

# Complex Systems Engineering & Management CoSEM

## MSc Programme



**Our society strongly depends on complex systems: think of the infrastructures for telecom, transport and energy. These systems are not only technologically complex, but almost always involve many parties if we are to innovate. Maintaining cyber security, increasing the amount of sustainable energy without compromising our electricity supply, and safely introducing autonomous vehicles are just some of the challenges we face.**

<b>Degree</b>	Master of Science
<b>Starts</b>	September
<b>Type</b>	full-time
<b>Credits</b>	120 ECTS, 24 months
<b>Language</b>	English
<b>Application deadline</b>	April 1st: international students May 1st: Dutch degree
<b>Scholarships</b>	<a href="https://www.tudelft.nl/scholarships">scholarships.tudelft.nl</a>

The CoSEM programme teaches you how to design in socio-technical systems: engineering and managing the complex systems we depend on. You learn to work in a broader field than technology alone. When designing technological innovations, you have to know not only how these systems function technically, but also how their governance and management are organised.

You have to deal with matters such as regulations, distribution channels and infrastructures, as well as cultures and human

behaviour. In order to achieve successful innovations, these aspects must be considered and used in your sociotechnical design.

Who is responsible for the network? Which companies supply services on that network? Do we need to regulate the market, and how? What are the drivers and incentives of all parties involved, and what power do they have? These questions – and many more – need to be answered before you can start designing to realise change.

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FIRST YEAR				SECOND YEAR		
1ST SEMESTER		2ND SEMESTER		3RD SEMESTER		4TH SEMESTER
1ST QUARTER	2ND QUARTER	3RD QUARTER	4TH QUARTER			
Introduction to Designing in Complex Systems	Complex Systems Engineering	Managing multi-actor decision making	Law and institutions	Track electives		CoSEM Master Thesis Project
	Institutional Economics for designing in Socio-technical Systems	Methods: Agent-based modelling / Statistics Analysis of Choice Behaviour	Methods: Mixed Research Methods for Multiactor Systems / Design in Networked Systems	Electives		
	Track	Track	Track	Master Thesis preparation		

### Comprehensive Engineer

The CoSEM Master's degree programme educates engineers with a global view. We look at the challenges at an international level, and do not confine ourselves to the Netherlands. We encourage our students to study abroad in the first semester of the second year. Studying in a different culture boosts your creativity and flexibility.

### The Programme

The two-year programme starts with a Boot Camp week in which you design a socio-technical system. You choose one of three different tracks that are based on major current issues in which you will gain the in-depth technical knowledge you need to make socio-technical designs. This means you will focus on your area of interest from the start.

You can choose from the following tracks:

- Energy
- Information and Communication
- Transport and Logistics

If your previous qualifications do not tie in entirely, we offer you additional modules to acquire this knowledge.

The third semester can largely be tailored to your preferences. You can choose from a range of TU Delft electives packages, or design your own package. This also gives you the opportunity to study outside TU Delft and even abroad. In addition, you follow a course on writing a project plan and a scientific paper in preparation for the Master's thesis project. The master thesis itself can be carried out in a company.

Design projects integrate the technology, systems engineering and management aspects. To ensure an interdisciplinary approach, groups are supervised by lecturers from widely differing fields.

### ICT in education

In our programme we use the latest teaching methods, including blended learning. We offer you a combination of learning on campus and e-learning. Face-to-face contact with the experts, your teachers, is essential for your academic training, and the approachability of our teachers is highly valued by our students.

### Career prospects

CoSEM graduates typically take up positions as project managers, policy makers and strategic consultants. Graduates are just as comfortable speaking to technical experts as they are when speaking with managers, and they often work in an interdisciplinary environment. They have a systematic approach to problem solving, think analytically, discern the linkage between technical and social aspects of a situation, and are adept at recognising common patterns linking issues across domain boundaries.

Many CoSEM graduates work in multinationals, consultancy companies, energy companies, engineering companies, insurance companies and financial institutions, as well as in ministries and governmental agencies. In addition, graduates have launched their own ventures or became a PhD candidate within the faculty.



15<sup>th</sup>

QS World University Rankings by Subjects 2020 in Engineering and Technology



20%

international MSc students



96

students started in 2020

### Career perspective



90%

has a job within 6 months



11%

starts an entrepreneurship



70%

works within a private company