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 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 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.

<table>
<thead>
<tr>
<th>Diploma</th>
<th>Master of Science</th>
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<tbody>
<tr>
<td>Credits</td>
<td>120 ECTS, 24 months</td>
</tr>
<tr>
<td>Starts in</td>
<td>September</td>
</tr>
<tr>
<td>Language of instruction</td>
<td>English</td>
</tr>
<tr>
<td>% International students</td>
<td>5-10</td>
</tr>
</tbody>
</table>

Systems and Control

Tools to regulate behaviour of other devices and systems
Programme
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.

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.

Specialisations
Due to the diversity of participating groups and flexible setup, the MSc programme can offer many specialisations, ranging from a pure engineering profile to more theoretical oriented research. Teaching and research at DCSC (Delft Center for Systems and Control) encompasses the wide area of modelling, estimation and identification, control and optimisation of linear, nonlinear and hybrid dynamical systems. Applications include 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.

Curriculum Systems and Control
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 the MSc thesis supervisor. Within the elective courses students have various specialisation options, for instance mechanical systems, process control, automotive, robotics, wind energy, transportation networks, smart physical systems, systems and control theory.

Graduation projects
- Model based Control design of adaptive optics for confocal microscope with biological specimen
- Model predictive traffic control: Efficiency versus accuracy
- Towards data-driven autonomous control systems in the process industry
- Large perturbation recovery for bipedal robots

Career prospects
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.

Curriculum Systems and Control

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<thead>
<tr>
<th>First Year</th>
<th>Second Year</th>
<th>Third Year</th>
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<tbody>
<tr>
<td>1st semester</td>
<td></td>
<td></td>
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<tr>
<td>Introduction project SC (1 EEC)</td>
<td>Robust and Multi-variable Control Design (6 EEC)</td>
<td></td>
</tr>
<tr>
<td>Control theory DCSC (6 EEC)</td>
<td>Integration project SC (5 EEC)</td>
<td></td>
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<tr>
<td>Filtering &amp; identification (6 EEC)</td>
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<tr>
<td>Optimisation in systems and control (14 EEC)</td>
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<tr>
<td>Modelling and Nonlinear Systems Theory (46 EEC)</td>
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<tr>
<td>Philosophy of Engineering Science and Design (36 EEC)</td>
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<td></td>
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<tr>
<td>System and Control electives (2 IBEC)</td>
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<tr>
<td>Free electives (6 IBEC)</td>
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<table>
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<tr>
<th>Second Year</th>
<th>Third Year</th>
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<tbody>
<tr>
<td>2nd semester</td>
<td></td>
</tr>
<tr>
<td>Literature study (1 EEC)</td>
<td>Literature thesis project (8 EEC)</td>
</tr>
</tbody>
</table>

1 EC = 28 hrs study, according to the European Credit Transfer System (ECTS)
Total number of credits in the MSc programme = 120 EC

For more information on all courses please visit: www.studyguide.tudelft.nl

Matteo Ciocca (Italy)

My name is Matteo Ciocca and after three years of intense studies in my home country, Italy, I obtained my bachelor degree in Polytechnic of Milan. I decided the master track in Milan did not reflect my future prospective. I loved to continue my studies along with the field of robotics. I considered carefully universities in Europe and Delft University was one of the few that stood out for the master programme in Systems and Control. This master programme allowed me to choose elective courses strictly related with the field of robotics, respecting my bachelor track in the field of Control Engineering. This master track gave me the opportunity to participate many laboratory works and to team up for several projects with different incredible international groups of students.

Laboratories with advance equipments and stages in companies at the forefront of technological developments are unique chances that only prestigious university such as TU Delft could provide me. Last year I was projected in complex works and devoted myself fully in them. The university became my new home.

The university was not the only factor that helped me in my career. Delft is an incredible town, we could say, is only populated by students. The international environment outside of the TU Delft Campus is rich of events every week that made me enjoy the time spent here. House parties organized by students and weekly sport activities are embedded in the Dutch definition of “serious fun”. However, if Delft sometimes was too little for me, the train network in Netherlands allowed me to reach Rotterdam, Den Haag, Amsterdam and Breda for bigger events: as Carnival in February. My second year in Delft started with a three month internship in a start-up, perClass, in the well-known incubator YES!Delft. The experience that I gained was incredible: it helped me to make the first step outside the university and it will definitively help me for future work decisions. I am currently working on my master thesis in Reinforcement learning that combines Control Engineering with Computer Science knowledge.

For incredible years, I got incredible knowledge.

Matteo Ciocca
Admission requirements and application procedure

Dutch BSc degree
In most cases, if you hold a BSc degree and the Master’s programme is closely related to your Bachelor’s programme, you will be admitted directly into the programme. However, if the Master’s programme does not follow directly from your undergraduate programme, you will be required to take additional courses in what is called a bridging programme. This may be a standard programme, or it may be tailored to your specific situation.

To see which Master’s programmes are open to you on completion of your Bachelor’s degree Dutch university, go to www.doorstroommatrix.nl.

Application goes through Studielink: tudelft.studielink.nl

Dutch HBO degree
An HBO Bachelor’s degree does not qualify you for direct admission to a TU Delft Master’s degree programme. To start a Master’s degree programme, you will first need to complete a supplementary programme in order to bring your knowledge to the required level. You can do this during your HBO programme by completing a bridging or by means of a bridging programme after securing your HBO diploma. Entrance requirements for mathematics and English (some exceptions) apply for both the bridging minor and the bridging programme. See www hbodoorstroom tudelft nl for detailed information.

Application goes through Studielink: tudelft.studielink.nl

International applicants
To be considered for admission to a MSc Programme you’ll need to meet TU Delft’s general admission requirements.

1. A BSc degree (or a proof that you have nearly completed a BSc programme) in a field closely related to the MSc programme.
2. A BSc Cumulative Grade Point Average (CGPA) of at least 75% of the scale maximum.
3. Proof of English language proficiency:
   • TOEFL (Test of English as a Foreign Language) with a minimum score of 21 for each section and an overall band score of at least 90 (internet-based test). Please note that we only accept the TOEFL internet-based test.
   • or IELTS (academic version) with a minimum score 6.0 for each section and an overall Band score of at least 6.5.
   • or proof that you have passed the University of Cambridge ‘Certificate in Advanced English’ with a minimum grade B or the University of Cambridge ‘Certificate of Proficiency in English’.

Further information
Please visit the webpage for all details, complete requirements, deadlines and contact information: www.sc.msc.tudelft.nl

Dr.ir. A.J.J. van den Boom
T: +31 (0)15 27 84052
E: sc-coordinator-dcsc@tudelft.nl

Further information for international applicants
International office 3mE
T: See website
E: internationaloffice-3me@tudelft.nl
W: www.studyabroad.3me.tudelft.nl

3mE Faculty
Mekelweg 2
2628 CD Delft
The Netherlands
www.3me.tudelft.nl

For international students, the application period starts in October and closes on 1 April. To start an MSc application, fill in the online application and pay the refundable application fee of €100. Then send hard copies of the application documents to TU Delft’s International Office. Please note that you should apply early when you want to be considered for a scholarship as well!

For more information about the application procedure and studying at TU Delft in general, go to: www.admissions.tudelft.nl.