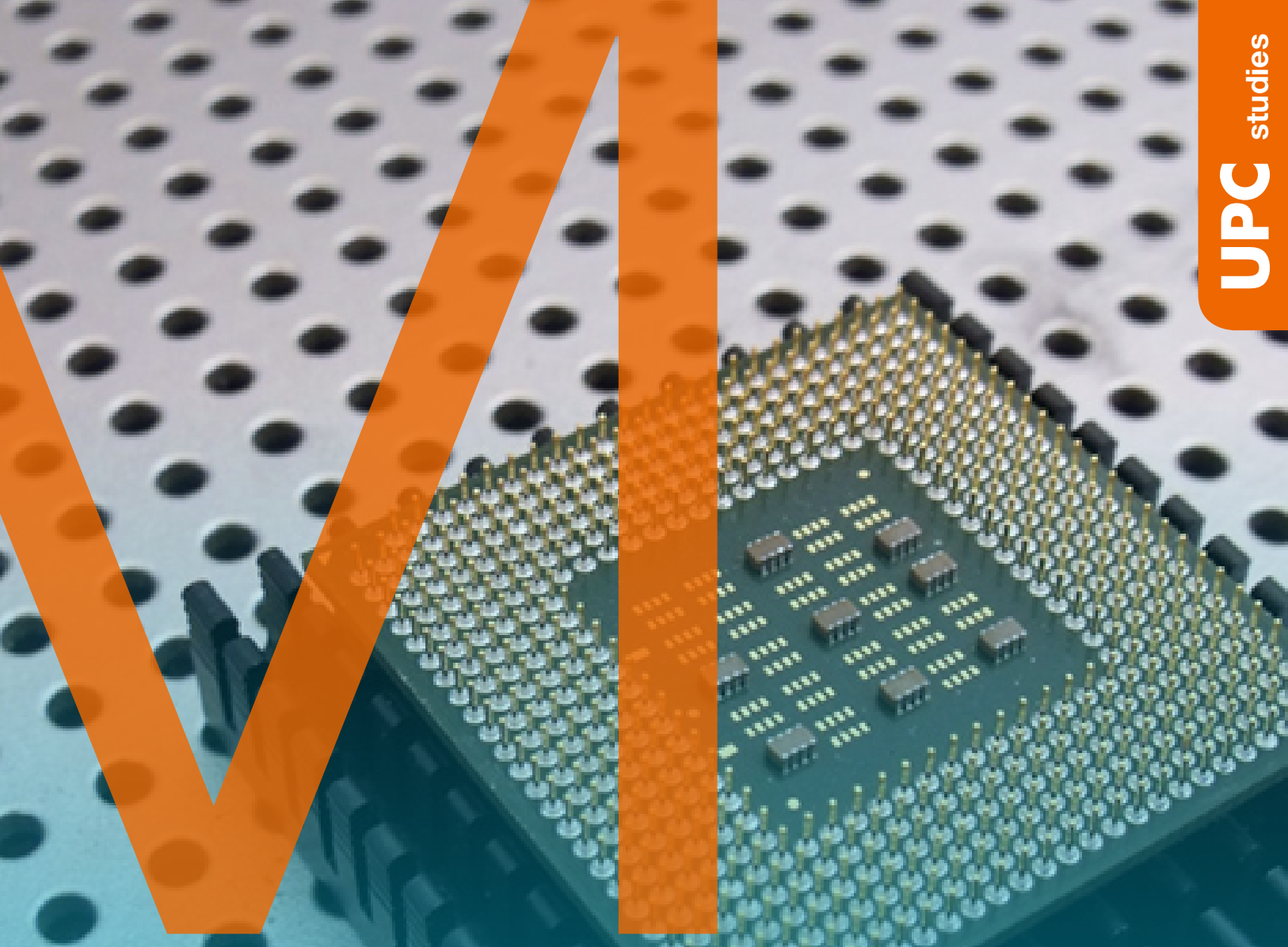
UPC studies



MASTER'S DEGREE IN SEMICONDUCTOR ENGINEERING AND MICROELECTRONIC DESIGN

ETSETB
Barcelona School
of Telecommunications Engineering

UNIVERSITAT POLITÈCNICA
DE CATALUNYA
BARCELONATECH

MASTER'S DEGREE IN SEMICONDUCTOR ENGINEERING AND MICROELECTRONIC DESIGN

1st
Spanish university in Telecommunications, Electrical and Electronic Engineering
Source: QS World University Rankings by Subject (2024)

The main objective of the master's degree is to train professionals who are capable of designing and manufacturing microelectronic devices and systems (chips) for both general and specific purposes (memories, communications, integrated power systems, sensors). It is also to teach students to be able to adapt to a constantly changing technological world and to understand the current microelectronics industry, technological opportunities and predominant business models. Experts in Semiconductor Engineering and Microelectronic Design must be able to respond to engineering problems that arise in the fields of modern and emerging electronic technologies and design methodologies, with an emphasis on modern computers and general integrated circuit applications.

This is an interuniversity master's degree organised by the Universitat Politècnica de Catalunya (UPC), the Universitat de Barcelona (UB), the Universitat Autònoma de Barcelona (UAB), the Universitat Rovira Virgili (URV) and the National Microelectronics Center (CNM). It is coordinated by the UPC's Barcelona School of Telecommunications Engineering (ETSETB).

Curriculum

This information may be subject to change.
Up-to-date information is available at upc.edu

60 ECTS credits

Delivery: face-to-face.

Language: 100% in English.

Teaching periods: from mid-September to the end of June, classes in the afternoon.

Places offered: 30.

The master's programme is divided into two branches or specialisations: one in Semiconductor Engineering and the other in Microelectronic Design. Students will need to choose one of the two branches.

1st semester

Microelectronic Design	6
Microelectronic Technologies and Processes	6
Semiconductor Devices	6
Semiconductor Facilities and Device Manufacturing	6
Packaging Characterisation and Reliability	6
Analogue Integrated Circuit Design	6
Integrated Circuit Physical Design	6
SOC Design and Verification	6

Compulsory common subjects Compulsory IC Manufacturing subjects Compulsory IC Design subjects

36
laboratories for practicals

96%
UPC master's degree graduate employment rate

Source: Graduate employment survey of master's degree graduates of Catalan universities by the Catalan University Quality Assurance Agency (AQU Catalunya) 2023

+50%
of students did internships in companies during the last academic year

Recommended applicant profile

For the proper development of studies leading to the master's degree in Semiconductor Engineering and Microelectronic Design, it is recommended that students' entry profile is aligned with the following personal and academic characteristics:

- Students with a bachelor's degree in Electronic Engineering or related areas who have completed at least 30 ECTS credits of content in electronic devices and analogue or digital electronics.
- Understanding, oral expression and written expression in English equivalent to a B2 level.

Specific requirements

The proposed master's programme is open to students with qualifications who have completed at least 30 ECTS credits of content in electronic devices and analogue or digital electronics. For these students, no other specific technological requirements or entrance exams are established. However, for other qualifications bridging courses (up to a maximum of 12 ECTS credits) will be proposed if necessary to standardise the level of candidates based on their entry profile.

Teaching objectives

Common training module.

Subjects comprising the module common to the two specialisations amount to a total of 20 ECTS credits (30 if we include the 10-credit Master's Thesis). These 20 credits are divided into three compulsory subjects of 6 ECTS credits each and one subject of 2 ECTS credits, the latter consisting of an academic space for seminars and conferences by external professors and experts.

Compulsory specialisation training module.

Compulsory specialisation subjects are divided into two sets of subjects that are taught in parallel during the master's programme, one corresponding to the Semiconductor Engineering specialisation (18 ECTS credits) and the other corresponding to the Microelectronic Design specialisation (18 ECTS credits).

Teaching methodologies

Students achieve the objectives of the degree through lectures, problem-solving classes, laboratory classes and presentation of works and technical and scientific articles. All master's programme activities/subjects contain a significant laboratory activity component.

2nd semester

Innovation, Entrepreneurship and Leadership	6
Seminars on the Microelectronics Industry and Advanced Research	2
Material Characterisation	4
Integrated Photonics	4
Power Devices and Systems	4
Microsensors	4
Emerging Technologies for Computing	4
Flexible and Printed Electronics	4

RF Integrated Circuit Design	4
ASIC Design Techniques for High Security Systems	4
Advanced IP Core Design	4
Integrated Sensors and Circuits for Imagers and Radiation Detectors	4
Mixed Signal IP Design	4
Power Management Circuits in ASICs	4
Master's Thesis	10

Compulsory common subjects Optional IC Manufacturing subjects Optional IC Design subjects

MASTER'S DEGREE IN

SEMICONDUCTOR ENGINEERING AND MICROELECTRONIC DESIGN

The **Barcelona School of Telecommunications Engineering (ETSETB)** has been an institution dedicated to teaching and research in the field of ICT since 1971. It has strong relations with the industry sector and develop an innovative activity though professors and researchers that reverse into the business and productive sector.

The **ETSETB** is a school of the **Universitat Politècnica de Catalunya - BarcelonaTech (UPC)**, a benchmark public institution of research and higher education in the fields of engineering, architecture, science and technology. With 50 years of history and more than 30,000 students, the UPC has the greatest concentration of research and innovation in IT in southern Europe. It is the best Spanish university in Telecommunications, Electrical and Electronic Engineering, according to the 2024 QS World University Rankings by Subject.

telecos BCN

Telecommunications, engineering for the 21st century

Further information:
masters.etsetb@upc.edu

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Centro Nacional de Microelectrónica IMB
UNIVERSITAT POLITÈCNICA DE CATALUNYA BARCELONATECH
Barcelona School of Telecommunications Engineering