Materials Science & Engineering is an interdisciplinary field applying the properties and applications of matter to various areas of science and engineering.

<table>
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<tr>
<th>Diploma</th>
<th>Master of Science Materials Science and Engineering</th>
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<tr>
<td>Credits</td>
<td>120 ECTS, 24 months</td>
</tr>
<tr>
<td>Starts in</td>
<td>September, February</td>
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<tr>
<td>Language of instruction</td>
<td>English</td>
</tr>
<tr>
<td>% international students</td>
<td>50%</td>
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If asphalt could be designed so that it repaired itself, all that inconvenience and congestion that results from road repair would be a thing of the past. And if lighter materials could replace the current metals in auto bodies at an affordable price, far less fuel would be required to get from point A to point B. Those challenges are the sort that materials engineers and materials scientists confront every day in their work.

Materials Science & Engineering is concerned with the development of materials that meet and exceed performance expectations for specific functions. It is also concerned with the manufacturing processes that convert basic materials into final engineered products and the design of innovative new materials for the continuously evolving needs of society.

The MSc Programme in Materials Science & Engineering combines studies of the physical, chemical and mechanical properties of materials with the training in production techniques and the selection of appropriate materials for a wide range of applications.

In the programme, you will gain an understanding of the behaviour of materials under different conditions and learn how to assess their suitability in products and industrial processes. You will study the design of new material properties at nano and micro levels to suit applications on a macro scale. The programme focuses in particular on the design of new materials, including, for example, self-healing materials. Covering subjects from atoms to applications and from design to disposal, the Materials Science & Engineering programme is well-suited to meet the expectations of students with a more theoretical background and those with backgrounds in applied science or engineering.

Programme
The programme starts with core courses offering a firm grounding in Materials Science. Subsequently students choose a specialisation, which is a consistent set of courses focussing on a particular topic. This can be either one of the predefined specialisations, which may also include an internship, or students can choose to compose their own specialisation. Finally students undertake a literature study and an independent scientific investigation leading to a master’s thesis.
Specialisations

- Materials in Engineering Applications (MEA)
  The focus is on the usage of materials in applications and structures by paying attention to processing, joining, selection and failure of materials. An obligatory internship is part of this specialisation.

- Metals Science and Technology (MST)
  Attention is paid to the design and performance of metallic microstructures by considering aspects like phase transformations, strengthening mechanisms and processing and by studying computational materials science and corrosion science.

- Materials for Sustainable Development (MSD)
  The emphasis is on materials engineering in the context of sustainable resources (materials and energy) and environmental impact. Concepts such as clean energy technologies, high temperature performance and recycling of materials are discussed.

- Metals Science and Technology (MST)
  Attention is paid to the design and performance of metallic microstructures by considering aspects like phase transformations, strengthening mechanisms and processing and by studying computational materials science and corrosion science.

- Advanced Materials and Nanotechnology (AMN)
  Functional materials and nano-scale phenomena in materials are considered, a/o by using computational and characterisation techniques.

- Advanced Construction Materials: Roads & Buildings (ACM)
  This specialisation focuses on civil engineering and infrastructure industries and allows materials science MSc students to study modelling and experimental aspects of advanced construction materials in depth.

First Year

<table>
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<tr>
<th>1st semester</th>
<th>2nd semester</th>
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<tbody>
<tr>
<td>Structure &amp; Properties (8 EC)</td>
<td>Functional Ceramics (3 EC)</td>
</tr>
<tr>
<td>Characterisation of Materials (6 EC)</td>
<td>Computational Materials Science (3 EC)</td>
</tr>
<tr>
<td>Ethics and Engineering (3 EC)</td>
<td>Mechanical Behaviour of Materials (4 EC)</td>
</tr>
<tr>
<td>Society’s Needs (3 EC)</td>
<td>Processing of Materials (3 EC)</td>
</tr>
<tr>
<td>Metals Science (4 EC)</td>
<td>Obligatory / elective</td>
</tr>
<tr>
<td>Polymer Science (4 EC)</td>
<td>specialisation courses (19 EC)</td>
</tr>
</tbody>
</table>

Second Year

| Obligatory / elective specialisation courses (20 EC) or Internship (15 EC) Obligatory / elective specialisation courses (5 EC) | Master Thesis Project (40 EC) |

1 EC = 28 hrs study, according to the European Credit Transfer System (ECTS)
Total number of credits in the MSc programme = 120 EC

For more information on all courses please visit: www.studyguide.tudelft.nl
Examples of graduation projects
- Welding aluminium alloys without causing residual stresses or distortion;
- Development of self-healing coatings for turbine blades;
- Recycling neodymium-magnet scrap;
- Thermomechanical fatigue of SiMo cast iron used in truck engines.

Career prospects
Tata Steel, Allseas, Stork, DAF, Bosch and Philips are just a few of the companies where graduates in Materials Science & Engineering have found positions. They are working in materials production, development and research in the industrial sector, or as materials experts in high level consultancy and management positions. Many work at steel and aluminium production firms. Others have more unusual positions – in archaeology, for example, of authenticating works of art on behalf of museums. Still others are employed in higher education and research, the polymer and recycling industries, patent offices, and industries involved in the development of high-tech micro devices for applications in biomedical prostheses.

I started my education with a bachelor and master in materials science. During my masters project I did research on bonding techniques of high-strength steel for use in high-end products in the car industry, like race cars. I continued with a PhD-project in 2005 on laser brazing. I finished the practical work for my PhD-project in 2009 and I am now finishing my PhD thesis. I chose an education in materials engineering mainly because of the many different opportunities and topics in this field. I wanted to get a thorough technical education and yet be flexible for the future. I have also done many additional things during my education to broaden my horizon. I have been part of the board of the study association for two years and I have worked as a student assistant in the department to get more working experience. I think materials engineering is far less specialized than people think. It provides you with an excellent educational background and provides many possibilities for the future.

Martin Janssen (The Netherlands)

Unexpected career change
After working on a PhD-project in materials engineering at the TU Delft, I am now working at the Netherlands Forensic Institute (NFI), an institute for forensic services for police and other organizations in the criminal justice chain. It’s a career change you would not expect after trying to obtain a PhD in materials engineering, but it is very interesting. It shows that the field of materials science is much broader than you would expect. An education in material engineering gives you technical knowledge and analytical skills that are applicable in many jobs and businesses, not just in materials engineering itself.
Admission requirements and application procedure

Dutch BSc degree
In most cases, if you hold a BSc degree and the Master’s programme is closely related to your Bachelor’s programme, you will be admitted directly into the programme. However, if the Master’s programme does not follow directly from your undergraduate programme, you will be required to take additional courses in what is called a bridging programme. This may be a standard programme, or it may be tailored to your specific situation.

To see which Master’s programmes are open to you on completion of your Bachelor’s degree Dutch university, go to www.doorstroommatrix.nl.

Application goes through Studielink: tudelft.studielink.nl

Dutch HBO degree
An HBO Bachelor’s degree does not qualify you for direct admission to a TU Delft Master’s degree programme. To start a Master’s degree programme, you will first need to complete a supplementary programme in order to bring your knowledge to the required level. You can do this during your HBO programme by completing a bridging or by means of a bridging programme after securing your HBO diploma. Entrance requirements for mathematics and English (some exceptions) apply for both the bridging minor and the bridging programme. See www.hbodoorstroom.tudelft.nl for detailed information.

Application goes through Studielink: tudelft.studielink.nl

International applicants
To be considered for admission to a MSc Programme you’ll need to meet TU Delft’s general admission requirements.

1. A BSc degree (or a proof that you have nearly completed a BSc programme) in a field closely related to the MSc programme.
2. A BSc Cumulative Grade Point Average (CGPA) of at least 75% of the scale maximum.
3. Proof of English language proficiency:
   - TOEFL (Test of English as a Foreign Language) with a minimum score of 21 for each section and an overall band score of at least 90 (internet-based test). Please note that we only accept the TOEFL internet-based test.
   - or IELTS (academic version) with a minimum score 6.0 for each section and an overall Band score of at least 6.5.
   - or proof that you have passed the University of Cambridge 'Certificate in Advanced English' with a minimum grade B or the University of Cambridge 'Certificate of Proficiency in English'.

For international students, the application period starts in October and closes on 1 April. To start an MSc application, fill in the online application and pay the refundable application fee of €100. Then send hard copies of the application documents to TU Delft’s International Office. Please note that you should apply early when you want to be considered for a scholarship as well!

For more information about the application procedure and studying at TU Delft in general, go to: www.admissions.tudelft.nl.

Further information
Please visit the webpage for all Details, complete requirements, deadlines and contact information: www.mse.msc.tudelft.nl

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