

MSc Programme



The technology industry is changing rapidly. Robotization and digitization are no longer vistas but an everyday reality. Previous developments in electronics have led to mechatronics. Nowadays, mechatronics is indispensable in mechanical engineering. At this moment, rapid advances in artificial intelligence lead to the emergence of a new discipline: that of cognitive robotics, in which an artificial ‘brain’ is integrated with the mechanical ‘body’ of a robot. Robotics – if well designed and integrated into society – has the potential to contribute to solutions to the complex challenges in the areas of food supply, transportation, production, energy, and medical care.

What you will learn

The MSc Robotics offers students a multidisciplinary education, allowing them to develop innovative and intelligent products and systems that meet today’s challenges. The focus of the programme is on the interaction between human and machine. You will acquire and apply broad knowledge on Robotics on the multidisciplinary intersection of mechanical engineering and artificial intelligence. You will learn how to model, design, and control robotic systems, how to analyse, evaluate, and validate robotic systems in complex environments, and how to relate scientific knowledge to robotic systems, by critically considering their interaction with societal aspects.

Profile of the Robotics Engineer

The Robotics Engineer will supervise the transition towards further robotization of society. He or she masters a variety of mechanical engineering and computer science disciplines: mechatronics, artificial intelligence, embedded systems, control, human-machine systems, ethics, and security. The Robotics Engineer can solve complex and multi-functional robot problems, is a critical thinker beyond cultural boundaries, has a can-do mentality, and understands privacy, security, and ethical aspects of working with robots in human environments.

Degree	Master of Science in Robotics
Credits	120 ECTS, 24 months
Language	English
Start	September
Tuition fee	€ 18.750 (non EU) € 2.143 (EU)
Scholarships	scholarships.tudelft.nl

First year	Second year
Obligatory courses (30 EC)	Choose (15 EC): Research Assignment In-depth courses Internship Joint Interdisciplinary Project
Dynamics & Control Machine Learning Machine Perception Planning & Decision Making Human Robot Interaction Robots & Society	
Elective courses (20 EC)	Literature Assignment, Problem Statement (10 EC)
Logistics Project management Economic/business Organisational Human	Thesis (35 EC)
Projects (10 EC)	
Robotics Software Practicals Multi-disciplinary Project	
Portfolio	

Programme

During the first year, eight obligatory courses will contribute to a solid common background in Robotics for all students. In addition, students have the freedom to choose elective courses (technical and societal). The goal of the second year is to let students work on complex research problems both individually and in groups, apply the tools and methods taught in the first year, and develop new theories or design methods to solve complex mechanical engineering problems. The Robotics Engineer is not expected to have only technical knowledge, but also societal knowledge and transferable skills, such as communication, teamwork, organisation, time management, problem-solving, leadership, and openness to change. The curriculum has been designed to ensure that students have plenty of opportunity to gain such experiences.

Research

Students work on research topics in one of the three labs of the Cognitive Robotics department. The researchers work on robotics solutions within a complex environment. Examples are: a robot that manages to make its way through an environment with obstacles and humans, a robot arm that responds to a person when he pushes the robot, robots that work together, or an intelligent vehicle that can predict where someone will cross the street.

International opportunities

There are several options for students to study abroad. For example an internship or

a MSc project with an international industrial or academic partner. The department of Cognitive Robotics maintains a strong international network with contacts in many leading industries and research institutes.

Career prospects

There is a need for engineers with state-of-the-art knowledge in a broad technical domain of robotics. The connection between mechanical engineering and artificial intelligence is a complex matter. The MSc Robotics is of great added value because these knowledge and skills are currently not contained in one engineering programme.

Many companies indicate that a Robotics Engineer is indispensable for the further technological development of society and the economy. This includes established companies such as Philips, Lely, TomTom, and ABB to relatively new companies and start-ups such as Hankampgears, Seatools, 2Getthere, Festo, and Heemskerk Innovative Technology. The combination of mechanical engineering and artificial intelligence in the programme makes Robotics Engineers also attractive for a broader spectrum of companies, such as retailers (e.g. Ahold Delhaize), engineering consultancy companies (e.g. Royal HaskoningDHV), and business consultancy companies (e.g. Roland Berger).

 **MSc**
started
in september 2020

 **100-150**
students