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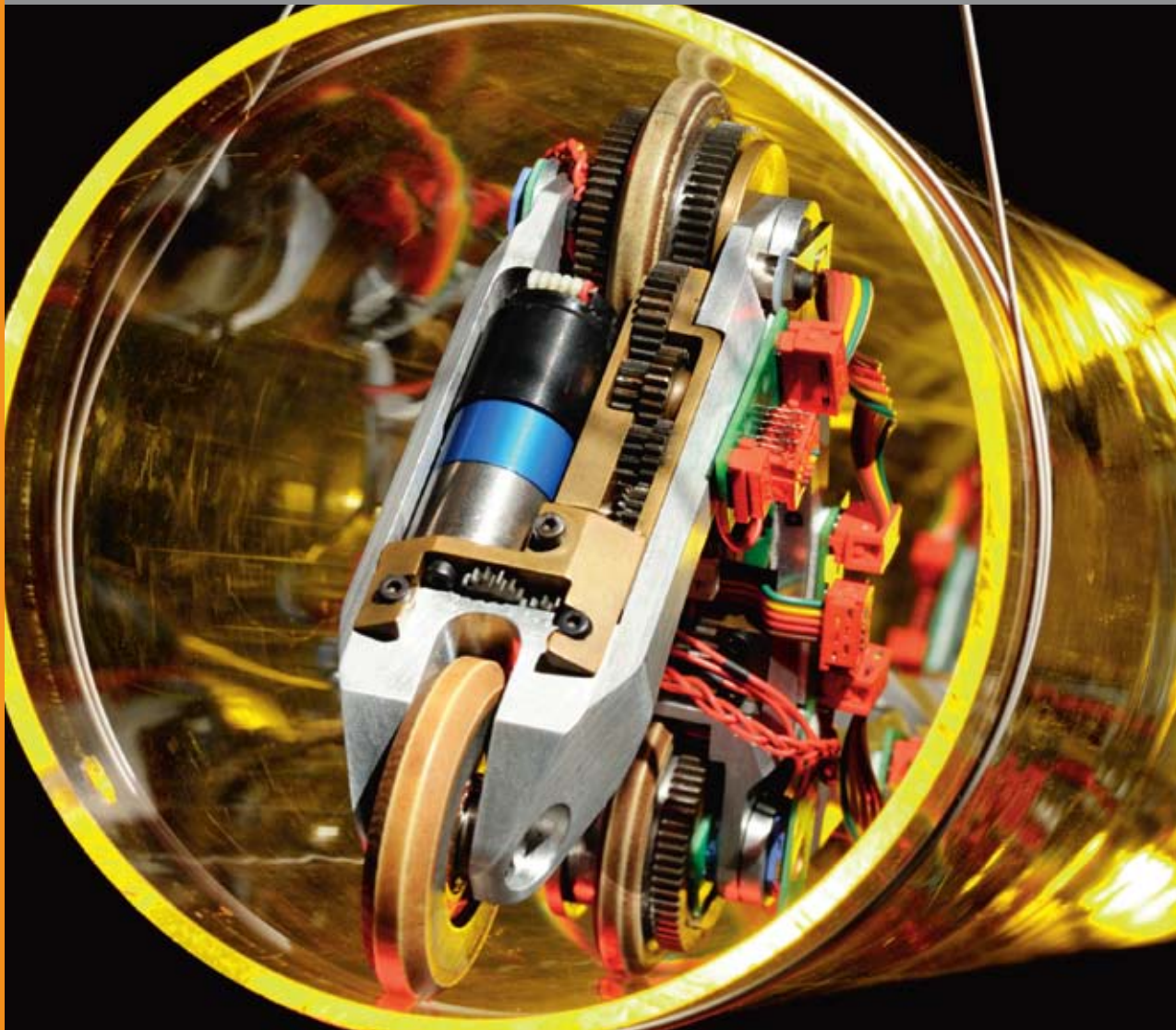
3TU Master of Science in Systems and Control

An essential engineering qualification for future decades

TU Delft Delft
University of
Technology

TU/e Technische Universiteit
Eindhoven
University of Technology

UNIVERSITY OF TWENTE.



The challenge of Systems and Control

As the complexity and importance of our many industrial structures and manufacturing systems grow, so does the guiding hand of Systems and Control. This active research area is an important discipline in many fields, involving such specialists as engineers, physicists, mathematicians and designers.

The world of systems and control guides more of our lives than most of us realise. Areas as diverse as the manufacturing and semiconductor industry, infrastructure management, transportation, communications and logistics, energy delivery, the medical profession, and the family household are increasingly dependent on it. And as the world becomes more and more automated and guided, its impacts will spread even further.

The 3TU* MSc programme trains students to use interdisciplinary strategies involving modelling, signal processing, controller design, and system analysis. It prepares engineers for a key role in the field of dynamics and control technology for complex systems and processes. The programme provides top-quality expertise and skills for successful professional careers in research, technology development and design. For students who wish to expand their academic career. The MSc programme is the perfect preparation for the national graduate (PhD) programme of the Dutch Institute of Systems and Control (DISC) as well as other PhD programmes.

disc dutch institute
of systems
and control

* The three leading universities of technology in the Netherlands - Delft University of Technology, Eindhoven University of Technology and the University of Twente - have joined forces in the 3TU. Federation (www.3tu.nl). This federation maximizes innovation by combining and concentrating the strengths of all three universities in research, education and knowledge transfer.

A curriculum for the needs of tomorrow

The two-year MSc programme in Systems and Control is aimed at students with a technical BSc background interested in analysis and control of dynamic systems in their widest sense. The programme addresses both fundamental and application-specific features, emphasising the multidisciplinary character of the field. It gives attention to applications in mechanical engineering, electrical engineering, applied physics, chemical and aerospace engineering. Among them:

- 1) Mechatronics, micro-systems, production systems, robotics, smart structures
- 2) Petrochemical/chemical/physical and biotechnological production processes
- 3) Transportation systems (automotive systems, logistic systems, aerospace)
- 4) Physical imaging systems (acoustic and optical imaging)
- 5) Energy conversion and distribution
- 6) Biomedical Engineering
- 7) Embedded systems

Combining the disciplines above results in an interdisciplinary approach, with attention given to modelling, experimental design, mathematical system theory, signal analysis and processing, model-based control design, and hardware and software systems. For systems of high complexity, such as high-order, non-linear or time-delay dynamics, hybrid and embedded systems, study targets range from small-scale micro-systems to large-scale industrial processes. An MSc degree in Systems and Control will surely be a key engineering qualification for future decades.

One programme - three flavours

The MSc programme in Systems and Control is a two-year curriculum of lectures and assignments. The course section consists of a compulsory part, an elective part in which modules are chosen from a list of systems and control modules, and a freely selected part chosen in consultation with the MSc coordinator and/or the MSc thesis supervisor. Within the elective courses students have various specialization options, for instance motion and vibration control, automotive control, nonlinear control, process control, hybrid systems, and embedded systems. The programme includes an optional internship of three months, which can be replaced by a cohesive collection of elective courses and literature study.

	What	
Year 1	Introduction Project	
	Compulsory courses Modelling, Control and Identification; and Integration Project	
	Elective Courses	
	Research-Oriented Courses specific to profile	
Year 2	Elective Courses	Practical training (internship)
	Literature Study	
	Graduation Project	

Specializations

Due to the diversity of participating groups and flexible setup, the MSc programme can offer many specializations, ranging from a pure engineering profile to more theoretical oriented research.

Delft Centre for Systems and Control (DCSC)

Teaching and research at the DCSC encompasses the wide area of modelling, estimation and identification, control and optimisation of linear, nonlinear and hybrid dynamical systems. Applications include, but are not limited to, mechatronics and microsystems, sustainable industrial processes, transportation and traffic control, adaptive optics, automotive applications, and physical imaging systems. DCSC has extensive laboratory facilities and participates in many collaborative research projects with industrial partners.

Systems and Control at TU/e

Systems and Control at TU/e focuses especially on positioning systems, automotive applications, machine dynamics, biomedical modelling of basic physiological processes and instruments, embedded dynamic systems, hybrid and networked systems, acoustics and controls, and large-scale process control systems. Within these application areas, an integrated approach addresses physical and experimental modelling, signal analysis and processing, model-based controller design and hardware and software systems.

Systems and Control at UT

The program in Twente has two specializations: *Robotics and Mechatronics* and *Systems and Control Theory*. Twente focuses on both fundamentals and applications in biomedical engineering, robotics, mechatronics, precision equipment, MEMS (mechanical electronic micro systems) and hybrid and embedded systems. Expertise centres around general mathematical systems theory, robust control, infinite dimensional systems, hybrid systems, learning and adaptive control systems and modelling of physical systems with applications in such domains as mechatronics, robotics, machine dynamics, signal processing, embedded control systems and computer science.

Picture yourself as ...

Programme graduates find careers across numerous sectors of industry and academia which range from management, to design, research and development in technical departments. In our technologically developed society, commercial and governmental organisations are in constant need of people with a solid engineering education at the academic level, and this need will surely grow. Because of system complexity, an increasing number of engineers are playing a crucial role in the advising on and selling of smart products and capital equipment. Naturally there are also numerous careers awaiting systems and control engineers in academia, where these skills are in high demand as well.

Testimonials

"In my very first physics class the teacher asked us: 'Why is it still light outside when the sun has set?' I found that a fascinating question, and since then I've been sure that I wanted to do a technological and innovative study program. I took my Bachelor's in Intelligent Systems Control in Romania, and this Master's program is a perfect way to proceed it. Why in the Netherlands, and why at TU/e? Quite simply, because the scientists here in my own field are highly respected in other countries. And I can also benefit here from the links with industry. With companies like ASML, Océ and Philips, there are plenty of opportunities for engineers in this region alone. And just as important, it's a great place to live; the people are nice to you and speak good English."

Emilia Silvas (Romania), MSc student Systems and Control (TU/e)

"Looking back on my experience with Systems & Control, for me three aspects have made it the perfect MSc program. First, the theoretical basis to model, analyze and control systems in combination with the ability to work on a wide variety of real life problems. Second, working with highly motivated students, teachers and professors from various backgrounds, i.e. multidisciplinary and multicultural. And last, DCSC is an internationally acclaimed institute, which gave me the opportunity to conduct my graduation research at and in collaboration with UC Berkeley (USA). I worked on a relevant problem in Systems Biology with biologists, applying my S&C skills in a multidisciplinary and international setting."

Roel Dobbe, MSc student Systems and Control (TU Delft)

Admission requirements

Bachelor of Science degree

Direct admittance is granted to students with an academic BSc degree in Mechanical Engineering, Electrical Engineering, Applied Physics, Aerospace Engineering, Chemical Engineering or Technical Mathematics of a Dutch University of Technology or a University of the IDEA League (Imperial College London, ETH Zürich, RWTH Aachen, Paris Tech). Any possible deficiencies in background can be resolved by one or two additional courses included as electives. For students with other academic BSc degrees admittance to the MSc programme will be judged on a case by case basis.

Bachelor's degree from a Dutch institute of higher vocational education (HBO)

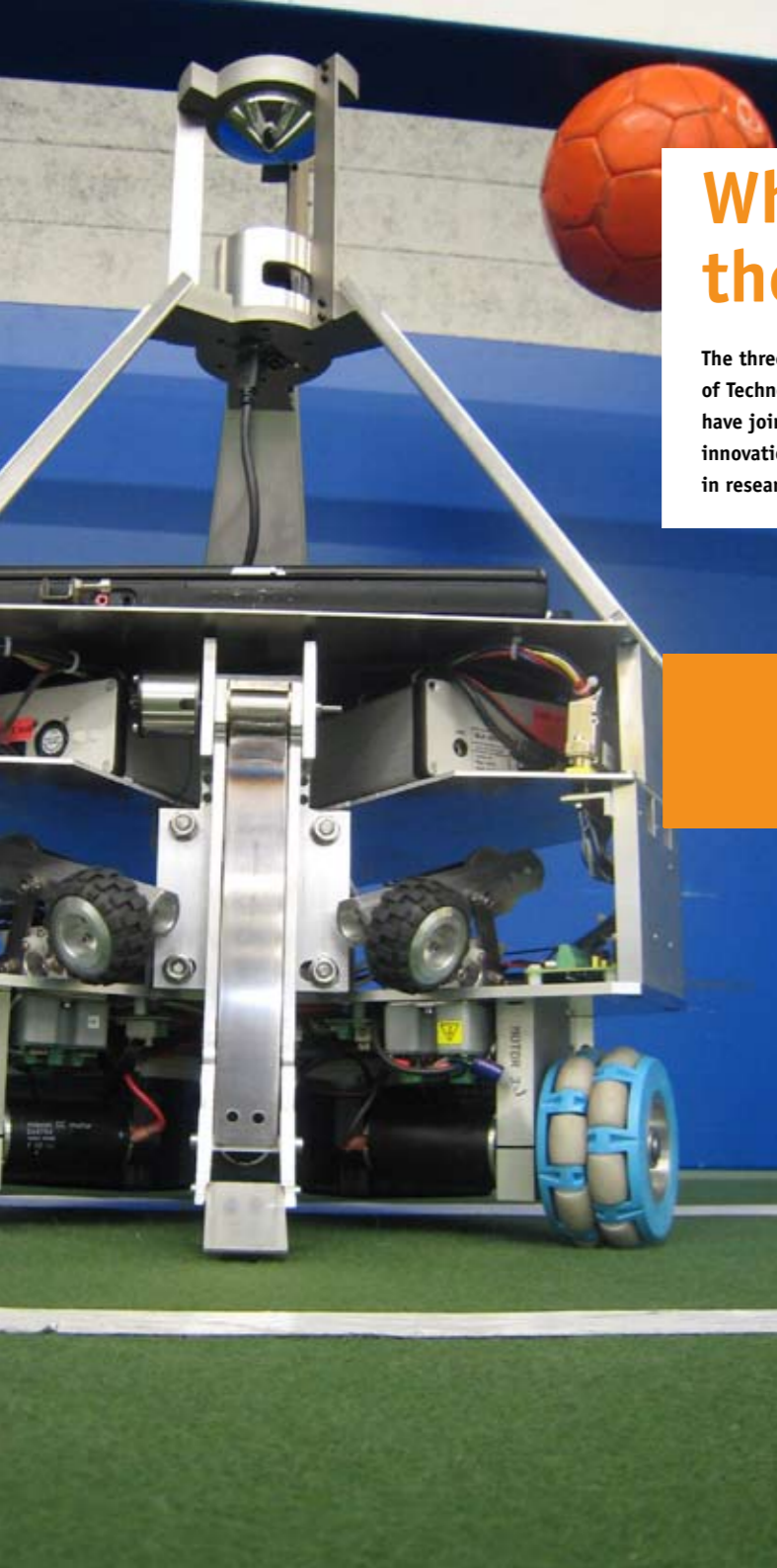
Candidates with a (HBO) Bachelor degree in Electrical Engineering, Mechanical Engineering, Applied Mathematics, Applied Physics, Aerospace Engineering and other programmes can be admitted. A pre-master's programme of 30 ECs needs to be completed before the candidate is formally admitted.

For detailed information consult:

www.dsc.tudelft.nl

www.tue.nl/masterprograms/sc

www.graduate.utwente.nl/sc



What is the 3TU.Federation?

The three leading universities of technology in the Netherlands - Delft University of Technology, Eindhoven University of Technology and the University of Twente - have joined forces in the 3TU.Federation (www.3tu.nl). This federation maximizes innovation by combining and concentrating the strengths of all three universities in research, education and knowledge transfer.

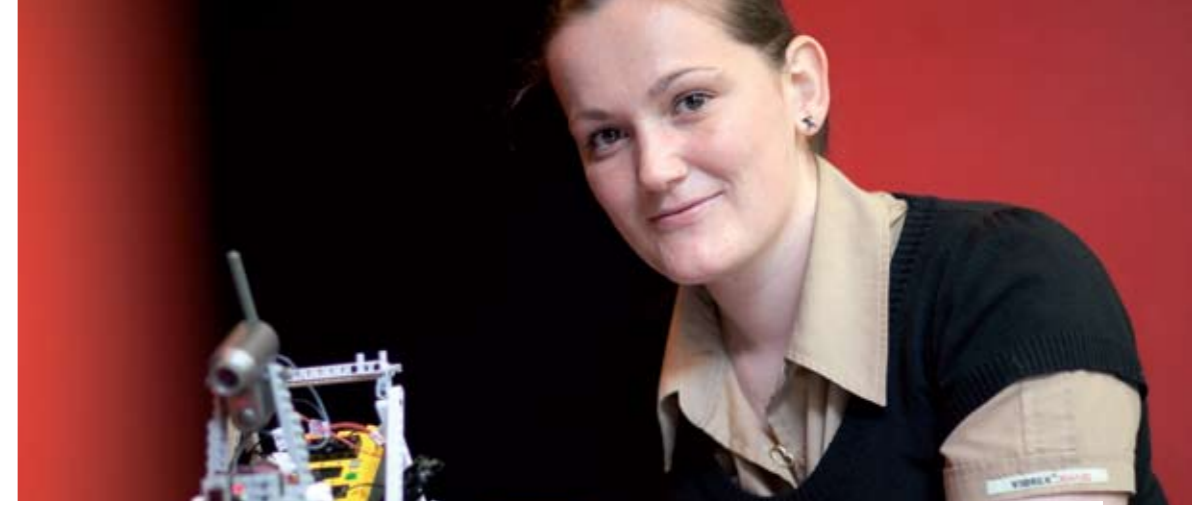
Within the framework of this cooperation, five joint MSc programmes have been developed that address key issues in engineering and society. These five MSc programmes are:

- Construction Management and Engineering
- Embedded Systems
- Science Education and Communication
- Sustainable Energy Technology
- Systems and Control

The main advantages for students

The 3TU MSc programmes have been developed as exclusive programmes of outstanding academic quality that enable you to study at three of the top universities in the Netherlands. These programmes focus on areas of innovation developed with state-of-the-art engineering expertise. You will have the opportunity to acquire qualifications and competences that are in high demand. Upon graduation you will have obtained an outstanding qualification profile. The 3TU masters combine excellent subject-based competences, research skills, the capacity for independent analysis and synthesis and an advanced capability to apply knowledge in practice.

The core programmes of the 3TU master are largely identical and can be followed at any of the three locations. The admission procedures, teaching and examination regulations and academic calendars at all three universities have been carefully matched. You will benefit from the special strengths of the three universities by choosing a specialization at any of the three locations. You will be registered at the location of your choice, but you will automatically be co-registered at the other two locations to ensure access to the facilities of all three.



Universities of Technology in the Netherlands

Delft University of Technology (TU Delft)

TU Delft (www.tudelft.nl) is an enterprising university at the forefront of technological development. The university trains the engineers of tomorrow by means of its fundamental and applied research and educational programmes. With its broad knowledge base, worldwide reputation and successful alumni, TU Delft contributes significantly to the development of responsible solutions to urgent societal problems worldwide. The university offers 16 BSc and 39 MSc programmes. With approximately 16,500 students, TU Delft is the nation's largest university of technology with the most comprehensive range of engineering courses.

Eindhoven University of Technology (TU/e)

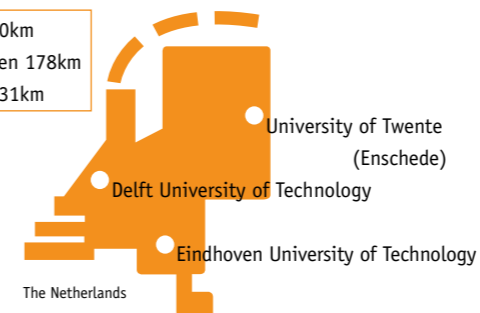
Eindhoven University of Technology (www.tue.nl) is a modern and relatively young university. Students find the atmosphere open, informal and friendly. As an 'Eindhoven educated engineer', you are able to carry out complex analyses and develop solutions based on your findings. You are a problem solver with the ability to design new products, processes and systems. This means you can offer the community new opportunities for sustainability, safety, health, welfare and prosperity. You can look forward to a varied, challenging, lucrative and socially relevant career.

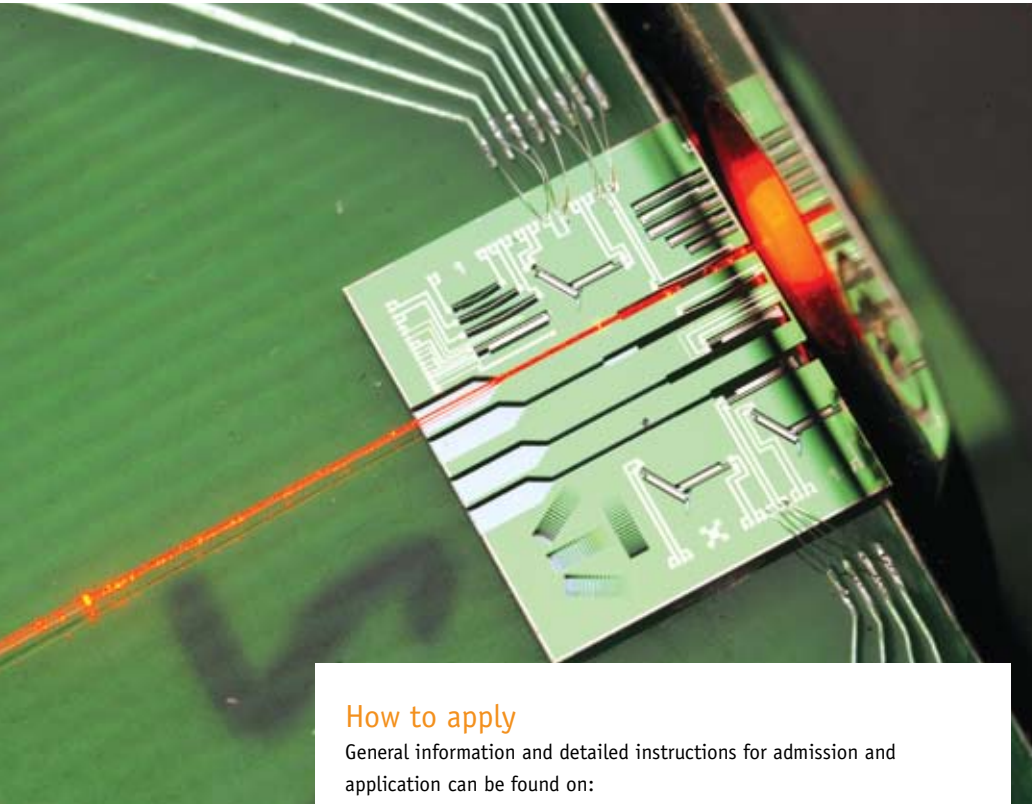
Compared to other universities TU/e has the highest scientific output in cooperation with industry. This position confirms the unique and close cooperation in R&D with the high-tech business sector in Brainport Eindhoven and the rest of the Netherlands.

University of Twente (UT)

Integrating social and engineering sciences. Developing high tech, with a human touch. This is what the University of Twente is committed to. Through teaching and research at the highest level. And through the innovations brought to the market place by over 700 spin-off companies. We offer degree programmes in fields ranging from the behavioural and management sciences to engineering and natural sciences. Research spearheads include nanotechnology, biomedical technology, information technology, governance studies, and learning and cognition. The University of Twente is the only full-campus university in the Netherlands. 2,700 faculty and staff and 8,500 students and work and unwind in the beautiful green park grounds, supported by top facilities for research and teaching, as well as for sports and culture. It is home to events such as the world's largest annual student think-tank Create Tomorrow. All on less than 2 hours drive from Amsterdam. UT offers 23 BSc programmes and 33 MSc programmes.

Delft <-> Enschede 200km
Enschede <-> Eindhoven 178km
Delft <-> Eindhoven 131km





How to apply

General information and detailed instructions for admission and application can be found on:

Delft University of Technology:

www.studyat.tudelft.nl

Eindhoven University of Technology:

www.tue.nl/masterprograms/sc/admission_application

University of Twente:

www.graduate.utwente.nl/sc

More information?

For more information visit **www.3tu.nl**

Additional information can be obtained from:

Delft: MSc Coordinator, Dr. Ton van den Boom, **A.J.J.vandenBoom@tudelft.nl**

Eindhoven: Master S&C International office, **mastersc@tue.nl**

Twente: Dr. Jan Willem Polderman, **J.W.Polderman@math.utwente.nl**