



SPECIALIZING MASTER IN

INDUSTRIAL DESIGN ENGINEERING AND INNOVATION

XVIII EDITION - NOVEMBER 2024

GENERAL OVERVIEW

The Politecnico, together with its advanced production system and a top-class historic culture, creates for its master students access to this value. Politecnico's technical and design culture, placed in Design 5th place in the world and powered by Italian design masters such as Marco Zanuso and Achille Castiglioni, is integrated with the high technology and engineering expertise in the field of production and innovative materials, feeding the tradition of excellence from the Nobel Prize for Chemistry Giulio Natta to our day.

It is a high profile professionalism the Specializing Master purpose, placing the designer and product design expert in line with contemporary technology and innovation, starting from a solid tradition on creativity and method.

I Master di POLI.design

Specializing Masters combine academic strictness and business dynamics. These educational paths for graduate students include lectures, seminars, and workshops; they aim to transfer theoretical knowledge as well as practical tools to face the world of work from the very beginning.

The Specializing Master in Industrial Design Engineering and Innovation, directed by Prof. Matteo O. Ingaramo, was created to mold capable designers who can manage the entire development of a new product from the initial concept to the manufacturing stage.

This Specializing Master joins the artistic and humanistic skills belonging to design culture with the technical know-how that relates to production technology, materials, and manufacturing costs. It strives to meet the need to operate in a worldwide landscape of heightened competition where the designer can increase the value of a product by making innovations – in both aesthetics and usability – that take advantage of available technologies. The aim is to train professionals whose creative capacity is matched by technical expertise and awareness in a product's industrial feasibility.

Because its faculty is made up of teachers from a variety of fields, from both inside and outside the Politecnico di Milano, the Specializing Master establishes a set of multidisciplinary skills called upon throughout the course of training. Cultural visits to foundations and museums, along with technical field trips to manufacturing companies, round out the training and foster the attainment of educational objectives. Many graduates from previous editions are playing leading roles in major manufacturing concerns or renowned design studios, including: Whirlpool Europe, Chicco Artsana, 3M, Polti, Cini&Nils Lighting, V12 Design, Studio Volpi, Studio Luca Trazzi, Serralunga, Rupes spa, Zinc, Design Group Italia, Toys Toys, Ditronetwork srl. Others have founded and directed their own studio.

35
students

1500
hours

13
months

€13.500
cost

TRAINING OBJECTIVES

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The Master aims to develop professionals who are able to deal with the design and production process of large and small series industrial products, placing special emphasis on technological, production and cost aspects, without neglecting the aspects of expressive quality.

The curriculum offered by the Master in Industrial Design, Engineering and Innovation combines the artistic and humanistic skills related to project culture and language of the product with techniques related to manufacturing technologies, materials and industrial costs. This way, it aims to respond to the need to compete in an increasingly competitive international scene, in which the designer is able to enhance product value by generating innovations (aesthetic and use) that take advantage of the possibilities offered by the available technologies. It is therefore of primary importance to develop professionals that combine creative skills with sound technical skills related to industrial feasibility of the product.

DIDACTIC PLAN

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The Masters teaching includes lectures, seminars, practical classes and workshops. The program is divided into three main topics of study:

- large appliances;
- small appliances;
- consumer electronics and IT products.

Particular attention will be given to learning the theoretical methods and techniques behind the use of software for three-dimensional digital modelling. The course provided is divided into areas – comprising a total of modules, workshops and the Internship to achieve a total of 60 CFU credits (university credits). The final exam consists in the development and presentation of an elaborate in which the candidate will take care of bringing out the experience gained during the curricular internship and all the master activities and developed projects.

DIDACTIC MODULES

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The 11 learning modules:

• 1 – Computer-aided Design (CAD)

We learn both the theoretical methods and the practical techniques for applying dedicated software to three-dimensional modeling. This includes an in-depth understanding of the issues involved in modelling and in photorealistic rendering. We learn to handle both surface modelling and top-down parametric 3D modelling.

Specifically, we deal with the stages of form development starting from product conception and we develop skills in using engineering software during execution stages of the design that are compatible with rapid prototyping and putting items into automated production.

• 2 – Processes and Criteria for Designing

This module analyzes the development process in manufacturing enterprises to acquire an understanding of how to manage – at the design stage – all the variables related to planning new manufactured products of medium complexity, with an eye to applying planning systems to industrial production.

• 3 – Production Processes and Methods

Students acquire the ability to understand and manage the technical, technological, organizational, and financial issues involved in manufacturing processes and the workflow of industrial logistics for medium-complexity products.

• 4 – Financial Evaluation of a Design

Students acquire the knowledge about the cost of running machinery, tooling up, machining, and finishing that is needed to evaluate the 'industrial cost' of a product. They learn to select among possible design solutions, taking into account the project's economic feasibility.

• 5 – Quality Control and Certification, Patenting

We learn about certification procedures for manufactured goods and for stages of the production process, as well as the procedures for protecting inventions and a product's planning value.

- **6 – Materials and Technologies**

This module provides the knowledge and tools that enable designers to understand how manufactured products relate to the materials they are made of, using material-selection information systems such as the design version of the Cambridge Engineering Selector (CES).

- **7 – Enterprise and Innovation**

Objectives include acquiring the main skills needed to organize a product portfolio coherent with company strategy and to organize the innovation process so as to integrate all the corporate skills involved, as well as some know-how for setting up, managing, and verifying the individual development projects for a new product.

- **8 – Tools for Design-driven Innovation**

Defining the concept of innovation led by design. This involves an in-depth look at design's contribution to new product development, providing knowledge needed in creating innovative product concepts.

- **9 – Empowerment**

This course contributes to the student's individual learning process through lessons in self-empowerment, public speaking, and teamwork.

- **10 – English Language**

Improved language skills are needed to work in a corporate or professional environment, both for technical purposes and for managing product development.

- **11 – Seminars**

The seminars led by professionals from the corporate world deal with issues in designing products of medium complexity, in production processes, and in tools for innovation.

Workshops and Product-development Laboratory

The workshops are design simulations on topics identified in the course of training. The Specializing Master follows two sequential workshop phases, in incremental difficulty. This makes it possible to coach students gradually into a growing design awareness. Practical design work wraps up with the Product-development Laboratory, where students learn product-plan execution.

- **Workshop 1: Product Concept and Layout**

In this design simulation students identify usability limitations in specific product categories. They start by analyzing state-of-the-art products and users on the market, in an attempt to uncover unsatisfied needs. Using this analysis, students are expected to design a new product, including layout and determining its main components.

- **Workshop 2 and Product-development Laboratory: Design and executive development of industrial product**

The exercise consists in the design of mass consumption products of medium complexity starting from removal and relief of an existing product. After analyzing and understanding the starting material, students are required to prepare a brief that highlights the possible areas of project. Improvement focus on formal and usability aspects of the product, without ever neglecting the industrial feasibility aspects and methods of assembly. The level of definition of the project is accurate, with great attention to the producibility and the clear identification of all components.

- **Product-development Laboratory: Executive development of industrial products**

Students are called upon to develop the designs laid out in the preceding phase. Specifically, they have to make detailed choices about materials, production processes and logistics, and how to present the design. This must be done with an eye to chances for optimizing product parts for actually putting it into production. Special attention is thus paid to execution design, using parametric modeling software and, where called for, physical modeling and component prototyping.

There will be a strong focus on learning theoretical methods and acquiring the techniques that underlie the use of dedicated software applied to three-dimensional modeling.

TITLE RELEASED

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Upon completion of the Specializing Master, students earn a first-level Politecnico di Milano Specializing Master Degree, provided they have met the 75% minimum attendance requirement.

In addition to the degree, the program also issues:

- certificate for completion of course in Rhinoceros with software-manufacturer accreditation from McNeel;
- certificate for completion of course in CREO with software-manufacturer accreditation from PTC.

EMPLOYMENT OPPORTUNITIES

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The Master programme was created to train expert designers, who can develop a new product from its concept to production. The employment opportunities are:

- working with professional firms which participate in the various product development stages, from concept to engineering;
- working with manufacturing companies belonging to the sectors which make up the Italian production industry (e.g. house hold and professional appliances, lighting, furniture, toys and children's products);
- freelancing with enhanced skills to interact with the business world.

The professional role will be an expert product designer, with theoretical knowledge combined with significant experience applied to production processes. By achieving the necessary professional field experience, students can aspire to the role of product manager responsible for the development of new products.

REQUIREMENTS

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Candidates with Bachelor or Master of Science on Engineering, Architecture, Industrial Design fields can be eligible. The Specialising Master's Board requires applicants to pass a selection interview.

The selection interview will take place online after they will have sent their application documents.

The Board reserves the right to select and admit graduates or applicants with a three-year university degree (equivalent to a Bachelor of Science) from other universities, on condition that those academic qualifications are compatible with the Specializing Master's subjects and/or applicants with a curriculum vitae that is coherent with the Specialising Master. Foreign applicants holding equivalent qualifications are welcome to apply for enrolment in the Specialising Master.

DEADLINES

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To take part to the selection process, the application form must be completed online within the following deadlines:

- for Italian / foreign citizens with a qualification obtained in Italy within September 18th, 2024
- for Extra U.E. citizens within August 18th, 2024

PRICE

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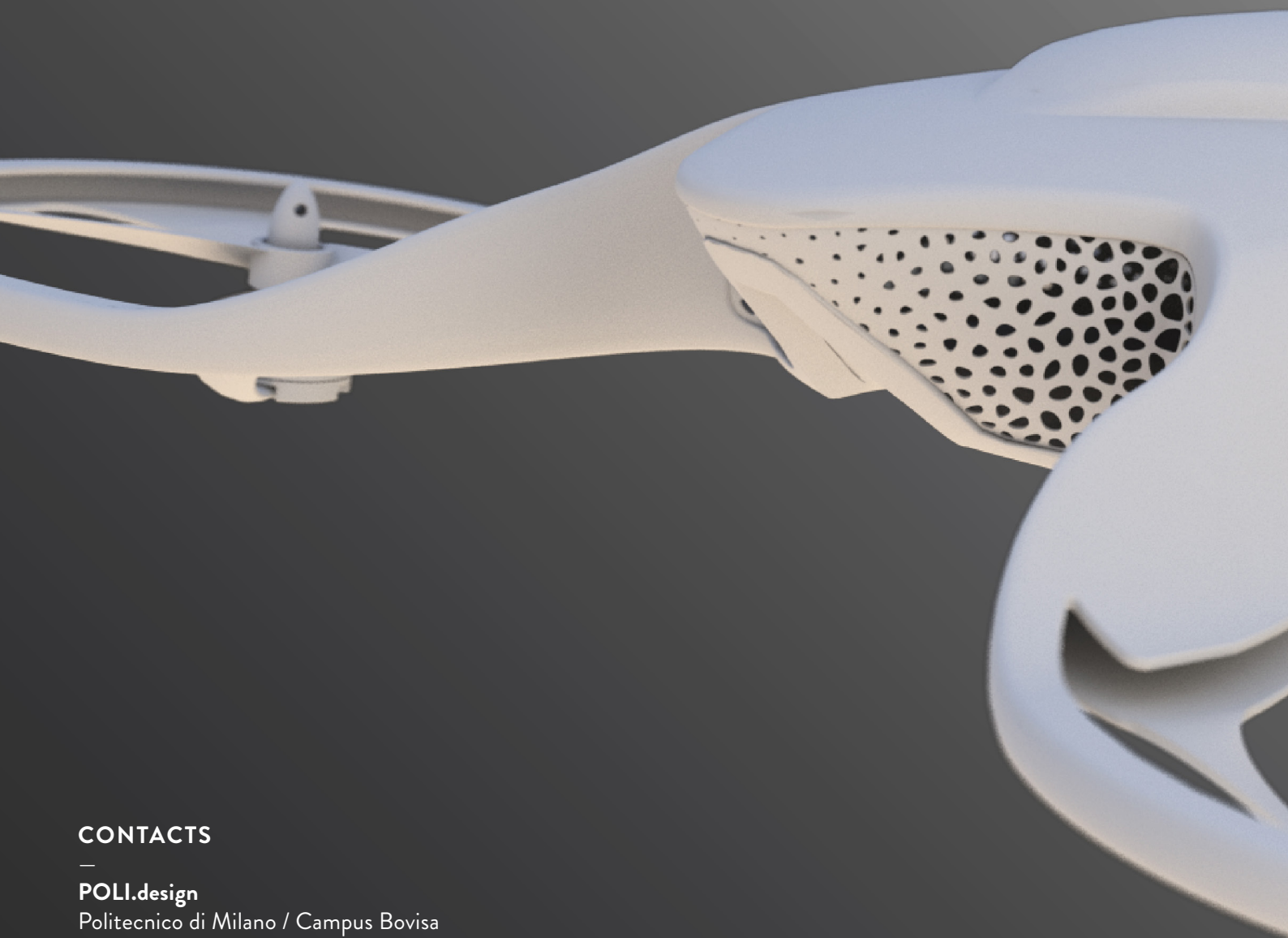
The Specializing Master costs € 13.500 (including Politecnico di Milano enrollment fee of € 500 €)

FACULTY

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Scientific Director

Matteo O. Ingaramo



CONTACTS

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