMANN

RIMOND 

 **MATEREA**
Automate the non-standard

 **Versy**

ADMISSION REQUIREMENTS AND MODALITIES

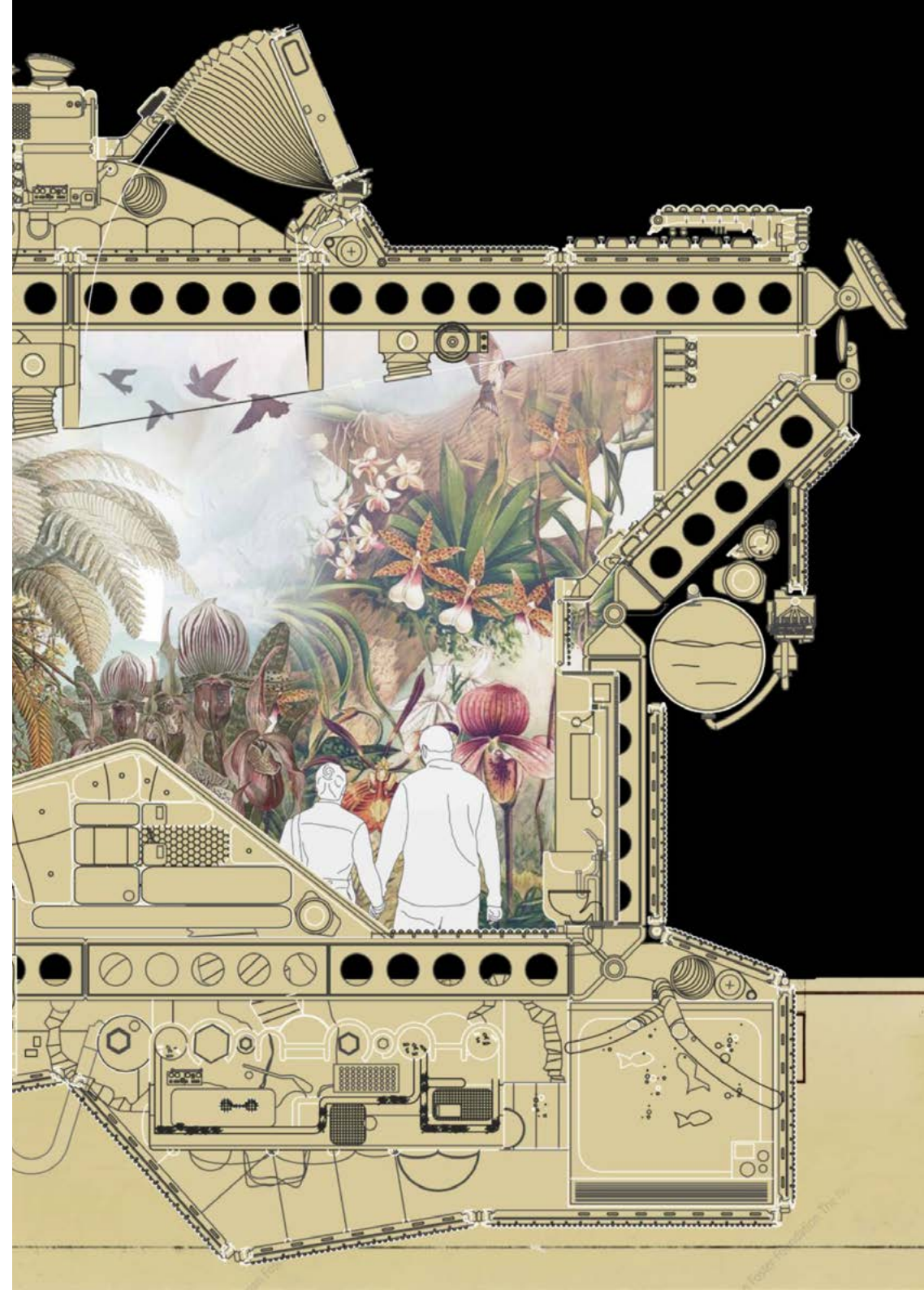
Candidates with a Bachelor's and/or Master's degree in Engineering, Architecture, and related disciplines are admitted to the Master's program. Any other degree courses will be evaluated during the interview process. The equivalent degrees in their respective curricula will be considered valid for foreign candidates.

FEES AND CONTRIBUTIONS

The total cost of the University Master's Degree is € 7,000.00 (V.A.T. exempt according to art. 10, Presidential Decree No. 633 of 26/10/1972, as amended), to be paid in three installments. This amount includes the registration fee to Politecnico di Milano of € 500.00.

TITLE AND MODE OF PARTICIPATION

At the end of the course, the participants will obtain the title of University Master's Degree Level I or II in "Material Balance Design. Digital Techniques and Circular Innovation in Architecture" upon passing the final exam.



FOR INFORMATION:
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