Materials and Chemical Engineering for Nano, Bio, and Sustainable Technologies
Master of Science Degree («Laurea Magistrale») in «Materials and Chemical Engineering for Nano, Bio, and Sustainable Technologies»

a «multiscale» course

chemical engineering & materials engineering

molecules processes

nano materials materials
materials and processes are cornerstones of innovation

Key Enabling Technologies
- advanced materials
- advanced manufacturing technologies
- nanotechnology
- micro and nanoelectronics
- industrial biotechnology
- photonics

Emerging Disruptive Technologies
- 3D printing
- Advanced Robotics
- New computing technologies
- Energy capture, storage, transmission
- Ubiquitous linked sensors
- Space technologies
objectives

• solid fundamentals in physics and chemistry
• advanced training in materials engineering and chemical engineering
• focus on hot topics:
  ✓ Advanced industrial technologies
  ✓ Nanotechnology
  ✓ Biotechnology
  ✓ Sustainability
a multidisciplinary environment
...and relaxed!

a multidisciplinary environment
raft_ING - Isonzo river

climb_ING
Val Rosandra
a network of collaborations
- knowledge transfer with companies and institutions -
advanced applied research

biomedical applications
of materials and processes

- (bio)photonics
- cellular mechanics
- nanotechnology
- multiscale simulation
- modeling of transport phenomena
- data science

diagnostics
prosthetics
drugs & drug delivery
advanced applied research

nanotechnology for sensors
advanced applied research

(bio)photonics

(materials imaging for prosthetics)

(imaging of biological tissues)

(non-invasive diagnostics)
advanced applied research

multiscale simulation

(drug mechanisms) (nano-bio interaction) (nanocomposites)
advanced applied research

materials and processes for energy and environment

- synthesis of advanced materials
- characterization
- nanotechnology
- bioconversion
- treatment of solids and liquids
- process modeling
- Life Cycle Assessment
advanced applied research

nanotechnology for sustainable energy

(nanostructures for photovoltaics and photocatalysis)
advanced applied research

materials for sustainable energy production

(ceramic materials for thermal barrier coatings)
advanced applied research

materials for energy efficiency

(recyclable natural composite materials for thermal insulation)
from research to classroom

molecular simulation

spectroscopic methods of analysis

materials for the energy transition

ceramic materials

polymers and composites

soft materials

sustainable industrial chemistry

chemical and biochemical reactors

process simulation

design of sustainable materials and processes

dynamics and control of chemical processes

nanomaterials and biomaterials

research
laboratories

chemistry and nanotechnology labs
materials characterization
electron microscopy
atomic force microscopy
spectroscopy and imaging
photovoltaic laboratory
solid and liquid treatment lab
molecular simulation lab
Area tecnologico-scientifica

laboratories

ranked in the top three for labs!

chemistry and nanotechnology labs
materials characterization
electron microscopy
atomic force microscopy
spectroscopy and imaging
photovoltaic laboratory
solid and liquid treatment lab
molecular simulation lab
student satisfaction

quality teaching 8.2/10 (among the best at UniTS!) average evaluation of the single courses

teachers for students 9/10 average evaluation for availability of the teachers

a great experience 85% of graduated are satisfied (AlmaLaurea) (would re-enroll in the same course)
(speaking of her new university)

«[...] almost nobody has solid bases of math, chemistry, physics. In class you’ll often see advanced topics and yet at the same time the teacher has to go back to the fundamentals. A disaster....

[...] Teachers don’t teach. It’s all projects, presentations, case studies, reports, practicals.

[...] Moreover, there’s a lot of «technical» and very little about «science», and I don’t like this...

[...] In the end: go Materials and Chemical Engineering in Trieste! ... where you learn a lot!»
a trampoline for the World
from research to enterprise

**patents**
10% of patents at UniTrieste

**startup**
from student to entrepreneur

**support**
teachers have entrepreneurial experience

**successi**
- StartCup FVG (3 first places, 1 third place)
- National Innovation Prize, 2° e 5° place
- Special Prize for Innovation
- European Young Entrepreneurship Award

10% of patents at UniTrieste

Next Generation Leaders

Material Can

Genefinity

Maxun
will you get a job?

quickly enter the job market

100% of students are employed within 3 years

an all-round professional

✓ can be employed in any kind of industry
✓ can work in research and innovation

70% industry 30% research and academia
will you get a job?
will you get a job?

education that pays!

<table>
<thead>
<tr>
<th>Field</th>
<th>Annual Salary</th>
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<tbody>
<tr>
<td>25-34 anni</td>
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<tr>
<td>Ingegneria Chimica e dei Materiali</td>
<td>63,579</td>
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<tr>
<td>Ingegneria Gestionale</td>
<td>59,651</td>
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<tr>
<td>Scienze giuridiche</td>
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<tr>
<td>Scienze economiche</td>
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<tr>
<td>Ingegneria Meccanica, Navale, Aeronautica e Aerospaziale</td>
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<td>Scienze mediche</td>
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<td>TOTALE LAUREATI</td>
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<td>35-44 anni</td>
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<tr>
<td>Ingegneria, architettura e scienze delle costruzioni</td>
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<td>Scienze matematiche e fisiche</td>
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<td>45-54 anni</td>
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<td>(annual salary)</td>
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study program

- entirely renewed
- aligned with global and European strategies
- flexible

- Design your own study plan around one of three hot topics
- Focus on either chemical engineering or materials engineering

Details: corsi.units.it/in17/ingegneria-processo-materiali
general information

The course is an interclass degree («laurea interclasse»)
(a merge of the MS in Chemical Engineering LM-22 and the MS in Materials Engineering LM-53)

Before the beginning of the 2° year, the student is required to choose the «class» of his/her degree:
either «Ingegneria Chimica (LM-22)» or «Ingegneria dei materiali (LM-53)»

<table>
<thead>
<tr>
<th>Credits</th>
<th>Description</th>
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<tbody>
<tr>
<td>90</td>
<td>Characterizing courses (TAF B) or complemtary («affini») (TAF C)</td>
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<td>15</td>
<td>Elective courses</td>
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<tr>
<td>3</td>
<td>Internship</td>
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<td>12</td>
<td>Thesis project</td>
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<td>120</td>
<td>TOTAL</td>
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B2 level of English or equivalent is required
CONTACT INFO

Dipartimento di Ingegneria e Architettura

www.dia.units.it
segreteria@dia.units.it
040 558 7300

Coordinator
Orfeo Sbaizero
sbaizero@units.it

Detailed information
corsi.units.it/in17/ingegneria-processo-materiali
Vanni Lughi - vlughi@units.it
www.units.it
Un mare di ragioni per studiare a Trieste