

# Materials Science and Engineering

## MSc Programme



**Materials Science and Engineering is an interdisciplinary programme focusing on the relationship between structures and behaviour of materials (science) and the design of these structures to produce predefined properties for specific applications (engineering).**

**Students consider materials over a wide range of length and time scales, from the behaviour of collections of individual atoms through to macroscopic structural and functional properties and from raw material processing through materials production and application, to failure, durability and recycling.**

<b>Degree</b>	Master of Science in Materials Science & Engineering
<b>Starts</b>	September
<b>Credits</b>	120 ECTS, 24 months
<b>Language</b>	English
<b>Application deadline</b>	April 1st: international students July 1st: Dutch degree
<b>Tuition fee</b>	€ 18.750 (non EU) € 2.083 (EU)
<b>Scholarships</b>	<a href="https://www.tudelft.nl/scholarships">scholarships.tudelft.nl</a>

Materials Science and Engineering is concerned with the development of materials that meet or exceed performance expectations for specific functions. It is also concerned with the manufacturing processes that convert raw 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 and Engineering combines studies of the physical, chemical and mechanical properties of materials with 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 materials that perform better, last longer, enhance function, conserve resources and have a low environmental footprint. Covering subjects from atomic scale (fundamental) to large scale (application) and from design to disposal, the Materials Science and Engineering programme is well suited to meet the expectations of students with a more theoretical background as well as those with backgrounds in applied science and engineering.

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First Year		Second Year	
<b>Core Programme</b>	<b>41 ECTS</b>	<b>Obligatory / elective specialisation courses</b>	15 ECTS
Structure & Properties	8 ECTS	<b>Literature Review</b>	10 ECTS
Ethics and Engineering	3 ECTS		
Characterisation of Materials	6 ECTS		
Society's Needs	3 ECTS		
Metals Science	4 ECTS	<b>Master Research Project and Thesis</b>	35 ECTS
Polymer Science	4 ECTS		
Functional Ceramics	3 ECTS		
Computational Materials Science	3 ECTS		
Mechanical Behaviour of Materials	4 ECTS		
Processing of Materials	3 ECTS		
<b>Specialisation / electives</b>	<b>19 ECTS</b>		

See website and study guide for more information.

## Programme

The programme starts with core courses offering a firm grounding in Materials Science and engineering. Subsequently, students choose a specialisation which addresses a particular subject area. The specialisation can be one of four predefined course options (which may also include a research based 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 MEA specialisation focuses on the usage of materials in applications and structures and how material properties influence performance. Attention is paid to processing, joining, selection, failure and durability of materials. An obligatory internship is part of this specialisation.

### • **Metals Science and Technology (MST)**

In the MST specialisation attention is paid to the design and performance of metallic microstructures considering aspects such as phase transformations, strengthening mechanisms and processing. This specialisation includes the study of degradation due to corrosion and the prediction of properties from a computational perspective.

### • **Materials for Sustainable Development (MSD)**

The emphasis in the MSD specialisation 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 addressed.

### • **Advanced Construction Materials: Roads & Buildings (ACM)**

The ACM specialisation focuses on civil engineering and infrastructure industries and allows materials science masters students to study modelling and experimental aspects of advanced construction materials in depth.

### • **Self Defined Specialisation (SDS)**

Students may compile their own specialisation on any material class or aspect of material science that attracts their interest (subject to approval). TU Delft offers more than 80 materials related master courses. The specialisation should have a minimum of 14 ECTS following a common theme.

## Graduation examples

- Phase fraction control in quenched and tempered steels;
- Investigation of the colour pallet used in a painting by Rembrandt;
- 3D printing of fibre reinforced polymers for aerospace applications;
- Evaluation of transport properties of radionuclides in clay materials.

## Career prospects

Tata steel, Allseas, Stork, DAF, Bosch and Philips are just a few of the companies where graduates in Materials Science and 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 graduates choose to work in the steel and aluminium production industries. Others have more unusual positions – in archaeology, for example, or 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.



**15th**

QS world ranking in materials science (TU Delft)



**60%**

international students



**50**

students per year

Career perspective



**70%**

industry



**20%**

academia & government