Welcome to Systems and Control

- Presentation (45 min)
  - Master program
  - Pre-Master program

- Time for questions (15 min)

Department tour (30 min): 17:00 – 17:30
CONTENT

• Brainport region
• Systems and Control: why?
• Systems and Control: what?
• After graduation
• Studying S&C at TU/e
• Application / More information
• Systems and Control pre-Master program: what?
Brainport: the beating technological heart of Europe
CONTENT

• Systems and Control: Brainport region
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Systems and Control

- Plant
- Sensor
- Actuator
- Controller
Systems and Control

• Technological contributions in many fields
• Hidden but crucial technology
• Generic theory for many applications
• Applications in high tech industry, communication, health, 3D printing, etc...

Communication
Additive manufacturing
Health and care
Aviation systems
Energy distribution
Automotive applications
CONTENT

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Systems and Control: an interdisciplinary study

Partner universities:

TU/e
Mechanical Engineering

TU/e
Electrical Engineering
# Program overview

<table>
<thead>
<tr>
<th>1st year</th>
<th>2nd year</th>
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<tbody>
<tr>
<td>• Core program (25 EC)</td>
<td><strong>Internship</strong> 15 EC</td>
</tr>
<tr>
<td>• Specialization courses (20 EC)</td>
<td><strong>Graduation project</strong> 45 EC</td>
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<tr>
<td>• Free electives (15 EC)</td>
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<tr>
<td>• Diagnostic test (SkillsLab, mandatory – 0 EC)</td>
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Systems and Control - core program

- Control engineering (W)
- System theory for control (W)
- Modeling dynamics or Multibody and non-linear dynamics (EE / W)
- System identification (EE)

Integration project
Education

Core courses (25 EC), compulsory:

- **Control engineering**
- System theory for control
- Modeling dynamics *or* Multibody and non-linear dynamics
- System identification
- Integration project

Specialization courses (20 EC):
Choose in consultation with your mentor
Education

Core courses (25 EC), compulsory:
• Control engineering
• **System theory for control**
• Modeling dynamics *or* Multibody and non-linear dynamics
• System identification
• Integration project

Specialization courses (20 EC):
Choose in consultation with your mentor
Education

Core courses (25 EC), compulsory:
• Control engineering
• System theory for control
• **Modeling dynamics or Multibody and non-linear dynamics**
• System identification
• Integration project

Specialization courses (20 EC):
Choose in consultation with your mentor
Education

Core courses (25 EC), compulsory:

• Control engineering
• System theory for control
• Modeling dynamics or Multibody and non-linear dynamics
• **System identification**
• Integration project

Specialization courses (20 EC):
Choose in consultation with your mentor
Integration project

- Apply all knowledge from the other core courses
- Define the goal yourself on a given set-up such as a 3-DOF gyroscope or a drone
- Work in a multidisciplinary project team (+/- 4 members)
- Develop your professional skills

Foto’s: Bart van Overbeeke
## Specialization

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<th>Specialization courses</th>
<th>Free electives</th>
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<th>Internship</th>
<th>Graduation project</th>
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<tbody>
<tr>
<td></td>
<td>15 EC</td>
<td>45 EC</td>
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</table>

- Curriculum = coherent, in line with specialization, guidance from mentor
- Internship and graduation project: independent work, explore new research questions, within university or in cooperation with industry
• TU/e world class in control:
  IEEE/IFAC Fellows, National and European Grants (ERC, VICI)
• Contacts and contracts with many industrial partners
• Staff members are authors and editors in top journals
• Spin-off companies
• Guiding and coaching research of close to 100 PhD students
• Follow-up PhD and graduate work in national Dutch Institute of Systems and Control (DISC)
Project examples

Cooperative vehicles and traffic control

Energy distribution

Process control

Reservoir modeling and control

3D printing: modeling and control
Project examples

- Magnetically levitated planar motor
- Active car suspension
- Wafer scanner
- Care and cure robotics
- Mechatronic designs, cooperative robotics
- High tech for agriculture
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After graduation

Research:
• PhD (graduate school DISC)
• PDEng (Automotive Systems Design, or...)

Industry:
• High-tech industry
• Aviation
• Process industry
• Health
• Automotive industry

Consultancy / Start-up / Spin-off company

Foto: Bart van Overbeeke
TU/e Graduate School – shape your own future!

Bachelor College

Graduate School

PhD
Doctor of Philosophy

BSc
Bachelor of Science

MSc
Master of Science

PDEng
Professional Doctorate in Engineering

3 years
2 years
2 years
4 years
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Studying S&C at TU/e

• Not easy!
• Small scale (approx. 50 students in year 1)
• Highly motivated peers
• Excellent job opportunities
• Good student evaluations

National Student Survey 2019 (1-5 scale):

  Content                  4.3
  Lecturers                4.2
  Academic guidance        4.1
  General                  4.5
Coaching

• Mentor program
• Full, associate or assistant professor
• Skills-lab for personal development
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Admission with a BSc degree in

- Mechanical Engineering
- Electrical Engineering
- Mechatronics
- Aerospace Engineering
- Automotive
- Applied Physics
- Technical Mathematics

Prior education needs to be of sufficient academic level and quality to be able to complete this Master's degree program.
Application master degree programs

Dutch students:
• More info about admissions: www.tue.nl/admission
• Application via www.studielink.nl
• Questions: studeren@tue.nl

Deadline
1 May 2020
Application master degree programs

International students:
• Check [www.tue.nl/admission](http://www.tue.nl/admission) for the requirements
• Apply via online application form
• Application fee of € 100 per application (non refundable)
• Application procedure takes +/- 8 weeks
• You will be informed by email about the outcome of your application
• Questions: [io@tue.nl](mailto:io@tue.nl)

Deadline
1 May 2020
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Pre-Master Systems and Control

- Duration: 1 years (30 EC)
- Time of entry: September
- Language: English
Pre-Master Systems and Control

Why?
• Can you handle the level?
• Eliminate deficiencies

What?
• Program of 30 EC, to be achieved within one year
• Focus on mathematics (10 EC)
## S&C pre-Master program 2020-2021

<table>
<thead>
<tr>
<th>Compulsory courses</th>
<th>30 EC</th>
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<tbody>
<tr>
<td><strong>quarter 1</strong></td>
<td></td>
</tr>
<tr>
<td>2DL60 Linear Algebra</td>
<td>2.5</td>
</tr>
<tr>
<td>2WBB0 Calculus variant 2</td>
<td>5</td>
</tr>
<tr>
<td>5ESC0 DSP fundamentals (signals II)</td>
<td>5</td>
</tr>
<tr>
<td><strong>quarter 2</strong></td>
<td></td>
</tr>
<tr>
<td>2DL40 Advanced Calculus I</td>
<td>2.5</td>
</tr>
<tr>
<td>4DB00 Dynamics and control of mechanical systems</td>
<td>5</td>
</tr>
<tr>
<td><strong>quarter 3</strong></td>
<td></td>
</tr>
<tr>
<td>4CC10 Mechatronic Design</td>
<td>5</td>
</tr>
<tr>
<td><strong>quarter 4</strong></td>
<td></td>
</tr>
<tr>
<td>5EMA0 Mathematics II</td>
<td>5</td>
</tr>
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</table>

### Mandatory trainings
- RSI (healthy use of laptop)
- Safety & environment

### Recommended
- Matlab training
Difference WO & HBO (in general)

University of technology:
- Developing new technology and design methods to solve technological problems
- Education focusses on concepts and their implications
- Guaranteeing performance of controlled and engineered systems
- Internship is a research project

University of applied science:
- Applying existing technology and design methods to solve technological problems
- Education focusses on practical application
- Internship in industry
How to prepare during your bachelor’s program?

• A pre-master’s program is more work than one might think, you must be willing to work hard

• It is not advised to do the pre-master in combination with a part-time job in the industry

• Check the additional entry requirements regarding mathematics and English

• Subscription for a pre-master via Studielink before May 1st
Admission HBO bachelors to pre-Master

Depending on HBO degree:

→ Direct admission:
  • Mechanical Engineering
  • Autotechniek
  • Elektrotechniek
  • Mechatronica
  • Luchtvaarttechnologie
  • Industriële Automatisering
  • Technische Natuurkunde
  • Technische Wiskunde

→ Individual admission by admission committee
  • Send grades and course information HBO bachelor to Admission.Mech@tue.nl
More information

Go to the stand in Auditorium!

Or contact:

• Master S&C: https://www.tue.nl/en/education/graduate-school/master-systems-and-control/ (info on Master’s program, curriculum, interviews with students and alumni)
• https://www.tue.nl/en/education/mystarttue/webinars/ (inloggen via MyStart@TU/e)
• Check www.tue.nl/education for more information
• Receive updates about our events? Go to http://start.tue.nl and create a mystart@tue account
• Questions right after the webinar? WhatsApp +316 416 83 406