Presentazione dei Corsi di Laurea Magistrale in Materials and Production Engineering e Mechatronics Engineering

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Responsabile del Corso di LM in Materials and Production Engineering e del programma di doppia laurea EIT Raw Materials in Sustainable Materials
MPE - Learning outcomes

- To produce and to manage technological innovation
- High level technical/managing positions
- Deep knowledge of science and engineering fundamentals
- Production, quality control and design of materials
MSc in Materials and Production Engineering

**Manufacturing & Product development**
Experts in Materials Engineering with deep knowledge on production and processing technologies

**Energy, environment & sustainable development**
Experts in Materials Engineering highly skilled in materials and processes for the production and transformation of energy

**Engineered materials and biomedical applications**
Experts in Materials Engineering with expertise in materials for biomedical and functional applications

Multi-disciplinary experts in the sustainable management of materials.
Materials used for major vehicle structure components

Materials properties
- Engineering properties of materials
- Physics and Thermodynamic of materials
- Corrosion and degradation of materials
- Metallic materials engineering
- Polymeric and composites materials engineering
- Ceramic materials engineering

Design
- Product design
- Design methods for industrial engineering
- Mechanics and materials for engineering design
- Finite elements modeling

Processing
- Metallic materials engineering
- Polymeric and composites materials engineering
- Ceramic materials engineering
- Steelmaking and foundry technologies
Application of biomaterials for the human body functional recovery

Materials properties
- Engineering properties of materials
- Physics and Thermodynamic of materials
- Corrosion and degradation of materials
- Metallic materials engineering
- Polymeric and composites materials engineering
- Ceramic materials engineering
- Metallic biomaterials and technologies
- Bioinspired and functional materials

Design
- Principles of biomaterials and medical device design
- Biomechanics

Processing
- Metallic materials engineering
- Polymeric and composites materials engineering
- Ceramic materials engineering
- Metallic biomaterials and technologies
- Biomaterials and biomedical Technologies

Source: Manivasagam et al. (2010).
# Study programme

## First Year
- **Metallic materials engineering**: 6 CFU
- **Physics and Thermodynamic of materials**: 6+6 CFU
- **Engineering properties of materials**: 9 CFU
- **Ceramic materials engineering**: 6 CFU
- **Polymeric and Composite materials engineering**: 6 CFU
- **Corrosion and degradation control of materials**: 6 CFU

## Manufacturing & Product development
- **Design methods for industrial engineering**
- **Product Design**
- **Mechanics and materials for engineering design**
- **Finite elements modeling**
- **Steelmaking and foundry technologies**

## Energy, Environment & Sustainable Development
- **Materials for energy**
- **Electrochemistry for energy and environment**
- **Mechanics and materials for engineering design**
- **Nanomaterials, nanotechnologies and smart materials**
- **Recycling and sustainable materials**

## Engineered materials and biomedical applications
- **Principles of biomaterials and medical device design**
- **Biomedical metallic materials & technologies**
- **Fundamentals of mechanics and biomechanics**
- **Bio-inspired and functional Materials**
- **Biomaterials and biomedical Technologies**

## Second Year
- **2 Elective course (12 CFU)**
- **Other activities (3 CFU)**
- **Thesis (18 CFU)**
## Elective courses

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<td>Electronic materials technologies</td>
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<td>Advanced Formula SAE</td>
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<td>Glass engineering</td>
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<td>Interdisciplinary laboratory</td>
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<td>Ceramic materials</td>
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<td>Polymeric materials</td>
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<td>Characterization techniques</td>
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<td>Advanced Metals</td>
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<table>
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<th>Second semester</th>
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<td>Circular economy for materials processing</td>
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<td>Protection of materials and structures</td>
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<td>Powder metallurgy</td>
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<td>Biosignals and transducers</td>
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Dual degrees

This Master’s course offers its students the opportunity to participate in joint Double Degree programs with the following universities:

- Instituto Superior Técnico, Lisboa (Portugal)
- Technische Universität München (Germany)
- Ecoles Centrales Lille/Lyon/Nantes/Marseille, CentraleSupelec-Paris (France)
- EIT Raw Materials Sustainable Materials, KU Leuven (Belgium), INP Grenoble (France), Montanuniversität Leoben (Austria)
Career opportunities span from innovation and development of production, advanced planning and programming, management of complex systems, both as self-employment professionals and in manufacturing and services companies, as well as in public authorities.

Materials engineers may be employed in: chemical, pharmaceutical and processing industries; companies active in the production, transformation, transportation and storage of substances and materials; industrial laboratories; public administration offices for environment and safety management.

With the MS in Materials Engineering graduates will also be able to work as scientists, engineers or managers in many different industries, including R&D Departments of public and private institutions.

Graduates may pursue a PhD in Trento or at international level.
Contact details

International Mobility Office
Science and Technology Area
Via Sommarive, 5 - 38123 Trento, Italy
tel.+39 0461 283236 – 3976
master-st@unitn.it

https://offertaformativa.unitn.it/it/lm/materials-and-production-engineering/iscriversi
EIT Labelled Master Programme in Sustainable Materials

www.master-suma.eu
SUMA Graduates

- Multi-disciplinary experts in the sustainable management of materials.
- Ready for industry, research and policy-making
- Highly qualified to work in areas such as:
  - resource efficiency
  - engineering economy
  - recycling and resource recovery
EIT Labelled Master on Sustainable Materials (SUMA)

- Two years - 120 ECTS
  - Solid technical basis (60 ECTS)
  - Master thesis (24 ECTS)
  - Internship (6 ECTS)
  - Entrepreneurship and innovation (30 ECTS)
Five academic partners - 9 different tracks

- International mobility
- Double Degree
- EIT Label
- Summer school on Innovation and Entrepreneurship and Digitalization
- Industry Advisory Board

Videos:
https://www.youtube.com/watch?v=aYZ3MiBCsNk&t=2s
https://www.youtube.com/watch?v=vlupMDrtwQY
Tracks

SUMA mobility year 1

Track 1
KU Leuven

Track 2
University of Trento (UniTrento)

Track 3
University of Milano-Bicocca (UNIMIB)

Track 4
Montanuniversität (MU) Leoben

Year 1 (60 ECTS) addresses the following topics:
- Materials and processing
- Sustainability and recycling
- Circular (ecodesign and life cycle engineering)
- Materials substitution and manufacturing

Summer school on circular economy

1a. Grenoble INP
1b: UniTrento
1c: MU Leoben
1d: UNIMIB

2a: Grenoble INP
2b: KU Leuven
2c: MU Leoben

3a: KU Leuven

4a: KU Leuven

SUMA mobility year 2

Year 2 (60 ECTS) addresses the following topics:
- Innovation entrepreneurship and leadership (30 ECTS)
- Industrial internship (6 ECTS)
- Master Thesis (24 ECTS)
Practicalities

- EIT Scholarship: 13 500 euro in total
- Double degree + EIT Label certificate

Application procedure

- Online application
  => www.master-suma.eu/how-to-apply
- Pre-screening of CV, background and motivation
- Evaluation interview (by skype/phone)
- Registration at entry university: check of transcripts