

Courses MSc Systems and Control 2023/24

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| Core course |
| Homologation course |
| Specialization course |

Students choose 5 out of 7 core courses (25 EC). The modeling courses 5CSA0 and 4DM10 cannot both be included in the program of examinations, due to overlap.

- The course 4DM10 focuses on 1) the dynamic modeling and analysis of mechanical systems which is key in the fields of robotics, vehicle dynamics, high-tech systems and control of mechanical systems and 2) the analysis of generic nonlinear dynamical systems.
- The course 5CSA0 covers a broad scope of applications and treats the modeling and analysis of general physical models, networks of models, the role of passivity and conservation laws and a broad range of stability properties in nonlinear dynamics.

The Integration project S&C (SSC26, 5EC) is mandatory for all S&C students.
Homologation modules are part of free electives. The total amount of bachelor and homologation courses may not exceed 15 EC. Homologation is strongly advised, depending on student's background. See information at the online education guide for target groups.

Students need to choose at least 15 EC of specialization courses from this list. Core courses can also be chosen as specialization elective. .

Quarter 1

| | | | Timeslot | credits |
|-------------------------------------------|-----------------------|---------------------------------------------|----------|---------|
| ME Control Systems Technology | 4CM00 | Control Engineering | C | 5 |
| ME Control Systems Technology | 4CM10 ^[1] | System theory for control | B | 5 |
| EE Control Systems | 5CSA0 ^[2] | Modeling Dynamics | D | 5 |
| ME Energy Technology | 4WM20 | Homologation Matlab Simulink | E1 | 2.5 |
| ME Dynamics and Control | 4SC060 | Homologation dynamics of mechanical systems | E2; E3 | 2.5 |
| ME Dynamics and Control | 4AT000 ^[3] | Vehicle Dynamics | B | 5 |
| EE Electromechanics and Power Electronics | 5LWE0 | Control of Rotating-field Machines | A | 5 |
| EE Electromechanics and Power Electronics | 5LWH0 | Modelling & Control of power converters | C | 5 |
| BMT CB | 8CM00 ^[3] | Systems Medicine | D | 5 |

Quarter 2

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|-------------------------------------------|-----------------------|-----------------------------------------------------|--------|-----|
| ME Dynamics and Control | 4DM10 ^[2] | Multibody and Non-linear Dynamics | A | 5 |
| EE Control Systems | 5SC29 | Stochastic processes, filtering and estimation | E | 5 |
| ME Control Systems Technology | 4CM60 | Advanced Motion Control | B | 5 |
| ME Control Systems Technology | 4SC000 | Optimal control and reinforcement learning | D | 5 |
| ME Control Systems Technology | 4SC010 | Control and operation of tokamaks | E2; E3 | 2.5 |
| EE Control Systems | 5LMA0 | Model reduction | C | 5 |
| EE Control Systems | 5SMCO ^[10] | Control principles for engineered systems | A | 5 |
| EE Electromechanics and Power Electronics | 5SWA0 ^[3] | Rotary Permanent Magnet Machines | D | 5 |
| EE Electromechanics and Power Electronics | 5AT010 | Electrical Components (1/2 Powertrains 4AT060) | C2 | 2.5 |
| EE Electromechanics and Power Electronics | 5SWCO ^[3] | Linear and planar motors for high-precision systems | D | 5 |

Quarter 3

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|-------------------------------------------|----------------------|------------------------------------------------------------------|----|-----|
| EE Control Systems | 5SMB0 | System Identification | C | 5 |
| ME Control Systems Technology | 4SC080 | Supervisory Control of Cyber-Physical Systems | D | 5 |
| ME Dynamics and Control | 4DM30 | Non-linear Control | A | 5 |
| ME Dynamics and Control | 4DM60 | Control of distributed parameter systems | E | 2.5 |
| ME Control Systems Technology | 4DM20 | Engineering Optimization | B | 5 |
| ME Control Systems Technology | 4CM80 | Extremum seeking control for data-based performance optimization | E | 2.5 |
| ME Control Systems Technology | 4CMA0 ^[3] | Physical and data-driven modelling | D | 5 |
| ME Energy Technology | 4EM30 | Scientific Computing for Mechanical Engineering | B | 5 |
| EE Control Systems | 5LMCO | Robust Control | E | 5 |
| EE Control Systems | 5LMB0 | Model predictive Control | A1 | 5 |
| EE Control Systems | 5LMG0 | Advanced Process Control | A2 | 5 |
| EE Electromechanics and Power Electronics | 5SWB0 | Advanced Power Electronics | A | 5 |
| EE Electronic Systems | 5LU0 | Embedded Control Systems | E1 | 5 |

Quarter 4

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|------------------------------------------------------|-----------------------|----------------------------------------------------------------|--------|-----|
| EE Control Systems | 5SC26 | Integration Project SC | E | 5 |
| ME Dynamics and Control | 4DM40 | Modelling and control of manufacturing networks | A | 5 |
| ME Dynamics and Control | 4SC050 | Performance of Nonlinear Control Systems | A | 2.5 |
| ME Dynamics and Control | 4DM70 | Analysis and design of networked dynamical systems | B | 5 |
| ME Dynamics and Control | 4AT080 | Vehicle control | B | 5 |
| ME Control Systems Technology | 4SC040 | Haptics - perception and technology | A | 2.5 |
| ME Control Systems Technology | 4SC030 | Control of magnetic instabilities in fusion plasmas | B | 2.5 |
| ME Control Systems Technology / Dynamics and Control | 4CM20 | Hybrid systems and control | C | 5 |
| ME Control Systems Technology | 4AT030 | Advanced full-electric and hybrid powertrain design | C | 5 |
| ME Control Systems Technology | 4SC070 ^[4] | Learning control | D | 5 |
| ME Control Systems Technology | 4SC020 ^[4] | Mobile Robot Control | D2; D3 | 5 |
| ME Control Systems Technology | 4AT070 | Advanced control for future HD powertrains | D | 5 |
| ME Control Systems Technology | 4DM80 | Fault detection and isolation for control systems | B1 | 2.5 |
| EE Control Systems | 5LMD0 ^[5] | Selected Topics in S&C - course will not be offered in 2023/24 | E2 | 2.5 |
| EE Control Systems | 5SC28 | Machine learning for Systems and Control | B | 5 |
| EE Electromechanics and Power Electronics | 5LWC0 | Advanced actuator design | A1 | 5 |
| EE Electromechanics and Power Electronics | 5LWG0 | Power electronics for high-precision applications | B2; B3 | 5 |

Check actual information about quarter and timeslot in Osiris

^[1] To avoid the (partial) content overlap with the course System theory for control (4CM10), students who follow 4CM10 and 5SMCO will be offered a parallel module within 5SMCO.

^[2] The modeling courses 5CSA0 and 4DM10 cannot both be included in the program of examinations, due to overlap.

^[3] Both courses can be followed simultaneously in timeslot D

^[4] Both courses can be followed simultaneously in timeslot D

^[5] This course is scheduled in the same timeslot as a core course