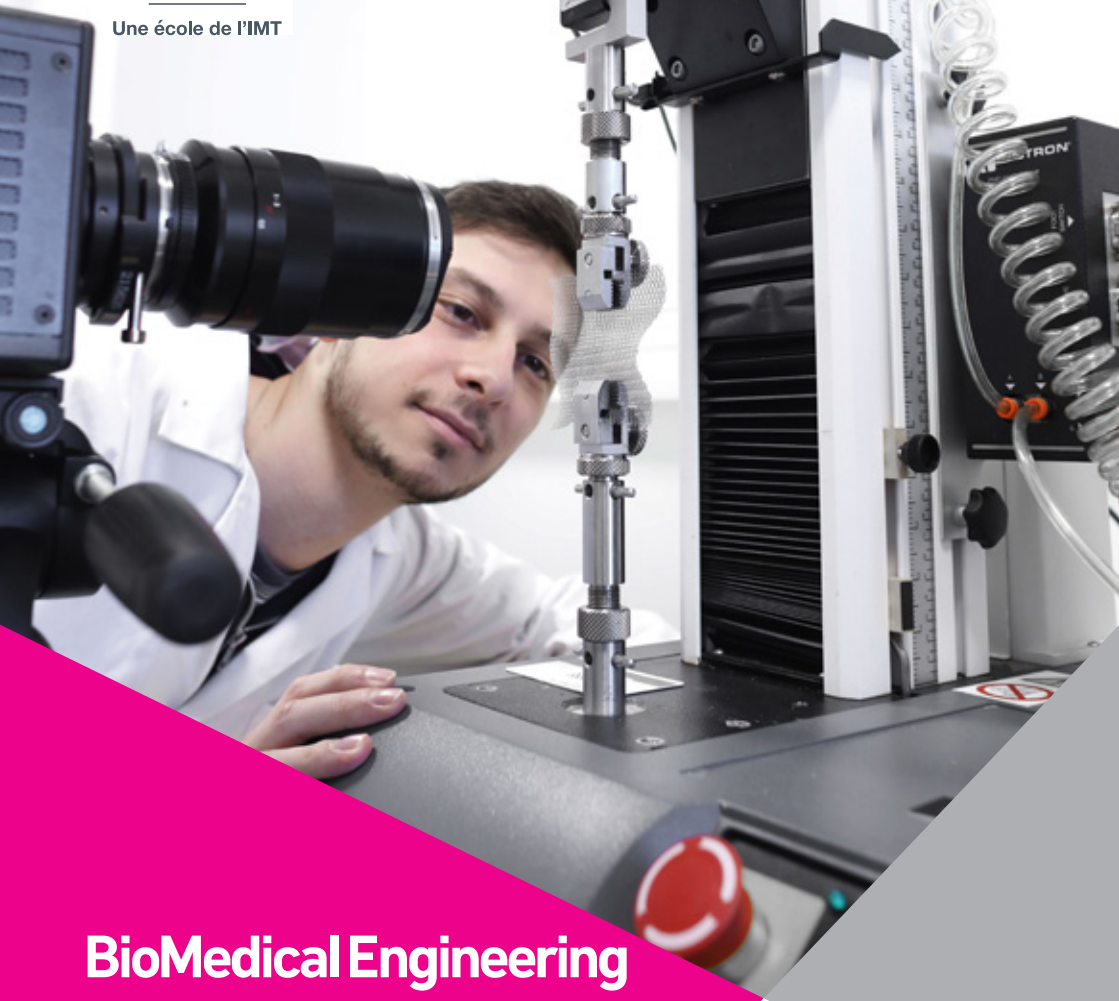




MINES  
Saint-Étienne

Une école de l'IMT

Welcome to  
MINES Saint-Étienne!



# BioMedical Engineering & Design

Master of Science

[www.mines-stetienne.fr](http://www.mines-stetienne.fr)



INSPIRING  
INNOVATION  
SINCE 1816

# « Improving health through science and engineering »

**A Master of Science** (National Masters' Degree)  
Accredited by the French Ministry of Higher  
Education and Research  
at the *École Nationale Supérieure des Mines  
de Saint-Étienne, France*

 **Taught in English**

## A new opportunity for international students

- Taught in English
- A one year program
- Provide the diploma of Master of science
- A key step for PhD studies

## Course structure

**The Master content provides students with the background and the specific requirements to lead projects in the biomedical field, or to join a PhD.**

### **Bioengineering**

- Introduction to biology
- Medical diagnosis tools

### **Biomechanics**

### **Biomaterials**

### **Nano-medicine, nano-toxicity**

### **One advanced course:**

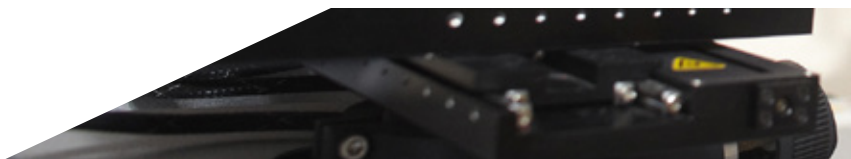
- Advanced Biomechanics
- Advanced Biomaterials

### **One Elective course (choose 1 in the following list):**

- Mechanobiology
- Neuromuscular physiology during exercise
- Biomechanics - Performance
- Human/Machine/Environment interface
- Nanotracers, Nuclear Imaging
- Autonomous nervous system
- Exercises, aging, metabolic disorder
- Child exercise physiology

### **Semester-long research project in the laboratory**

### **6-month internship**



# Internships and PhD Opportunities

- Bioinstructive materials for tissue repair and regeneration
- Spine implants: mechanical tests to find the best design
- Medical device optimization using clinical trials and/or numerical modelling
- Cardiovascular and musculoskeletal biomechanics, computational modeling and experimental studies
- Care pathway mining and optimization
- Dynamic medical resources management

# Requirements for applicants

- Prior successful completion of a first year of a Master's Degree in theoretical and / or applied science, or equivalent diploma (at the home university or Ecole des Mines) / or 240 ECTS validated
- Basic coding skills are required

# Job Opportunities

Graduates may work at the crossroads between healthcare providers, manufacturers and end users, in some of these sectors:

- Engineering of medical devices,
- Design of implants, prostheses,
- Biomedical instrumentation,
- Medical textiles,
- Development of biomaterials
- Bio-electronic devices,
- Healthcare engineering



# With the collaboration of the Education and Research Centre for Biomedical and Healthcare Engineering (CIS).

## Fields of expertise

Mechanics, material science, physico-chemistry, mathematics, computer science, image processing and biology.

## Topics

Biomechanics: soft tissue experimental characterization and computational modeling in interaction with medical devices, cardiovascular bioengineering /  
Biomaterials: bioceramics for bone tissue engineering, biodistribution, biopersistence, bioreactivity of inhaled nanoparticles, biotribocorrosion of implants/  
Healthcare engineering: modeling and optimisation of healthcare systems, hospital logistics and planning

## Industrial sectors

Biomedical devices, augmented medicine  
Pharmacy, healthcare systems  
Sports industry, cosmetics

## Research Units

SalnBioSE (UMR INSERM 1059)  
LIMOS (UMR CNRS 6158)  
LGF (UMR CNRS -EMSE 5703)

## ...and the Centre for Microelectronics in Provence (CMP)

### Fields of expertise

Pioneering Microelectronics for Applications in Flexible Electronics, Secure Hardware, Bioelectronics and Logistics Designing, Prototyping and Secure Characterisation of Circuits

### Topics

Optimisation and operational research in industrial engineering  
Hardware security (smartcard)  
Inkjet Printing on Flexible Substrates for Connected Objects  
Interfacing between Life Sciences and Organic Electronics

### Research Units

UMR : CEA, LIMOS, INSERM Marseilles

### Facilities and specific platform

CIMPACA-MicroPackS Platform:  
Partnership between Business and Academic World  
Clean rooms, Security and Bioelectronics Labs



**La Région**  
Auvergne-Rhône-Alpes

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