

**TEACHING AND EXAMINATION REGULATIONS  
(TER)  
(see Article 7.13 of the Higher  
Education and Research Act)**

**2013-2014**

**3TU MASTER'S DEGREE PROGRAMME  
SYSTEMS AND CONTROL**

**DELFT UNIVERSITY OF TECHNOLOGY  
UNIVERSITY OF TWENTE  
EINDHOVEN UNIVERSITY OF TECHNOLOGY**

The Board of the EEMCS Faculty of the University of Twente,

in view of articles 9.5, 9.15, first paragraph, subparagraph a, 7.13, first, second and third paragraph, 9.38, subparagraph b, and 9.18, first paragraph, subparagraph a, as well as article 7.8b of the Higher Education and Scientific Research Act of the Netherlands

having heard the recommendations of the Education Committee of the MSc programme Systems and Control,

with due observance of the consent of the Faculty Council/Faculty Student Council

**hereby establishes**

Teaching and Examination Regulations for the Systems and Control programme.

## **Section 1 - General**

### **Article 1 – Definitions of terms used**

The terms used in these regulations should be interpreted as meaning the same as in the Higher Education and Scientific Research Act, insofar as they are defined in that Act.

The following terms are to be defined thus:

- a. the Act: the Higher Education and Scientific Research Act (in Dutch: Wet op het Hoger onderwijs en Wetenschappelijk onderzoek, WHW), in the Dutch Bulletin of Acts, Orders and Decrees, number 593 and as amended since;
- b. the Dean If an institution that is fully or partly responsible for the programme has opted for a Joint Faculty Board, then “Dean” will also include the Faculty Board;
- c. programme: the Master's degree programme as denoted in Article 7.3a paragraph 1, subparagraph b of the Act;
- d. student: anyone enrolled at the University of Twente as a student or external student for the purpose of benefiting from education and/or for the purpose of sitting the examinations and undergoing the degree audit which form part of the programme;
- e. subject: a unit of study within the programme as referred to in Article 7.3, paragraphs 2 and 3 of the Act;
- f. practical: a practical exercise as intended in Article 7.13, paragraph 2, subparagraph d of the Act, taking one of the following forms:
- writing a thesis
  - conducting a project or developing an experimental design
  - completing a design or research assignment
  - conducting a literature review
  - completing an internship
  - giving a public presentation
  - participating in field work or an excursion
  - conducting tests and experiments
  - writing a position paper

- or participating in other educational activities aimed at enabling participants to attain certain knowledge, insights or skills;
- g. examination: an assessment of the student's knowledge, insight and skills in relation to a subject, as well as the marking of that assessment by at least one examiner, appointed for that purpose by the Board of Examiners;
- h. degree audit: an assessment by which the Board of Examiners, in accordance with Article 7.10 of the Act, establishes whether all examinations in the various subjects that constitute the degree programme have been successfully completed (also referred to as final examination);
- i. Board of Examiners: the programme's Board of Examiners, which has been installed in accordance with Article 7.12 of the Act;
- j. examiner: the individual who, in line with Article 7.12, paragraph 3 of the Act, has been appointed to set the examinations;
- k. credit: a credit awarded in accordance with the European Credit Transfer System (ECTS); one credit denotes a study load of 28 hours;
- l. working day: Monday to Friday with the exception of recognised national public holidays and other days that the university is closed;
- m. study guide: a guide to the degree programme containing specific information pertaining to the various subjects;
- n. graduation supervisor a staff member, appointed by the Board of Examiners, responsible for the supervision of the graduation project.
- o. institution: University of Twente
- p. disability: all conditions which are (at least for the period in question) chronic or lasting in nature and which form a structural limitation for the student in receiving education and/or sitting examinations or taking part in practicals.

## **Article 2 – Programme composition**

1. The following points regarding the programme are included in the Appendix:
  - a. programme composition and relevant examinations,
  - b. whether the programme is full-time, part-time or a sandwich programme,
  - c. composition of the specializations,
  - d. study load of the programme and of each of the units of study making up that programme,
  - e. number and sequence of examinations and practical exercises,
  - f. whether the examinations will be administered in an oral, written or other format,
  - g. the content of the practicals,
  - h. if and when necessary, that a satisfactory result on an examination is a prerequisite for admission to other examinations,
  - i. if and when necessary, that the requirement to participate in a practical will be part of the admission procedure to a particular examination,
  - j. the units of study from which the student may choose to fulfil programme elective requirements,
  - k. the transitional regulations as referred to in article 23.
2. The Appendix forms an integral part of these regulations.

### Article 3 – The programme’s final attainment levels

The graduated Master of Systems and Control Engineering meets, to a sufficient level, the following qualifications:

1. Broad and profound knowledge of engineering sciences (electrical engineering, mechanical engineering, applied physics, mathematics) and the capability to apply this knowledge at an advanced level in the systems-and-control-engineering discipline.
2. Broad and profound scientific and technical knowledge of the systems- and control engineering discipline and the skills to use this knowledge effectively. The discipline is mastered at different levels of abstraction, including a reflective understanding of its structure and relations to other fields, and reaching in part the forefront of scientific or industrial research and development. The knowledge is the basis for innovative contributions to the discipline in the form of new designs or development of new knowledge.
3. Thorough knowledge of paradigms, methods and tools as well as the skills to actively apply this knowledge for analysing , modelling, simulating, designing and performing research with respect to innovative technological dynamical systems, with an appreciation of different application areas.
4. Capability to independently solve technological problems in a systematic way involving problem analysis, formulating sub-problems and providing innovative technical solutions, also in new and unfamiliar situations. This includes a professional attitude towards identifying and acquiring lacking expertise, monitoring and critically evaluating existing knowledge, planning and executing research, adapting to changing circumstances, and integrating new knowledge with an appreciation of its ambiguity, incompleteness and limitations.
5. Capability to work both independently and in multidisciplinary teams, interacting effectively with specialists and taking initiatives where necessary.
6. Capability to effectively communicate (including presenting and reporting) about one’s work such as solutions to problems, conclusions, knowledge and considerations, to both professionals and non-specialised public in the English language.
7. Capability to evaluate and assess the technological, ethical and societal impact of one’s work, and to take responsibility with regard to sustainability, economy and social welfare.
8. Attitude to independently maintain professional competence through life-long learning.

### Article 4 – Admission to the programme

1. Students in possession of a diploma which shows that they have passed the final examination for one of the Bachelor’s programmes, mentioned below, obtained at a Dutch Technical University (Delft, Eindhoven, Twente) or at one of the IDEA League Universities (ETH Zürich, Imperial College London, RWTH Aachen, ParisTech) will be eligible for admission to the programme.

BSc	University D: Delft E: Eindhoven T: Twente	Free admittance	Conditional free admittance	After additional program (max. 30 EC)
Advanced Technology	T			X
Biomedical Technology	E,T			X
Civil Engineering	D, T			X
Electrical Engineering	D,E,T	X		
Aerospace Engineering	D	X		
Marine Technology	D			X
Molecular Science and Technology	D		X	

Chemical Engineering	E, T		X	
Telematics	T			X
Applied Earth Sciences	D			X
Technical Informatics	D, E, T			X
Applied Physics	D, E, T		X	
Technical Mathematics	D, E, T	X		
Mechanical Engineering	D,E,T	X		

2. Students who are not in possession of one of the diploma's mentioned in paragraph 1 will require a certificate of admission issued by the Dean.
3. Notwithstanding the provisions of paragraph 1, the Dean may under special circumstances admit a student to one or more examinations and/or practicals of the programme before the student has passed the Bachelor's examination. A limited period of validity may be set for such permission.
4. Students in possession of a diploma which shows that they have passed the final examination for the Bachelor's programme at a Dutch institute of higher vocational education (HBO), can be admitted. A bridging programme, as detailed in Art. 2.2 of the Appendix, needs to be completed before the candidate is formally admitted.

#### **Article 5 Curriculum**

TU/e: Students must submit all electives and other study components that will be part of their curriculum to the departmental student administration before they begin on their graduation project. The departmental student administration will then provide each student with a curriculum in OWIS, which includes these study components.

#### **Article 6 – Language**

Teaching shall be provided in English. Students shall sit examinations and undergo the degree audit in English. The Dean has the authority to adapt language criteria under certain circumstances.

### **Section 2 – Examinations**

#### **Article 7 - Number, times and frequency of examinations**

1. There are at least two opportunities in each academic year for sitting examinations.
2. A timetable of all opportunities for sitting written examinations is drawn up on a semi-annual basis and details are published before the start of each semester.
3. Notwithstanding the provisions of paragraph 1, there will be at least one opportunity in a year to sit examinations relating to subjects not taught in that academic year.
4. If a subject is removed from the study programme, two opportunities to sit an examination in this subject will be granted after the last classes in this subject have been taught: an examination following the last of the classes, and one resit in the same academic year. In the following academic year there will be two subsequent resits.
5. In exceptional cases, the Board of Examiners may permit a deviation from the standard number of times and the way in which certain examinations may be administered.

#### **Article 8 – Validity of examinations**

1. The result of an examination is valid for an unlimited period.
2. However, in cases where the examination result dates from over six years ago, the Board of Examiners may impose an additional or substitute examination.
3. Written exams are to be kept in possession for at least two years
4. Graded three-dimensional products are to be kept in possession for at least 10 weeks (TUD and TU) or 6 weeks (TU/e) after the moment of grading. If a legal procedure or appeal is initiated within this period the product has to be kept for the entire period of the procedure/appeal.
5. Final reports and traineeship reports are to be kept in possession for at least ten years (UT, TUD) or seven years (TU/e).

#### **Article 9 – Oral examinations**

Oral examinations will be held in public, unless determined otherwise by the Board of Examiners in a special case or unless the student has formally objected to the public nature of the examination.

#### **Article 10 – Determining and announcing the results**

1. The examiner is required to determine the result of an oral examination as soon as it is finished and to supply the student with a written statement of the result.
2. In the case of written examinations, the examiner is required to determine the result as soon as possible after the examination but within 15 working days at most. Taking due account of the student's right to privacy, the student administration then ensures that the results are registered and published within 20 working days of the examination date. If the examiner is unable to meet these criteria due to extenuating circumstances, the examiner must inform the Board of Examiners, stating reasons for the delay. The Board of Examiners will then pass this information on to the student or students without delay, and a new date for announcing exam results will simultaneously be made known.
3. Regarding any examinations that are not taken orally or in writing, the Board of Examiners will determine beforehand precisely how and within what period of time the student will be notified of the results.
4. When receiving the result of an examination, the student will be made aware of his or her right to inspect the results as referred to in Article 11, the opportunity for a subsequent discussion as referred to in Article 12 and the opportunity to lodge an appeal with the Examination Appeals Board.
5. The date of an examination is defined as the date on which the written or oral examination took place. For a practical assignment the date of examination is the day on which the final report was handed in or the day on which the oral end presentation took place or, if reports or oral presentations are not part of the assessment, the day on which the practical assignment was completed.

#### **Article 11 – The right to inspect the results**

1. For a period of at least 20 working days after notification of the results of any written examination, the student has the right to inspect his or her marked work, on request. If a student intends to lodge an appeal regarding the marking of his or her written work, he or she will be supplied with a copy of the marked work at cost price.
2. During the period referred to in paragraph 1, all interested individuals may acquaint themselves with the questions and assignments set in the examination in question, as well as with the criteria used for marking.

3. The Board of Examiners may determine that the right to inspection as referred to in paragraphs 1 and 2 will be exercised at a location specified beforehand and at no less than two specific times, also to be decided in advance.

If the student can prove that he/she is or was unable to be present at the location at the set time due to circumstances beyond his or her control, then another opportunity will be provided, if possible within the period stated in paragraph 1.

The location and times mentioned in the first sentence will be announced within five working days.

### **Article 12 – Subsequent discussion of the examination results**

1. As soon as possible after the results of an oral examination have been announced, an opportunity will be arranged for the examiner to discuss the results with the student, if so requested by the student or at the instigation of the examiner. At this meeting, the reasons behind the marks awarded will be explained.
2. For a period of 20 working days after the results have been announced, students who have taken a written examination may submit a request to discuss the results with the relevant examiner. The discussion will take place within a reasonable time span and at a place and time determined by the examiner.
3. In cases where a collective discussion is organised by or on the instructions of the Board of Examiners, a student may only submit a request, as referred to in the preceding paragraph, if the student was present at the collective discussion and if the student provides a good reason for the request or if, due to circumstances beyond the student's control, the student was unable to attend the collective discussion.
4. The provisions of paragraph 3 are similarly applicable if either the Board of Examiners or the examiner first gives the student the opportunity to compare his/her answers with model answers.
5. The Board of Examiners may permit deviations from the provisions of paragraphs 2 and 3.

## **Section 3 – Studying with a disability**

### **Article 13 – Adaptations to assist students with a disability**

1. Students who have a physical or sensory disability are entitled to adaptations in teaching, examinations and practicals. If possible, the student must submit a written request to the Dean at least three months before the student is due to participate in course work, examinations and/or practicals. These adaptations will be geared as much as possible to a student's individual needs, but they must not affect the quality or the degree of difficulty of a subject or an examination programme. The facilities provided to this end may involve adapting the form or duration of examinations and/or practicals to the student's individual situation or making practical aids available. (At TU/e, this request should be submitted to the STU/International Relations Office.
2. The request referred to in paragraph 1 should be accompanied by a recent medical certificate from a doctor or a psychologist. If there is evidence of dyslexia, for example, the request should be accompanied by a document issued by a recognised dyslexia-testing bureau (i.e. registered with BIG, NIB, or NVO). If possible, this certificate should also give an estimation of the extent of the disability and of appropriate steps that could be taken by the programme organisation.
3. The Dean will decide on requests for adaptations to the educational environment. The Board of Examiners will decide on requests for adapting examinations. The decision must be announced within four weeks after the request as mentioned in paragraph 1 has been submitted.

## **Section 4 – Approval by the Board of Examiners**

### **Article 14 Exemption from examinations or practicals**

1. After having been advised by the relevant examiner, the Board of Examiners may decide to exempt students from an examination or practical. Conditions for exemption are to be specified in:
  - The Exam Regulations of the Board of Examiners (Eindhoven),
  - The Rules and Regulations of the Board of Examiners (Delft, Twente).
2. The Board of Examiners may exempt a student from a specific examination only on the grounds of the content, level and quality of examinations successfully completed earlier or on the grounds of the student's prior knowledge, insights and skills developed outside of higher education.

### **Article 15 Elective subjects**

Criteria for approval of elective subjects to be followed by the student, as referred to in Art. 5 of the Appendix, are contained in:

- The Exam Regulations of the Board of Examiners (Eindhoven),
- The Rules and Regulations of the Board of Examiners (Delft, Twente).

### **Article 16 Free programme choice**

The Board of Examiners shall decide on reasoned requests from students for free programme choice as referred to in Article 7.3c of the Act. Conditions related to this matter are described in Art.8 of the Appendix. Criteria for approval for a free programme are contained in:

- The Exam Regulations of the Board of Examiners (Eindhoven),
- The Rules and Regulations of the Board of Examiners (Delft, Twente).

## **Section 5 – Degree audit**

### **Article 17 – The times and frequency of the degree audit**

The dates set by the Board of Examiners are to be published before the start of the academic year. Each academic year there are at least two degree audits

### **Article 18 – Student support and guidance**

Responsibility for student support and guidance lies with the Dean. This includes informing students about study options within the programme or elsewhere. One or more study advisers may be appointed for this purpose.

### **Article 19 – Monitoring academic progress**

1. The Dean is responsible for the registration and timely publication of the exam results of individual students in the institution's virtual learning system.



2. The Dean is responsible for facilitating discussion of the results between the student and the study adviser, when appropriate.

## **Section 6 – Appeals and objections**

### **Article 20**

1. Decisions by the Board of Examiners or examiners based on these regulations, may be appealed within six weeks after the announcement of the decision to the student in question. Appeals should be lodged with the Examination Appeals Board.
2. Decisions by the Dean based on these regulations may be appealed within six weeks after the announcement of the decision to the student in question. Objections are to be lodged with the Dean.

## **Section 7 – Contravention, changes and implementation**

### **Article 21 – Contravening the Regulations**

If the study guide and/or any other regulations relating to the study programme and/or the examination programme prove to contravene these Regulations and the accompanying Appendix, precedence will be given to the provisions of these Regulations with which the Appendix forms an integral whole.

### **Article 22 – Amendments to the regulations**

1. Any amendments to these regulations will be made by special resolution of the Dean.
2. No amendments will affect the current academic year unless it is reasonable to suppose that the interests of students will not be adversely affected.
3. Amendments to these regulations may not retroactively affect a decision by the Board of Examiners to the detriment of the student.

### **Article 23 – Transitional regulations**

1. If the composition of the study programme undergoes intrinsic changes or if these regulations are amended, the Dean will draw up transitional regulations that will be incorporated into Appendix of these Regulations.
2. If and when appropriate, such transitional regulations are required to include:
  - a. a provision concerning the exemptions that can be given on the basis of the examinations already passed;
  - b. a provision specifying the validity of the transitional regulations.
3. Students at TU/e: In accordance with Article 1.2.1.b of the Teaching and Examination Regulations for Bachelor's programs "in afbouw" at TU/e, a Bachelor's student may participate in some elements of the Master's program (without actually being enrolled in the Master's program), provided he fulfills the requirements and has received permission to do so from the Examinations Committee of the relevant Master's program.
4. Students belonging the categories 23.3 are allowed to start their graduation project only if they have passed the Bachelor's audit referred to in Article 4 paragraph 1.
5. Students in Twente with an approved examination programme for the Master Mechatronics, that want to enroll in the Master Systems and Control, have to issue a request to the Board of Examiners. The Board of Examiners evaluates the examination programme with respect to the

Systems and Control exit qualifications that were effective at the time the examination programme was approved. If the Board of Examiners concludes that the exit qualifications for Systems and Control are met, then the examination programme will be accepted as examination programme for the Master Systems and Control. The Board of Examiners may request changes or additions to the examination programme, before giving their approval.

#### **Article 24 – Publication of the regulations**

The Teaching and Examination Regulations and the Appendix, which forms an integral whole with the Regulations, shall be published on the institution's website.

#### **Article 25 – Entry into force**

These regulations will come into effect on September 1, 2013

**APPENDIX TO TEACHING AND EXAMINATION REGULATIONS**

**IMPLEMENTATION REGULATIONS**

2013-2014

**3TU MASTER'S DEGREE PROGRAMME**

**Systems and Control**

**DELFT UNIVERSITY OF TECHNOLOGY  
UNIVERSITY OF TWENTE  
EINDHOVEN UNIVERSITY OF TECHNOLOGY**

## Article 1 - Study load

1. The Master's degree audit for the Systems and Control programme has a study load of 120 credits. These 120 credits must not include any credits which constituted part of a previously passed Bachelor's audit.
2. The programme will be taught in full-time.

## Article 2 - Composition of the degree programme

1. The composition of the study programme for the student generation 2012-2013 is as follows:

Part	Number of credits
Core programme, as described in Article 3	24
Specialisation-linked subjects, as described in Article 4, Complemented with Elective subjects, as described in Article 5,	36
Internship / Literature study / Graduation work, as described in Article 6	60

2. Before being admitted to the programme on the basis of a Bachelor's degree awarded by a Dutch institute of professional education, students must also complete a bridging programme (preferably within a year of commencing their course of study) that includes the following subjects:

At Delft University of Technology, an obligatory programma of 30 EC:

Code	Course	Credits
WI1909TH	Differentiaalvergelijkingen	3
WI1807TH1	Lineaire algebra 1,	3
WI1708TH1	Analyse 1,	3
WI1708TH2	Analyse 2,	3
WI1708TH3	Analyse 3,	3
WI3104TN	Statistiek	3
SC3011TN	Stochastische signaalanalyse	3
TN2545	Systemen en signalen	6
WB2207-07	Regeltechniek	3

At the University of Twente, an obligatory programme of at most 29 EC (can be different in individual cases) :

Code	Course	Credits
191512001	Calculus A	4
191512021	Calculus B	3
191512041	Calculus C	3
191512061	Lineaire Algebra A	3
191512081	Lineaire Algebra B	2
191231490	Lineaire Systemen	6
191530062	Kansrekening	3
191157170	Statica voor WB <sup>1</sup>	2
191157180	Stijfheid en Sterkte 1 <sup>1</sup>	3
191210001	Instrumentation for Embedded Systems <sup>2</sup>	5

<sup>1</sup> For students having an Electrical Engineering background

<sup>2</sup> For students having a Mechanical Engineering background

At Eindhoven University of Technology, an obligatory programme of 40 EC.:

**Obligatory courses:**

<b>Code</b>	<b>Course</b>	<b>Credits</b>
2DL03	Basis Wiskunde	3
2DL04	Calculus A	3
2DL06	Linear Algebra	3
0LAB0	Inleiding Modelleren: Dynamische Systemen	5
4CA00	Signalen	5
4DB00	Regelen van Mechanische Systemen	5
5AIB0	Sensing, Computing and Actuating	5
4HH01	Trainingen 1	1
	4TR03 RSI	
	4TR02 Arbo & milieu	
	9ST11 Engelse toets	
4H000	Schakel Eindproject + Training Writing Skills	10

The three bridging programmes are interchangeable.

**Article 3 - Core programme**

Students must complete one of the three core programmes shown below, totalling 24 credits. The three core programmes are interchangeable.

At Delft University of Technology:

<b>Code</b>	<b>Course</b>	<b>Credits</b>
SC4010	Introduction project SC	3
SC4025	Control theory	6
SC4092	Modelling and Nonlinear Systems Theory	4
SC4040	Filtering & identification	6
SC4050	Integration project SC	5

At the University of Twente:

<b>Code</b>	<b>Course</b>	<b>Credits</b>
201100178	Introduction project	4
191211110	Modeling: Modelling and Simulation	5
191131700	System identification and param. estim.	5
191210770	Control: Digital Control Engineering	5
200900012	Integration project	5

At Eindhoven University of Technology:

<b>Code</b>	<b>Course</b>	<b>Credits</b>
4K410	Introduction project (Digital Motion Control)	3
4K580	Control (System theory for control)	3
5SC20	Control (State space control)	3
4K150	Control (Advanced motion control)	3
4J520	Modeling (Non-linear dynamics)	3

5MX00	Modeling (Dynamical Systems)*	3
4K560	Modeling (Physical modeling for S&C)	3
5MB40	Identification (System Identification)	3
4SC00	Integration project Systems and Control	3

\* One of the two courses 4J520 or 5MX00 is to be chosen.

#### Article 4 – Specialisations and specialisation-linked subjects.

For each specialisation, courses are selected from the list of elective courses as described in Article 5.4, after consultation with the graduation supervisor of one of the chairs of the specialisation, and to be approved by the Board of Examiners.

1. No specialisations are offered at Delft University of Technology
2. The following specialisations are offered at the University of Twente:
  1. Robotics and Mechatronics
  2. Control Theory

Obligatory to both specialisations is

191616040	Philosophy of Engineering	5
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3. The following specialisations are/will be offered at the Eindhoven University of Technology:
  1. Control Systems
  2. Control Systems Technology
  3. Dynamics and Control
  4. Electro Mechanics and Power Electronics
  5. Systems Engineering

For each of these 5 specialisations elective courses, worth 9 credits, are chosen from the lists described in Article 5.4, after consultation with the graduation supervisor of the specialisation.

#### Article 5 – Elective subjects

1. The number of credits obtained in specialisation-linked courses, as explained in Article 4, is complemented to a total of 36 credits with Elective subjects, selected from the in Article 5.4 mentioned lists from the three universities in question. In consultation with the graduation supervisor courses from all three universities can be chosen. These lists can be expanded and the total programme of 36 credits has to be approved by the Board of Examiners.
2. At the TU Delft the following extra regulations hold:
  - a. Students need to include at least 3 and maximally 13 credits in technical courses on Master's level, that are not contained in the lists mentioned in Article 5.4.
  - b. Students need to include at least 3 and maximally 6 credits in non-technical courses on Master's level, that are related to the exit qualifications of the MSc programme, as described in Article 3.7 of the Teaching and Examination Regulations.
3. At the TU/e students are allowed during their first semester to choose up to 9 credits in courses from the lists of elective courses mentioned in Article 5.4. without consultation of the graduation supervisor.
4. Lists of Elective courses:

Explanation of research theme abbreviations:

Fu: Fundamentals	MT: Mechatronics	CS: Computer Science
ST: System Theory	Tr: Transportation	ES: Embedded Systems
CT: Control Theory	Ae: Aerospace	MC: Motion Control
PC: Process Control	Ma: Mathematics	NC: Non-linear Control
BT: Biotechnology	RM: Robotics & Mechatronics	AM: Automotive

**Offered at Delft University of Technology:**

Course code	Course name	EC	Research Themes								
			Fu	ST/ CT	PC	BT	RM	Tr	Ae	AM	
AE3202	Flight dynamics 1	4								x	
AE4301	Automatic flight control system design	3								x	
AE4307	Flight and space simulation	4								x	
AE4313	Spacecraft attitude dynamics and control	3								x	
CI4801	Transportation and spatial modeling	6							x		
CI4821-09	Traffic flow theory and simulation	6							x		
CI4822-09	Traffic management and control	6							x		x
CI5804-09	Innovations in dynamic traffic management	4							x		x
ET4245ME	Electromechanics in mechatronic systems	3						x			
LM3512TU	Systems biology	6			x	x					
ME1100	Automotive Crash Safety; Active & Passive Safety Systems	3							x		x
ME1200	Robust Multivariable Control Design	6	x	x							
SC4045	Control of High Resolution Imaging	3		x				x			
SC4060	Model predictive control	4		x	x	x			x	x	
SC4081-10	Knowledge based control systems	4			x	x			x		
SC4091	Optimization in Systems and Control	4			x	x			x		
SC4110	System identification	5		x	x			x			
SC4120	Special topics in signals, syst. and contr.	3		x							
SC4160	Modeling and control of hybrid systems	3		x			x		x	x	
SC4210	Vehicle mechatronics	4						x	x		x
SC4230TU	Vehicle dyn.B–Antilock Braking Systems	3						x	x		x
SC4240TU	Control methods for robotics	3		x				x			
SC4250	Probabilistic Models in the Life Sciences	2	x		x	x					
WB2303-10	Measurement in Engineering	3						x			
WB2305	Digital control	3			x	x		x	x	x	
WB2414-09	Mechatronic system design	4						x			
WB2427	Predictive modeling	3						x			
WI4209	Systems and Control	6	x	x							
WI4218	Convex optimization and systems theory	6	x	x							
WI4221	Control of discrete-time stochastic systems	6	x	x							

**Offered at the University of Twente:**

Course code	Course name	EC	Research Themes						
			Fu	ST	Ma	RM	CS	ES	CT
191560671	Robust Control	5		x	x				x
191561620	Optimal Control	5		x	x				x
191211060	Modern Robotics	5				x			
191211110	Modeling and simulation	5		x					
191571090	Time Series Analysis	5		x					
191210760	Advanced Programming	5					x	x	
191211080	Systems Engineering	5		x				x	
191211090	Real-Time Software Development	5					x	x	
191211100	Mechatronic Design of Motion Systems	5				x			
191561750	Infinite Dimensional Linear Systems	6		x	x				
191561770	Nonlinear System Theory	5		x	x				
191571200	Hybrid Dynamical Systems	5		x			x		
191571501	Stochastic Differential Equations	6		x	x				
201200135	Random Signals and Filtering	5		x					
191131720	Advanced motion and vibration control	5							x
191131730	Dynamics of machines	5		x		x			
191131360	Design Principles for precision mech.	5		x		x			
191210930	Measurement Systems for Mechatronics	5				x			
191157740	Advanced Dynamics	5							
191210920	Optimal Estimation in Dynamic Systems	5		x					
191561560	Systems and Control	6	x	x	x				x

#### Homologation courses

Course code	Course name	EC	Research Themes						
			Fu	ST	Ma	RM	CS	ES	CT
191157170	Statics	2							
191157140	Dynamics 2	3.5							
191157110	Introduction to the Finite Element Method	3,5							
191210001	Instrumentation for embedded systems	5							
191210430	Engineering System Dynamics	3							
191157150	Mechanics of Materials 2	3.5							
191210441	Control Engineering	4							

#### Offered at Eindhoven University of Technology:

Course code	Course name	EC	Research Themes						
			Fu	ST	MC	NC	MT	PC	AM
4AT30	Modelling and Control of Diesel Engines	3		x		x			
4C560	Analysis of hybrid systems	3		x		x		x	x
4C660	Dynamics and Control of hybrid manufacturing systems	3				x		x	x
4J100	Control of nonlinear mechanical systems	3		x		x			x
4J300	Control of distributed parameter systems	3	x	x					
4J400	Multi-body dynamics	3	x		x	x	x		x
4J530	Engineering optimization: concepts and applications	3			x	x	x	x	x



4J570	Advanced vehicle dynamics	3								X
4J580	Humanoid robotics	3			X	X	X			
4J590	Performance of nonlinear control systems	3		X		X				
4J820	Applied nonlinear control	3			X	X	X			
4K140	Capita Selecta in control	3		X						
4K160	Modeling, analysis and control of hybrid dynamical systems	3	X	X						
4K420	Supervisory machine control	3							X	
4K450	Embedded motion control	3			X		X			
4K480	Control and Operation of Tokamaks	3				X		X		
4K490	Advanced control for fusion plasmas	3				X		X		
4L160	Introduction robotics	3			X	X	X			
4L810	Fundamentals of systematic low noise design	3					X			X
4S100	Verification of discrete events systems	3	X	X						
4T400	Stochastic models of manufacturing systems	3	X	X					X	
4T500	Modeling and control of manufacturing systems	3							X	
4T700	Engineering optimization: advanced topics	3			X	X	X	X	X	X
5EE90	Electrical Components	3					X			
5EP10	Design and application of industrial linear motors	3			X		X			
5MB10	Model reduction	3		X	X		X	X		
5MB30	Robust control	3		X	X		X	X		
5ME10	Statistical Signal processing	3	X	X						
5MJ00	Electrical machines	3			X		X			X
5MJ30	Realization of Power Converters	3			X		X			X
5N280	Low power electronics	3			X		X			X
5P060	Nonlinear systems/neural networks	4				X				
5P190	Control of rotating-field machines				X	X	X			
5P630	Special topics in power electronics				X		X			X
5p690	Advanced actuator systems			X	X		X			
5SC21	Modeling and predictive control	3		X					X	
0C903 *)	Energy and consumer	3								
0EM70 *)	Ethics and the risk	3								
0EM81 *)	Innovation and intellectual property	3								

\*) one of the courses 0C903, 0EM70, 0EM81, needs to be added to the programme.

#### Article 6 – Internship/ Literature study/ Graduation Work

1. At the TU Delft student can optionally do an internship worth 15 credits. Students must complete a literature study worth 15 credits and a graduation work worth 30 (if an internship is completed) or 45 credits.
2. At the TU Eindhoven students need to complete an internship or a literature study, each worth 15 credits, complemented with a graduation work worth 45 credits.

3. At the UT students need to complete an internship worth 20 credits, complemented with a graduation work worth 40 credits.
4. Graduation work consists of a graduation project, a graduation report, a summary of the report (Twente and Eindhoven), a poster (Eindhoven), one intermediate presentation (Delft), participation in MSc workshops (Delft) and a final presentation.
5. Students may not commence a literature study or an internship until they have:
  - completed a bridging programme (in the event that such a programme was required in accordance with Article 2, paragraph 2),
  - passed the Bachelor's audit referred to in Article 4 paragraph 1 of the Teaching and Examination Regulations (if applicable).

Furthermore:

- |               |   |
|---------------|---|
| In Twente:    | completed 40 EC of the first year, including the core programme referred to in Article 3,             |
| In Delft:     | completed at least 54 EC of the first year programme  |
| In Eindhoven: | completed at least 30 EC of the first year programme, of which at least 15 EC from the core programme |

6. Students may not commence with their graduation project until they have:
  - In Delft and Twente:
    - completed all of the remaining components of the study programme.
  - In Eindhoven:
    - completed at least 69 EC of the remaining components of the study programme. The graduation supervisor can permit deviations of this stipulation, after consulting with and permission of the Board of Examiners

### **Article 7 – Study Programme**

1. Before commencing the graduation project, students must draw up their study programme and submit this to the Board of Examiners for approval.  
UT: Students must submit within three months after enrolling in the Master a complete Master curriculum to the Board of Examiners for approval.
2. Each individual amendment to an approved study programme must be resubmitted to the Board of Examiners for approval.

### **Article 8 - Free degree programme**

1. Students can compile their own degree programme, with an associated degree audit. The degree programme, which requires prior approval by the Board of Examiners, must consist wholly or largely of components taught at one of the three universities within the framework of, or in support of, the programme. It may be supplemented by components taught within the framework of, or in support of, other degree programmes.
2. When applying to the Board of Examiners for the prior approval referred to in paragraph 1, students must provide details of their reasons for making this request.

### **Article 9 – Practical exercises**

1. Practical exercises, as described in Article 1 subsection f of the Teaching and Examination Regulations, are taught in accordance with the method described in the prospectus of the subject in question.
2. Any students who fail to complete the practical exercises will be barred from sitting the examination, unless stated otherwise in the prospectus of the subject in question.

**Article 10 - The form of the examinations**

1. Examinations will be administered in accordance with the details set out in the prospectus of the subject in question.
2. Examinations held by another programme within the framework of another programme are administered in accordance with the procedure set out in, or pursuant to, the Teaching and Examination Regulations of that other programme.

**Article 11 – The frequency, terms and sequence of examinations**

1. Written and oral examinations are held immediately after the teaching period for the course to which the examination in question relates.
2. Written examination resits are held as follows:
  - examination after teaching period 1: resits after teaching period 2
  - examination after teaching period 2: resits after teaching period 3
  - examination after teaching period 3: resits after teaching period 4
  - examination after teaching period 4: resits during the August resit period
3. Participation in practical exercises is governed by the timetables drawn up for this purpose.

**Article 12 - Transitional regulations**

Not applicable.