DIGITAL FABRICATION AND MEDIA
Changing Digital Design into a functional products

Course directors: Ignacio Prieto and Daniel García López

60 IED credits | October - July
Contact classes: 19:00 to 22:00h (2 days a week)
Online lessons: 16:00 to 20:00h (Fr) | 10:00 to 14:00h (Sat)
Intensive attendance-based Workshop: 1 weekend/month
Language of the MA: English

Admission process
CV / motivation letter
Portfolio (no greater than 3MB) / website
Personal interview, if deemed appropriate by the teaching coordinator

Admissions
+34 914 480 444 | info@madrid.ied.es
Aimed at designers, architects, engineers, entrepreneurs, artists, etc. Anyone linked to the field of design. / Course students will receive a certificate. Those who are taking the double qualification with the Fab Academy will also receive the Fab Diploma issued by the Fab Foundation. (attendance is mandatory) / Places are limited.

Price
€15,200 (€3,900 registration fee + €11,300 tuition fee). The Fab Academy (optional) is priced at €5,000, separately from the MA fee Accommodation in Madrid (optional) hospitality@madrid.ied.es
Master in Digital Fabrication and Media

WELCOME TO
THE IED MADRID
Welcome to IED Madrid

With a wide range of training courses in the areas of fashion design, product design, interior design, visual arts, communications and management, it has three spaces in the city, and is the largest Design Campus in Madrid.

Its classrooms, especially designed to accommodate the different specialties of our courses in design, fashion, visual arts and communication, have a library, multimedia laboratories, classrooms for 3D design, fashion workshops with sewing machines, knitting machines, mannequins, irons and model-making laboratories in which to produce models and prototypes, plus two photographic studios (130m²) with natural and artificial lighting and three cycloramas.

In addition to specially designed classrooms that accommodate the different disciplines in our courses in design, fashion, visual arts and communications, the IED Madrid offers facilities such as a screen printing and jewellery workshop, the Lightlab, an analogue black and white processing lab, a workshop for traditional printing techniques with a Riso machine, a Trotec laser cutter, a 3D printer, a fabric analysis lab with microscopes, scales, drying oven and a colour assessment booth, a room for computer-assisted patterns and a plotter to print designs, among other high-tech equipment.

Our experience, spanning more than 20 years, has resulted in an innovative and unique academic model that trains design professionals who are able to adapt to a changing society.

Why study at the IED Innovation Lab?

The IED Innovation Lab is an international networking centre focused on promoting a dynamic collaboration between disciplines, interaction with professionals, hybridization of concepts and prototyping results.

The centre operates around LABS where experts from different fields explore the future of design working with the latest technologies in digital fabrication, electronics, media production, virtual reality, etc.

It is located in what is considered the new creative district of Madrid, 20 minutes by underground from the other IED spaces. The neighborhood offers large-scale workspaces where new designers can work freely, taking advantage of the premises' great functionality.
¿What does it offer professionally?

1. **Networking** between students, professionals and companies working in the same space.
2. Learn, work and conceptualize using the most advanced technologies.
3. Promotion of **entrepreneurship** and the creation of start-ups.
4. The **platform and resources** of the IED Madrid for students’ enrichment with other design disciplines, cultural activities, media events and publications.
**Goals**

Digital Fabrication has enabled the leap from industrial manufacturing—which is hard to access—to affordable and accessible personal fabrication to allow for rapid prototyping in the development of projects.

With this course, you will learn to handle a digital workflow, in both the design and prototyping stages, learning to distinguish between different manufacturing processes for prototyping and designing your projects efficiently and quickly.

You will also learn to make your designs "smart" by equipping them with connectivity, interaction and responsive design. You will learn to do this in four steps: integration of electronics in the design, programming electronics, mechanical outputs so that your projects "do things" and interaction between your projects and their environment.

You will learn while you work on your projects, through learning by doing, combined with the knowledge offered by the best international faculty and the facilities of the Fab Lab IED Madrid, which you will have free access to all day long, so you can work on your prototypes and experiments.

① Understand manufacturing processes and contemporary rapid prototyping
② Develop your creativity and ability to solve design problems while providing specific solutions to real manufacturing problems
③ Lend your projects the ability to interact and respond to the environment around them
④ Enhance your digital representation skills and computer modeling
⑤ Understand difficulties of bringing a product to market
⑥ Obtain a roadmap of the many processes of technological development that are emerging and learn to incorporate them into your projects

**Professional opportunities**

Professionals who work simultaneously in global design and physical development of projects, achieving a great (the best) skill for companies specialize in rapid solutions to specific problems (communication, publicity, studios, etc.) or those who want to control the whole process between design and development of their products.

① Design lead
② Process and Prototyping manager
③ Product engineering
④ Product specialist
⑤ Embedded designer and developer
⑥ Fab Lab Manager
⑦ Workshop and facilities manager
If in this new century, as society, we are entitled to give meaning, shape and order to a world that is being transformed by the use of digital ones and zeroes, then as designers, we are bound to be the ones able to read and decode this digital entanglement into analog means that are useful and have a purpose in our tangible world.

Course directors

Ignacio Prieto
Architect specialized in infographics and 3D modeling. Run the Fab Lab IED Madrid together with Daniel García and teaches the courses of Digital Fabrication in MediaLab Prado (Madrid).

Has been Manager in Fab Lab UPM and has taught classes, seminars and workshops in the UPM, CEU and IED Madrid. In the professional field, as freelance, has developed projects of Digital Prototyping, Design, infographics and Interior Design through his carpentry workshop.

Daniel García López
Run the Fab Lab IED Madrid together with Ignacio Prieto and teaches the courses of fabrication in the MediaLab Prado (Madrid). Architect and Master in Advanced Architectural Projects (MPAA).

Was Manager of the Fab Lab in the Polytechnic University in Madrid (UPM) and has taught at several universities like UPM, IED Madrid, CEPT University or Camilo José Cela University.

As an Architect, he was founder member of Papalagi Studio, a national and international competition award winner.
Master in Digital Fabrication and Media Programme
What you will learn

The Master in Digital Fabrication and Media aims to teach all the knowledge required for project development, starting from the conceptual phase, development of the physical prototypes, until the final models are achieved, examining their final position on the market.

After this training, you will be able to:

1. Take the step from project ideas to working prototypes and make the leap into the market, controlling each stage of development and costs
2. Know and control manufacturing and prototyping processes to implement and improve products
3. Use interaction and programming to integrate intelligent behaviours into your designs
4. Create an ecosystem of connected products (IoT and wearables)
5. Use design tools and computer modeling to take advantage of a digital workflow, from the computer to the physical prototype
6. Use and discretize digital manufacturing machines and processes
7. Develop specific mechanical tools for concrete solutions. Not only will you learn to use existing machines but to create your own special purpose machines (Machines That Make)
8. Use interaction and programming to integrate intelligent behaviours into your designs

Programme

The master's programme covers all areas which you must understand in order to handle designs with rapid prototyping and "smart" objects with connectivity and interaction with their environment.

The teaching method consists of Learning by Doing, where, on the basis of theoretical lessons with the best professionals in each sector, you will develop practical tutored exercises at the Fab Lab IED Madrid.

The master's programme is divided into two blocks. The first (March to June) addresses design and digital manufacturing, and the second (September to December) focuses on how to embed "intelligence" to your prototypes. This will be learnt in four steps: integration of electronics in the design, programming electronics, mechanical outputs so that your designs generate responses and interact with their environment. These two blocks are complemented by a module on entrepreneurship where you will learn how to turn a project into a real viable product on the market and a Final Project where you can implement all the knowledge acquired during the master.
How we do it

The teaching methodology of the IED Innovation Labs constitutes the convergence of the theoretical knowledge of the best international professionals with their practical development in the Fab Lab, a prototyping laboratory fully equipped with everything necessary for the whole development of projects. During the week you develop in a practical manner everything you have learned during the lectures guru’s and mentor’s sessions.

Organization of each module:

- **ONLINE SESSIONS**
  Theoretical content and review of the work carried out during the week by online connection with the teacher, for your queries and interact with him.

- **PRACTICE AT FAB LAB**
  In addition to free access to the Fab Lab, you will have tutorials with specialized teachers to help you with the practical implementation of your exercises.

- **INTENSIVE WORKSHOP**
  Each module ends with an intensive workshop of 4 days to develop a project that will include all the knowledge learned during the module.
Programme

MODULE 1
CAD (Computer-Aided Design)

Computer-aided design is the basis for the development of digital manufacturing projects. In this module, coordinated by Andrés González, the global director of the Rhino Fab Studio programme at McNeel, you will learn not only the necessary tools for 3D modeling and parametric design, but also the best workflows to make the most of the potential of digital prototyping.

- 2D vector drawing in Rhino
- 3D modeling in Rhino
- Modeling by surface subdivision with TSplines
- Generative drawing and parametric design with Grasshopper
- Rendering and imaging with Maxwell Render
- Workshop: generative natures

MODULE 2
CAM (Computer-Aided Machining)

Working directly with the digital prototyping machines at the Fab Lab IED Madrid, you will learn to select manufacturing processes and apply them to the development of prototypes. You will be able to optimize your designs to make the most of the potential of the digital workflow between computer design and digital manufacturing (CAD-CAM).

- Design flow and digital prototyping
- Manufacturing processes
- Laser cutting
- 2D CNC milling machine
- 3D CNC milling machine
- 3D printing
- 3D scanner and digitization
- Design and prototyping workshop

MODULE 3
Composite Manufacturing and Industrial Processes

Manufacturing processes involving several techniques and greater scalability. Traditional manufacturing process reconverted to the design and digital prototyping flow. New materials and new techniques, with an awareness of the transition from prototyping to industrial manufacturing.

- Processes combining manual and digital techniques
- Production of molds through Digital Design and Manufacturing
- High repeatability parts, made by molding and casting. Materials and techniques
- Composites. Working with fibers (glass, carbon, natural fibers, etc.) and resins
- Laminates
- Production scalability. Going from prototyping to mass production
- Industrial manufacturing techniques
- Workshop: development of a project using molding and composites

MODULE 4
Electronics Design

Learn about the physical properties of electronics, to design and manufacture your own circuits using digital manufacturing, milling plates and welding the components.

- Electrical signals
- Current and voltage
- Electronic components and their function (from resistors and capacitors to ICs and MCUs)
- Electronic circuits
- CAD design systems for Printed Circuit Boards (PCB)
- Manufacturing and testing of PCBs
- Workshop: application of electronics in wearables (e-textiles)
MODULE 5
Programming and Communication

Understand programming languages (primarily Arduino, among others) with which to programme the circuits that you need to develop or existing prototyping plates, so that they are able to manage information (from sensors, databases, etc.) and convert it into specific actions (with actuators, engines, etc.).

- Arduino IDE
- Digital and analog inputs and outputs
- Time management
- Using libraries
- Use of motors, displays, capacitive sensors, etc.
- Communication (serial and wireless)
- Firefly (Arduino-Grasshopper link)
- Programming with Raspberry Pi
- Wearables
- Internet of Things (IoT) and home automation
- Workshop: wearables

MODULE 6
Robotics and Mechanical Design

Application for design and the development of machines and gadgets that combine the mechanical design of hardware with programming to perform specific tasks. This module aims, as an introduction, to present a broad spectrum of advanced application of the concepts studied during the master, for the creation of complex behaviors.

- Types of microcomputers and programmable shields
- Mechanical design
- Machines that Make (MTM)
- Workshop: building a machine that does something

MODULE 7
Digital Arts and Interaction

Take advantage of the tools offered by digital manufacturing in combination with new tools focused on innovation and experimentation in the field of creativity, using digital means. The student will be situated in the new paradigm of digital art.

- Visual / graphic programming. Processing, OpenFrameworks, Max MSP, etc.
- Communication protocols. Serial, OSC, etc.
- Real-time video and mapping
- Physical Computing. Sensors and actuators
- Workshop: Interaction and manufacturing

MODULE 8
Business and Practice

Coordination and market insertion of a project, looking at everything from collaboration tools and PR to cost calculation and authorship management. All you need to put a product on the market, with attention to at risk management and cost control.

- Methodology and project development
- Work management and PR tools (version control and web)
- User experience and going from the project to the product
- Start-ups and insertion of a product on the market
- Cost control (production / distribution / marketing)
- Patents, copyrights and open source projects
MODULE 9
Final Project

In the final project you will put to the test all the knowledge acquired during the master, with a comprehensive development of the project from its conceptual foundation to a fully operational prototype, on a formal and mechanical level, which you yourself will have prototyped and programmed under the supervision and tutelage of the faculty.

OPTIONAL - MODULE 10
Fab Academy

The Fab Academy program started in the MIT’s Center for Bits and Atoms, and has grown into a global network of more than 500 Fab Labs.

Directed by Neil Gershenfeld, the program consist in global lectures broadcasted every Wednesday and local access to the machines of the Fab Lab IED Madrid with a local instructor, who supervise and assist in the projects.
MASTER IN DIGITAL FABRICATION AND MEDIA

INFORMATION
60 IED credits
October 2018 - July 2019
Contact classes
19:00 to 22:00h (2 days a week)
Online lessons
14:00 to 20:00h (Fr)
10:00 to 14:00h (Sat)
Price
€15,200 (€3,900 registration fee + €11,300 tuition fee)

CONTENT
Module 1 CAD (Computer-aided Design)
Module 2 CAM (Computer-aided Machining)
Module 3 Composite Manufacturing and Industrial Processes
Module 4 Electronics Design
Module 5 Programming and Communication
Module 6 Robotics and Mechanical Design
Module 7 Digital arts and Interaction
Module 8 Business and Practice
Module 9 Final Project

MASTER IN DIGITAL FABRICATION AND MEDIA + FAB ACADEMY

INFORMATION
90 IED credits | October 2018 - July 2019
Contact classes
19:00 to 22:00h (2 days a week)
Online lessons
16:00 to 20:00h (Fr) | 10:00 to 14:00h (Sat)
Price
€20,200
(€5,000 Fab Academy + €15,200 Master in Digital Fabrication)

CONTENT
Module 1 CAD (Computer-aided Design)
Module 2 CAM (Computer-aided Machining)
Module 3 Composite Manufacturing and Industrial Processes
Module 4 Electronics Design
Module 5 Programming and Communication
Module 6 Robotics and Mechanical Design
Module 7 Digital arts and Interaction
Module 8 Business and Practice
Module 9 Final Project
Module 10 Fab Academy
DIGITAL DESIGN AND MANUFACTURING

INFORMATION
22 IED credits
October - December
Contact classes
19:00 to 22:00h (2 days a week)
Online lessons
16:00 to 20:00h (Fr)
10:00 to 14:00h (Sat)
Price
€5,100 (€1,200 registration fee + €3,900 tuition fee)

CONTENT
Module 1 CAD (Computer-aided Design)
Module 2 CAM (Computer-aided Machining)
Module 3 Composite Manufacturing and Industrial Processes

ELECTRONICS AND MEDIA PROTOTYPING

INFORMATION
21 IED credits
January - May
Contact classes
19:00 to 22:00h (2 days a week)
Online lessons
16:00 to 20:00h (Fr) | 10:00 to 14:00h (Sat)
Price
€5,100 (€1,200 registration fee + €3,900 tuition fee)

CONTENT
Module 4 Electronics Design
Module 5 Programming and Communication
Module 6 Robotics and Mechanical Design
Module 7 Digital arts and Interaction

FAB ACADEMY

INFORMATION
30 IED credits
January - June
Online lessons
Wednesday 15:00 to 18:00h
Contact classes
19:00 to 22:00h (1 day a week)
Access to Fab Lab
9:30 to 22:00h (Monday to Friday)
Price
€5,000 (desglose, reserve)

CONTENT
Module 10 principles and practices / project management
computer-aided design / computer-controlled cutting / electronics production / computer-controlled machining / embedded programing mechanical design / output devices / machine design / molding and casting / input devices composites / networking and communications / interface and application programming / applications and implications / inventions, intellectual property and income
The IED in the world.
Global Design

Madrid
Barcelona
Cagliari
Como
Florencia
Milán
Río de Janeiro
Roma
São Paulo
Turín
Venecia
GENERAL INFORMATION

ISTITUTO EUROPEO DI DESIGN
C/ Larra, 14 – 28042 Madrid. Mercantile register: Tome 7617, Book 0, Folio 201, Section 8, Page no. M – 123999, 1st registration.
Director IED Madrid: Dario Assante.

The IED offers Official Degrees in Design - Graphic Design, Product Design, Interior Design (code 28073045), whose training leads to the obtaining of an official and recognized qualification by the Education Department of the Madrid Region, order number 364/2010, of the 2nd of February, 2011. Provisional study plans, pending approval. Itineraries in the process of being regulated by the Madrid Region. The IED also teaches courses leading to its own qualifications, which do not lead to an official qualification, – three-, two- and one-year courses, MAs, advanced training, online courses, specialization and summer courses. In some cases, special technical skills will be required.

Courses are attendance-based, blended or online. For any information on the duration of each course, start and end date, number of teaching hours and practical hours, please see the leaflets for each department, available to all students. The cost of school materials, depending on the course chosen, ranging between €20 and €160. Additionally, the cost of the necessary materials to carry out projects ranges, depending on the course chosen, between €30 and €270. In the training programs in photography, the purchase of photographic material (camera, lens ...) should be considered as an added cost, in the event of not having it. The cost of this material will be the responsibility of each student, taking into account that the IED offers its students the use of its IT, fashion and product design workshops.

The courses are taught from Monday to Friday at the premises of the IED, and, occasionally, on Saturdays and Sundays. The timetable runs from 9:00 to 23:00.

The minimum number of registrations to carry out a course is 5 students. The hours mentioned in each programme include teaching hours, project tutorials, practical classes in laboratories and cultural visits, depending on each course.

The IED offers a Professional Guidance Service to its students, as well as the practical experience agreement form (a maximum of 400 hours) and the list of available companies.

The registration period opens eleven months before the start of the course, and closes once the available places have been filled. The annual fee is divided into a registration fee and a course fee. The registration of each place will be formalized by means of the payment of the registration fee. The IED recognizes students’ right to drop out of a course in certain cases. This information, as well as that describing the causes, formalities and consequences of the resolution of the contract, is included in the general regulations, available to the public at the offices of the Information and Guidance Service and Administration Department.

The IED organizes a yearly competition to offer a grant which may cover the course fee. As of the publication of this leaflet, the IED Master Madrid has a faculty of active professionals made up of 15 PhDs, 145 graduates and 53 professionals with other qualifications. The prices of the courses depend on their duration, the credits offered, the language in which they are taught and the provenance of each student. For more information please write to info@madrid.ied.es.

REGISTRATION FEE PAYMENT: BANK DEPOSIT AND SUBMISSION OF THE BANK RECEIPT BY FAX TO 91 448 01 22 OR E-MAIL TO INFO@MADRID.IED.ES SPECIFYING THE NAME OF THE STUDENT.
CRÉDIT CARD (VISA, MASTERCARD). PAYMENT OF THE COURSE FEE: A single payment of the total course fee (by means of one of the payment options listed for the registration fee), to be paid one month prior to the start of the course. Payment in instalments by financing the course fee through a financial institution, processed one month prior to the start of the course, as described in the information leaflet available to students at the Information and Guidance Service and Administration offices of the IED Madrid.
Acceptance is subject to approval by the financial institution.

The ISTITUTO EUROPEO DI DESIGN, S.L reserves the right to update, modify or remove the information contained in this information leaflet. Additionally, the company fulfils all personal data protection security measures as stated in RD 1720/2007.
TRA IN I NG P R O G R A M M E S O N O F F E R A T T H E I E D M A D R I D

Official Undergraduate Degree in Design
Higher Level Training Cycle
Three Year Course
One Year Course
Summer Courses
Junior Courses
Kids Courses

Masters
Blended Masters
Masters of Design and Innovation
Postgraduate Courses
Weekend Courses
Online Courses

Fab Lab IED Madrid
Avenida Pedro Díez 3, 28019 Madrid
+34 914 480 444
info@madrid.ied.es
Skype: master.iedmadrid

IED Madrid
Calle Flor Alta 8, 28004 Madrid
facebook.com/IEDmadrid
twitter.com/IEDmadrid
instagram.com/IED.madrid

IED Master Madrid
Calle Larra 14, 28004 Madrid

IED Network: Madrid, Barcelona, Cagliari, Como, Florencia, Milán, Río de Janeiro, Roma, São Paulo, Turín, Venecia

fablab.iedmadrid.com