

Founded in 1816, member of the GEM-network (Groupe des Ecoles des Mines), ENSM-SE is one of the highly selective French "Grandes Ecoles" dedicated to the task of educating engineers and researchers responsive to industry demands. The school's pioneering spirit has been nurtured for nearly two centuries through its exploration of new scientific themes and international partnerships, which makes it a unique player among the top 15 French "Grandes Ecoles d'Ingénieurs".

ENSM-SE provides students and young researchers with an optimal learning environment and offers a wide range of graduate and post-graduate courses in fields of research as varied as materials sciences, microelectronics, biomedical engineering, IT,

chemical engineering, environmental and industrial engineering.

The school's expertise is based on innovative teaching methods combining lectures and individual and group project work carried out in a corporate context. Strong industry relationships, research -inspired learning and state-of-the-art equipment constantly foster innovative projects in education and research.

Today, France educates more international students than any other country except the United States and the United Kingdom. We select international graduate and postgraduate students of high caliber.

Do you feel like joining us?

ÉCOLE NATIONALE SUPÉRIEURE DES MINES DE SAINT-ÉTIENNE



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> MASTER OF SCIENCE

- Accredited by the French Ministry of Higher Education and Research
- Delivered by Ecole Nationale Supérieure des Mines de Saint-Etienne

(1) Historical campus founded in 1816

(2) New campus opened in 2008

MICROELECTRONICS and NANOELECTRONICS

Master program proposed by the
Centre Microélectronique de Provence (CMP)

This 2-year master, taught in French, aims to provide a high level education, an introduction to research and professional integration in the fields of microelectronics, nanoelectronics and nanotechnology. This masters offers a large training curriculum which covers the 3 domains of micro and nanoelectronics:

- physics and material sciences
- microelectronics and nanoelectronic devices
- design and architecture of integrated circuits

PROGRAM STRUCTURE

I. First year (M1)

• First semester (30 ECTS):

- Semiconductor physics
- Quantum and statistical physics
- Magnetism
- Signal processing
- Computer Science

• Second semester (30 ECTS)

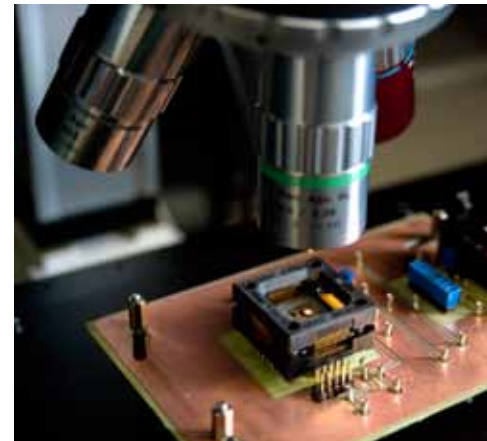
- Quantum mechanics
- Device physics & optoelectronics
- Advanced MOS devices
- Numerical techniques
- + work experience (2 months min.) in a research lab. or industry

II. Second year (M2)

• First semester (30 ECTS) : theoretical modules

The microelectronics master offers 2 options:
• Integrated circuit design and system on chip
• RFID architecture and communicating systems
The common-core syllabus deals with microelectronics materials and processes, MOS devices, molecular electronics, flexible electronics, packaging and reliability. The IC design supplementary courses cover memory devices, analog & digital circuits, IC tests, co-design & system on chip. This theoretical teaching is completed by a tutored laboratory project on analog, FPGA or ASIC design. The RFID architecture supplementary courses cover RF architecture, design and modeling, wireless systems & RFID and telecommunication. This theoretical teaching is completed by a tutored laboratory project on RF design and modeling.

The nanoelectronics master provides in-depth courses in fabrication, characterization and modeling tools of nanomaterials and advanced micro/nanodevices. A large part of this masters is dedicated to the specific physical properties/phenomena arising from these ultimate devices and to mono-electronics, molecular electronics, spin electronics and bioelectronics. This theoretical teaching is completed by a tutored laboratory project on numerical simulation.



Career opportunities :

higher education, industry and research centers in the fields of microelectronics, nanoelectronics.

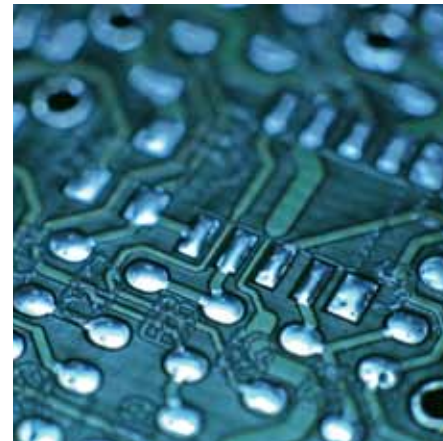
About us :

This master is taught in French by staff of the Aix-Marseille University, the Center of Microelectronics in Provence (CMP) and engineer schools from Marseille-Toulon area.

Admission

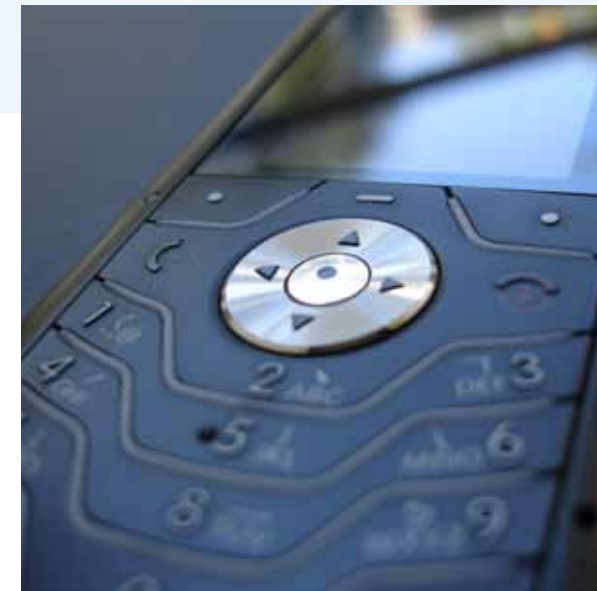
First year (M1) : successful completion of bachelor's degree in Sciences & Technologies

Second year (M2) : successful completion of a first year master degree MINELEC, materials or physical sciences or equivalent diploma.



Main industry partners

ST Microelectronics, Freescale, Texas Instrument, Amadeus, ST Ericsson, Gemalto, NXP, CEA, IMEC,



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