

# Civil Engineering Structural Engineering

## MSc Programme



Structural engineers analyse and design load-bearing structures such as buildings, roads, bridges, tunnels and storm surge barriers, and investigate the behaviour of the materials applied in these civil engineering structures. The structures must be able to withstand during a long period of time the loads due to human use and environmental conditions, such as earthquakes and heavy winds, with minimum maintenance. Structural Engineering is all about this challenge.

Degree	Master of Science
Starts	September
Type	full-time
Credits	120 ECTS, 24 months
Language	English
Application deadline	1 April
Tuition fee	€ 18.750 (non EU) € 2.083 (EU)
Scholarships	<a href="https://www.scholarships.tudelft.nl">scholarships.tudelft.nl</a>

### Programme

The Structural Engineering track provides students with in-depth knowledge of the fundamental behaviour of civil engineering materials and structures. Used daily, the safe, sound and durable design, construction and maintenance of these structures is imperative for human well-being and society. Students learn to formulate and test physical models of loads, materials and structures.

They test complex structure models for endurance under stresses that might occur. Additionally, students learn to test and apply hand calculations for quick decision-making

and to use computer simulations to determine whether a structure will comply with design specifications. Research is fundamental to the educational programme. Well-equipped laboratories enable testing from nanoscale materials to full-scale structures and their components.

### Specialisations

The Structural Engineering track offers the following specialisations:

**The Structural Mechanics specialisation** trains students to make in-depth analyses of

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FIRST YEAR	SECOND YEAR
TRACK-SPECIFIC COURSES (TOTAL OF 56 EC)	SPECIAL SUBJECTS (CHOOSE ONE) <ul style="list-style-type: none"> <li>• ADDITIONAL GRADUATION WORK, RESEARCH PROJECT (10 EC)</li> <li>• ELECTIVE (10 EC)</li> <li>• INTERNSHIP (10 EC)</li> <li>• MULTIDISCIPLINARY PROJECT, CIVIL ENGINEERING CONSULTANCY PROJECT (10 EC)</li> </ul>
COMPULSORY ETHICS COURSE (CHOOSE ONE) <ul style="list-style-type: none"> <li>• CLIMATE CHANGE: SCIENCE &amp; ETHICS (4 EC)</li> <li>• PHILOSOPHY, TECHNOLOGY ASSESSMENT AND ETHICS FOR CIVIL ENGINEERS (4 EC)</li> </ul>	ELECTIVE COURSES (10 EC)
	MSC THESIS (40EC)

structures. In the graduation project, students develop tools that other engineers use to design structures. For example, a calculation method for computers, rules of thumb or design charts. Structural mechanics specialists solve structural problems for which others do not know a solution.

### The Materials and Environment

**specialisation** provides students with a deep knowledge of civil engineering materials and their behaviours, keeping the environmental impact in mind. Students use sophisticated equipment to investigate many materials and processes, such as the hardening process, durability and crack propagation of conventional and high-strength concrete, and healing of bitumen. Innovations are also explored, such as self-healing concrete.

### The Concrete Structures specialisation

teaches students to make the right decisions for optimal design and construction of concrete structures, such as buildings, stadiums and bridges. Concrete, reinforced and/or pre-stressed, is the most widely used construction material because of its design possibilities, low cost, strength and durability.

### The Steel, Timber and Composite Structures

**specialisation** focuses on the design and construction of structures made of steel, timber, aluminium and fibre-reinforced plastic. These materials are used in structures such as utility buildings, wind turbines and bridges.

### The Road and Railway Engineering

**specialisation** focuses on infrastructural facilities, such as roads, airfields, port areas, railways and tramways. The multi-layer structures required for these facilities must withstand increasingly heavy traffic loads over time. Students learn to design, construct and maintain these structures that are essential for the proper functioning of modern society.

### The Hydraulic Engineering Structures

**specialisation** concentrates on hydraulic structures and systems, such as tunnels, quay walls, dykes and storm surge barriers. The specialisation focuses on the integral design, construction and maintenance of these structures and coherently addresses their hydraulic, geotechnical and structural aspects.

### Graduation examples

For most Master thesis projects, students collaborate with an external party. Some recent examples of graduation projects:

- Shear and torsion in a pre-stressed through railway bridge
- A multiphysics numerical framework for epoxy resins
- Development of a reliable and efficient 3D calculation model of a high-rise building under seismic loading
- Seismic inversion for estimating soil material damping for offshore wind turbines
- Experimental characterisation of chemical and physical performance of epoxy modified bitumen
- Pushover analysis of masonry structures in Groningen
- Application of biobased Fiber Reinforced Polymer on a road traffic bridge
- Exploration of stability of 3D printed steel members

### Career prospects

Structural engineers work with architects, consultants, contractors, mechanical, electrical and chemical engineers to ensure that all parts of the structure are safe and capable of fulfilling their intended function. Upon graduation, students may choose to work in structural design or choose to specialise in construction or research. The career prospects for structural engineering graduates are promising, and many find jobs at consultancy firms.



**4th**  
in QS subject ranking  
Civil Engineering



**35%**  
International students



**200**  
Students in total

### Career perspective



**98%**  
Job within 6 months



**20%**  
Work abroad



**70%**  
Graduation assignment  
with external party