ONDERWIJS- EN EXAMENREGELING 2024-2025

VAN DE MASTEROPLEIDINGEN

MECHANICAL ENGINEERING,

AUTOMOTIVE TECHNOLOGY,

SUSTAINABLE ENERGY TECHNOLOGY EN

SYSTEMS AND CONTROL

VOLGENS DE GRADUATE SCHOOL

Het bestuur van de (penvoerende) faculteit Mechanical Engineering van de Technische Universiteit Eindhoven, TU/e,
besluit deze Onderwijs- en Examenregeling (hierna OER) van de masteropleidingen Mechanical Engineering (ME), Automotive Technology (AT), Sustainable Energy Technology (SET) en Systems and Control (S&C)

gelet op de artikelen 9.5, 9.15, eerste lid, onder a, 7.13, 9.38, onder b, van de Wet op het hoger onderwijs en wetenschappelijk onderzoek (WHW),

en 9.18, eerste lid, onder a, alsmede artikel 7.8b WHW,

gelet op de instemming/het advies van de gemeenschappelijke opleidingscommissie d.d. 16 april 2024,

PROGRAM AND EXAMINATION REGULATIONS 2024-2025

FOR THE MASTER'S PROGRAMS IN

MECHANICAL ENGINEERING,

AUTOMOTIVE TECHNOLOGY,

SUSTAINABLE ENERGY TECHNOLOGY, AND

SYSTEMS AND CONTROL

ACCORDING TO THE GRADUATE SCHOOL

The Board of the (coordinating) department Mechanical Engineering of Eindhoven University of Technology, TU/e,
hereby establishes these Program and Examination Regulations (hereafter PER) for the Master's programs in Mechanical Engineering (ME), Automotive Technology (AT), Sustainable Energy Technology (SET) and Systems and Control (S&C) .

in view of Articles 9.5, 9.15, paragraph 1 under a, Article 7.13, Article 9.38 under b, Wet op het hoger onderwijs en wetenschappelijk onderzoek' (WHW),

and Article 9.18, paragraph 1 under a, as well as Article 7.8b WHW,

In view of the approval/the advice of the Joint Program Committee of the Masters chamber on April 16, 2024,

gelet op de instemming/het advies van de universiteitsraad d.d. 22 april 2024,

gelet op de instemming/het advies van de faculteitsraad d.d. 4 juli 2024,

gelet op de instemming/het advies van de opleidingscommissies d.d. 13 juni 2024 (Mechanical Engineering), 18 juni 2024 (Automotive Technology en Sustainable Energy Technology) en 20 juni 2024 (Systems & Control).

in view of the approval/the advice by the University Council on April 22, 2024,

in view of the approval/the advice of the Department Council dated 4 July, 2024,

in view of the approval/the advice of the Program Committees dated June 13 , 2024 (Mechanical Engineering), June 18, 2024 (Automotive Technology and Sustainable Energy Technology) and June 20, 2024 (Systems & Control).

Deze OER die op 1 september 2024 in werking treedt - met uitzondering van artikel 3.7, 3.8 en 5.1 lid 1 die met ingang van 1 augustus 2024 in werking treden - en geldig is tot en met 31 augustus 2025,

luidt als volgt:

This PER which enters into force on September 1, 2024 - with exception of Articles 3.7 and 3.8 that enter into force on August 1, 2024 - and are applicable to August 31, 2025,

read as follows:

H1/C1	**H1 ALGEMENE BEPALINGEN**	**C1 GENERAL PROVISIONS**
Art 1.1	**Toepassingsgebied**	**Scope**
1.	Deze regeling is van toepassing op het onderwijs, de tentamens en het examen van de masteropleiding Mechanical Engineering, Automotive Technology, Sustainable Energy Technology en Systems and Control.	These regulations apply to the teaching, examinations and final examinations of the Master's program in Mechanical Engineering, Automotive Technology, Sustainable Energy Technology and Systems and Control.
2.	Bepalingen van de OER van de betreffende bacheloropleiding zijn van toepassing wanneer masterstudenten bachelor onderwijseenheden volgen.	Stipulations of the PER of the bachelor's program in question apply if master's students take bachelor's program study components.
3.	De bijlagen maken integraal onderdeel uit van deze regeling.	The appendices constitute an integral part of these Regulations.
4.	Deze regeling is beschikbaar in het Nederlands en Engels. In het geval van een verschil in tekst of interpretatie tussen beide versies, dan is de Nederlandse versie leidend.	These regulations are available in Dutch and English. In the event of a difference in text or interpretation between the two versions, the Dutch version is leading.
5.	Niet van toepassing.	Not applicable.
Art 1.2	**Begripsbepalingen**	**Definitions**
1.	In deze regeling wordt verstaan onder:	In these regulations, the following definitions shall apply:
a.	*Canvas* Canvas is het Learning Management System van de TU/e. Het is een online omgeving voor cursusmateriaal - projectgroepen, opdrachten, quizzen en meer - dat een aanvulling vormt op het onderwijs (met een persoonlijke aanpak).	*Canvas* Canvas is the TU/e Learning Management System. It is an online environment for course materials – project groups, assignments, quizzes, and more – that complements (face-to-face) education.

b.	*Center for Student Administration (CSA)* het Center for Student Administration, de afdeling waaronder alle onderwijsadministratiemedewerkers van de TU/e in dienst zijn. Elke faculteit heeft een facultair CSA.	*Center for Student Administration (CSA)* the Center for Student Administration, the division where all program administration officers of TU/e work. Each department has its own Departmental CSA.
c.	*competentie* de capaciteiten van een individu om een bepaalde combinatie van attitudes, vaardigheden en kennis te verkrijgen, selecteren en gebruiken, die vereist is om zich effectief in een specifieke professionele, maatschappelijke of onderwijssituatie te gedragen.	*competency* an individual's ability to acquire, select and use the set of attitudes, skills and knowledge that is required to behave effectively in a specific professional, societal or educational setting.
d.	*Education and Student Affairs (ESA)* de dienst binnen de TU/e waar studenten e.a. terecht kunnen voor een gevarieerd aanbod aan diensten op het terrein van onderwijsondersteuning.	*Education and Student Affairs (ESA)* the service within TU/e where students and others can make use of a variety of services in the field of educational support.
e.	*eindcijfer* het cijfer van een onderwijseenheid dat is bepaald op basis van het cijfer (de cijfers) dat (die) is (zijn) behaald met (de component(en) van) het tentamen.	*final grade* the grade for a study component that is determined on the basis of the grade (grades) that was (were) achieved for (the parts of) the examination.
f.	*examenprogramma* een geheel van onderwijseenheden dat voor studenten het programma van de opleiding vormt.	*program of examinations* a coherent set of study components that comprises students' degree programs.
g.	*examinator* een functionaris die verantwoordelijk is voor een individuele onderwijseenheid aan de TU/e en door de examencommissie is aangewezen voor het beoordelen van studenten door middel van het	*examiner* the officer responsible for an individual study component at TU/e who is appointed by the examination committee to assess students by means of examinations about the study component and to determine their results.

	afnemen van tentamens over de onderwijseenheid en het vaststellen van de uitslag daarvan.	
h.	*examen* het masterexamen van de opleiding. Dit examen is met goed gevolg afgelegd als aan alle verplichtingen van de gehele masteropleiding is voldaan.	*final examination* the master's examination of the degree program. This examination is successfully completed if all requirements have been met concerning the master's degree program as a whole.
i.	*kwartiel* de vier perioden waarin het academisch jaar is verdeeld. De aanvangs- en sluitingsdatum van deze kwartielen wordt jaarlijks vastgelegd in de Academische Jaaragenda TU/e.	*quarter* the four periods into which the academic year is divided. The start and end dates of these quarters are determined annually in the TU/e annual academic calendar.
j.	*materiedeskundige* een inhoudelijk bekwame functionaris, niet zijnde een student.	*subject specialist* a teacher or similar representative with expertise concerning content who is not a student.
k.	*mentor* een universitair docent, een universitair hoofddocent of een hoogleraar, die studenten begeleidt bij het samenstellen van hun examenprogramma en de keuzes die daarbij moeten worden gemaakt.	*mentor* a teacher, assistant, associate or full professor, who supervises students as they put together their program of examinations and the related choices that need to be made.
l.	*niet voldaan (NVD)* de beoordeling van een onderwijseenheid indien de student niet aan alle eisen heeft voldaan, waardoor geen eindcijfer voor het tentamen kan worden vastgesteld.	*not met requirements (NMR)* assessment of a study component in cases where students have not met all requirements, so that the final grade cannot be determined for the exam.
m.	*omzwaaier* een student die de inschrijving voor een bepaalde opleiding dan wel een bepaald schakelprogramma gedurende het studiejaar wijzigt in een	*intra-university transfer student*

	inschrijving voor een andere opleiding of schakelprogramma binnen de TU/e.	students who alter their enrollment in a certain degree program or pre-master's program in the running academic year into an enrollment in another degree program or pre-master's program at the TU/e.
n.	*onderwijscatalogus* het onderdeel van OSIRIS waar informatie over onderwijseenheden is opgeslagen en wordt getoond, waaronder o.a. de betrokken docenten, de toetsonderdelen en de bijbehorende weging.	*course catalogue* the part of OSIRIS in which information about study components is stored and displayed, including, among other things, the teachers involved, the parts of the test and how these are weighed.
o.	*onderwijseenheid* een onderdeel van de opleiding gericht op de verwezenlijking van welomschreven doelen op het gebied van kennis, inzicht, vaardigheden en competentie-ontwikkeling, waaraan een tentamen is verbonden.	*study component* a component of the degree program aimed at achieving clearly defined goals concerning knowledge, insight, skills, and/or competency development with an associated examination.
p.	*OSIRIS* het onderwijsadministratiesysteem waarin gedurende de inschrijfperiode de administratie van studenten wordt bijgehouden door de facultaire onderwijsadministraties (Facultaire CSA).	*OSIRIS* the educational administration system in which the administration of students is maintained by the Departmental Center of Student Administration during the registration period.
q.	*praktische oefening* een onderwijsactiviteit in één van de volgende vormen: - het maken van een scriptie (afstudeerproject), - het maken van een werkstuk of een proefontwerp, - het uitvoeren van een ontwerp- of onderzoekopdracht/-project, - het verrichten van een literatuurstudie, - het doorlopen van een stage - het verzorgen van een (openbare) presentatie, - het deelnemen aan veldwerk of een excursie,	*practical exercise* an educational activity in one of the following forms: - writing a thesis (graduation project), - undertaking a project or an experimental design, - carrying out a design or research assignment/project, - doing a literature study, - doing an internship, - making a (public) presentation, - taking part in fieldwork or an excursion,

- het uitvoeren van proeven en experimenten,
- het schrijven van een position paper,
- het deelnemen aan andere praktische onderwijsactiviteiten gericht op het verwerven van beoogde vaardigheden.

De betreffende onderwijsactiviteit is (een onderdeel van) een onderwijseenheid die met een tentamen wordt afgerond.

- conducting tests and experiments,
- writing a position paper,
- taking part in other practical educational activities designed to acquire specific skills.

The educational activity in question is (part of) a study component that is finalized with an exam.

r. *professionele vaardigheden*
niet-disciplinaire vaardigheden die noodzakelijk zijn voor een succesvol afgestudeerde master in een professionele omgeving.

professional skills
non-disciplinary skills required in a professional environment by a successful master's graduate.

s. *reactietermijn*
een termijn van vier weken waarbinnen de examencommissie dient te besluiten na ontvangst van een verzoek, tenzij het verzoek is ontvangen na de vergadering van de examencommissie in juni. Een dergelijk verzoek wordt uiterlijk in de vergadering van augustus afgehandeld.

response term
the examination committee must decide within four weeks of having received a request, unless the request was made after the examination committee meeting held in June. Such requests are processed in the August meeting at the latest.

t. *schakelprogramma*
een programma om deficiënties weg te werken dat na afronding toegang geeft tot een bepaalde masteropleiding.

pre-master's program
a program to eliminate deficiencies which after completion grants admission to a particular master's degree program.

u. *schakelstudent*
degene die voor de toelating tot de masteropleiding een schakelprogramma volgt om deficiënties weg te werken.

pre-master's student
students who are required to follow a pre-master's program to eliminate deficiencies before being admitted to the master's degree program.

v. *schriftelijk*
daar waar de term 'schriftelijk' wordt gebruikt, wordt eveneens digitale communicatie (e-mail) of digitale afname van tentamens bedoeld.

written
where the term 'written' is used, digital communication (e-mail) or digital examinations are implied too.

w. *spijtoptant*

re-enroller

	iemand die zich na een onderbreking opnieuw als student aan de TU/e inschrijft.	a person who re-enrolls at TU/e after an interruption.
w1.	*studeerwijzer* een uitgebreide beschrijving en planning van een onderwijseenheid in Canvas om studenten te informeren over de leerdoelen en de opbouw van de onderwijseenheid, het werk dat van studenten wordt verwacht, de verbanden met de overige onderdelen van de opleiding en eventueel met de praktijk, de algehele organisatie binnen de onderwijseenheid, de toetsing en de wijze waarop terugkoppeling tussen docent en student is ingebouwd. De studeerwijzer is twee weken voor aanvang van het onderwijs beschikbaar.	*study guide* a comprehensive description and schedule of a study component in Canvas meant to inform students about the learning objectives and structure of the study component, the work that is expected of the students, the connection to the rest of the degree program and, possibly, professional practice, the overall organization of the study component, assessment and feedback between teacher and students. The study guide is available two weeks prior to the beginning of teaching.
x.	*student* iemand die een opleiding volgt aan de TU/e en is ingeschreven voor één van de opleidingen waar deze OER betrekking op heeft, conform de geldende Regeling Aanmelding, studiekeuzecheck, inschrijving en beëindiging inschrijving van de TU/e.	*student* a person taking a degree program at TU/e who is enrolled in one of the degree programs this PER is related to, in accordance with the applicable TU/e Regulations 'Registration, Study Choice Check, Enrollment and Termination of Enrollment'.
y.	*studiejaar* de periode die aanvangt op 1 september en eindigt op 31 augustus van het daaropvolgende jaar.	*academic year* the period that starts on September 1 and ends on August 31 of the following year.
z.	*studielast* de verwachte inspanning die nodig is om een opleiding of onderwijseenheid met voldoende resultaat af te ronden. De eenheid die gebruikt wordt is studiepunten, waarbij 1 studiepunt (sp) overeenkomt met 28 uur.	*study workload* the expected number of hours of study required to successfully complete a degree program or study component. The study workload is expressed in credits, where 1 credit is equal to 28 hours.

aa.	*switcher* iemand die in het studiejaar voorafgaand aan het studiejaar waarvoor diegene zich heeft aangemeld een inschrijving heeft voor een andere opleiding aan de TU/e (interne switcher) dan wel elders bij een instelling voor hoger of wetenschappelijk onderwijs (externe switcher).	*transfer student* students who, during the academic year prior to the academic year for which they registered, were enrolled at TU/e (internal transfer student) or elsewhere at an institution for higher education or university education (external transfer student)
bb.	*tentamen* is verbonden aan een onderwijseenheid en betreft een onderzoek naar de kennis, het inzicht en de vaardigheden van de student, alsmede de beoordeling van de uitkomsten van dat onderzoek.	*examination* connected to a study component and concerns an investigation into the knowledge, insight and skills of students, as well as an assessment of the results of that investigation.
cc.	*werkdag* een van de weekdagen maandag tot en met vrijdag, met uitzondering van de door de Nederlandse overheid als zodanig erkende feestdagen en de dagen waarop de universiteit is gesloten.	*working day* one of the weekdays, i.e. Monday through Friday, with the exception of public holidays recognized by the Dutch government, and days on which the university is closed.
dd.	*WHW* de Wet op het Hoger onderwijs en Wetenschappelijk onderzoek.	*WHW* Higher Education and Scientific Research Act (WHW).
2.	Voor zover de in deze regeling voorkomende begrippen niet zijn opgenomen in lid 1, hebben deze begrippen de betekenis die de wet eraan geeft.	To the extent that terms used in these regulations are not listed in paragraph 1, these terms have the meaning ascribed to them by law.
3.	In deze regeling zijn de namen gebruikt van de digitale onderwijssystemen die, op het moment van vaststelling van deze regeling, aan de TU/e worden gebruikt. Indien gedurende het studiejaar een onderwijssysteem wordt vervangen door een ander, vergelijkbaar onderwijssysteem, dan dient in deze regeling de nieuwe naam van het onderwijssysteem in de plaats van het ‘oude’ onderwijssysteem gelezen te worden.	These regulations use the names of the digital education systems in use at TU/e at the time of adoption of these regulations. Should an education system be replaced during the academic year by another, similar education system, the new name of the education system should be read in these regulations in place of the 'old' education system.

Art 1.3 **TU/e Gedragscode wetenschappelijke integriteit**

De student is gedurende de inschrijving gehouden aan de TU/e Gedragscode wetenschappelijke integriteit. In de eerste helft van de opleiding ondertekenen de studenten een verklaring in aanwezigheid van de mentor, dat gedurende de masteropleiding conform de TU/e Gedragscode Wetenschappelijke integriteit zal worden gehandeld. Deze verklaring dienen studenten in te leveren bij het facultaire Center of Student Administration (hierna het Facultaire CSA). Bij aanvang van het afstudeerproject is een verklaring van de student gevoegd dat in overeenstemming met de gedragscode zal worden gehandeld en bij oplevering van het afstudeerwerk is een verklaring opgenomen dat dit werk tot stand is gekomen in overeenstemming met de gedragscode.

Bij overtreding van deze gedragscode kan er melding worden gedaan bij de klachtencommissie wetenschappelijke integriteit van de TU/e. Deze klachtencommissie besluit door wie de melding zal worden afgehandeld: door de klachtencommissie of de examencommissie van de opleiding, die fraude afhandelt conform de bepalingen van het Reglement van de examencommissie.

TU/e Code of Conduct for Scientific Integrity

During enrollment students are held to the TU/e Code of Conduct for Scientific Integrity. In the first half of the degree program, the student must sign a statement in the presence of the mentor indicating they shall act in accordance with the TU/e Code of Conduct for Scientific Integrity throughout the master's degree program. This statement must be submitted to the departmental Center of Student Administration (henceforth Departmental CSA) by the students. An attachment is added at the beginning of the graduation project stating that students will act in accordance with the TU/e Code of Conduct for Scientific Integrity. When the graduation work is completed, a statement is attached indicating that the work was realized in accordance with the code of conduct.

Violation of this code of conduct may be reported to the Complaints Committee for Scientific Integrity at TU/e. This complaints committee decides who shall process the incident: the complaints committee or the examination committee of the respective degree program that deals with fraud in accordance with the stipulations of the Regulations for the Examination Committee.

H2/C2 H2 TOELATING EN INSCHRIJVING TOT DE OPLEIDING

C2 ADMISSION TO AND ENROLLMENT IN THE PROGRAM

Art 2.1 **Toelating en inschrijving**

1. De inschrijving aan de masteropleidingen staat uitsluitend open voor degenen die:

Admission and enrollment

Enrollment in the master's degree programs is open only to those who:

- tot deze masteropleidingen rechtstreeks toegang hebben op grond van een bachelor getuigschrift als genoemd in bijlage 1 onder l;
- over een verklaring beschikken van de examencommissie van de bacheloropleiding, voor zover het bachelor getuigschrift, zoals bedoeld in het eerste gedachtestreepje, nog niet is uitgereikt, maar wel alle onderwijseenheden zijn behaald; of
- over een toelatingsbewijs beschikken zoals genoemd in het tweede lid.

- have direct access to this degree programs based on a bachelor's degree certificate, as specified in Appendix 1 under l;
- possess a statement issued by the examination committee of the bachelor's degree program insofar as the bachelor's degree certificate, as referred to in the first hyphen, has not yet been awarded, but all study components have been completed; or
- have a proof of admission as referred to in paragraph 2.

2. Een toelatingsbewijs wordt door het faculteitsbestuur verstrekt op grond van de geldende Regeling Toelating Masteropleidingen TU/e. De kwalitatieve toelatingseisen, waarnaar de Regeling Toelating Masteropleidingen TU/e verwijst, zijn opgenomen in bijlage 1 onder k van deze regeling.

Proof of admission will be issued by the Department Board on the basis of the applicable TU/e Admission Regulations for master's Programs. The qualitative admission requirements, to which the Regulations for Admission to the TU/e master's Programs refer, are included in Appendix 1 under k of these regulations.

3. Studenten die een TU/e bacheloropleiding of TU/e masteropleiding hebben afgerond, kunnen per eerste dag van de maand volgend op de maand waarin zij het examen hebben gehaald, ingeschreven worden bij een van de masteropleidingen, mits voldaan wordt aan de gestelde eisen zoals vastgelegd in de Regeling Aanmelding, Studiekeuzecheck, Inschrijving en Beëindiging Inschrijving én er sprake is van een aaneengesloten periode van inschrijving aan deze universiteit. Hetzelfde geldt voor studenten die een schakelprogramma hebben afgerond dat toelating biedt op een van de masteropleidingen.

Students who have followed a TU/e bachelor's program, or TU/e master's program, may be admitted to one of the master's programs on the first day of the month following the month in which they passed the final examination, provided they meet the requirements set forth in the Regulations for Registration, Study Choice Check, Enrollment and Termination of Enrollment and have been enrolled at the university for a continuous period. The same applies to students who have completed a pre-master's program that provides admission to one of the master's degree programs.

4. In afwijking van lid 3, kunnen TU/e studenten die een competentiegerichte bacheloropleiding hebben afgerond, TU/e studenten die niet een

In derogation of paragraph 3, TU/e students who have completed a competency-centered bachelor's program, TU/e students who have not

aaneengesloten periode aan deze universiteit zijn ingeschreven en studenten die op basis van een afgeronde bacheloropleiding aan een andere universiteit zijn toegelaten (externe switchers en spijtoptanten), alleen op 1 september en 1 februari van ieder studiejaar ingeschreven worden in de masteropleiding, mits wordt voldaan aan de gestelde eisen, zoals vastgelegd in de Regeling Aanmelding, Studiekeuzecheck, Inschrijving en Beëindiging Inschrijving.

Art 2.2 **Het volgen van masteronderwijseenheden zonder toelating/inschrijving**

Bachelor- en schakelstudenten kunnen enkele masteronderwijseenheden van een van de opleidingen volgen (zonder feitelijke masterinschrijving), mits voldaan wordt aan:

- de gestelde eisen zoals vastgelegd in respectievelijk artikel 6.2 lid 6 van de OER van de bacheloropleiding en bijlage 2, artikel 2.6 van deze regeling; en
- toestemming is verleend door de examencommissie van de masteropleiding, waartoe de onderwijseenheden behoren.

Zie voor deelname en aanmelding tentamens artikel 5.3, tweede lid, van deze regeling.

H3/C3 **H3 OPBOUW EN INHOUD VAN DE OPLEIDINGEN**

Art 3.1 **Eindtermen van de opleidingen**

1. Algemene eindtermen van de opleidingen

been enrolled at this university for a continuous period and students who have been admitted on the basis of a completed bachelor's degree program at a different university (external transfer students and re-enrollers), may only enroll in the master's degree program on September 1 and February 1 of each academic year, provided they meet the requirements set forth in the Regulations for Registration, Study Choice Check, Enrollment and Termination of Enrollment.

Art 2.2 **Following master's program study components without admission/enrollment**

Bachelor's students and pre-master's students may participate in some study components of one of the master's degree programs (without actually being enrolled in the master's degree program), provided they meet:

- the set requirements as laid down respectively in Article 6.2 paragraph 6 of the PER of the bachelor degree program and Appendix 2, Article 2.6 of these regulations; and
- permission to do so has been obtained from the examination committee of the relevant master's degree program.

For participation in and registration for exams, see Article 5.3, paragraph 2 of these regulations.

C3 STRUCTURE AND CONTENT OF THE DEGREE PROGRAMS

Learning outcomes of the degree programs

General learning outcomes of the degree programs

Afgestudeerden van de masteropleiding (master of science):

- zijn academisch gevormd binnen het domein van 'science, engineering & technology',
- zijn competent in de relevante domeinspecifieke discipline(s) op het niveau van de wetenschappelijke master, zoals weergegeven in bijlage 1, eerste lid,
- kunnen zelfstandig onderzoeken en ontwerpen,
- zijn in staat en hebben de houding om waar nodig bij het eigen onderzoek andere disciplines te betrekken,
- hebben een wetenschappelijke benadering van problemen en ideeën van complexe aard,
- beschikken over intellectuele vaardigheden om kritisch te kunnen reflecteren, logisch te redeneren en tot oordeelsvorming komen,
- kunnen op internationaal niveau communiceren over resultaten van eigen leren, denken en beslissingen,
- zijn zich bewust van de temporele en maatschappelijke context van wetenschap en technologie (begrip en analyse) en integreren deze in het wetenschappelijke werk,
- hebben naast een herkenbaar domeinspecifiek profiel een voldoende brede basis om interdisciplinair en multidisciplinair (samen) te kunnen werken. Multidisciplinair betekent hier: gericht op andere relevante disciplines die nodig zijn om het ontwerp- of onderzoeksprobleem op te lossen,
- zijn in staat en hebben de houding om te zoeken naar nieuwe toepassingsmogelijkheden en houden daarbij rekening met de maatschappelijke context.

Master degree program graduates (Master of Science):

- are academically qualified to degree level within the domain of 'science, engineering & technology',
- are competent in the relevant domain-specific discipline(s) at the scientific master's degree level, as indicated in Appendix, Article 1,
- are able to conduct research and design independently,
- have the ability and attitude to include other disciplines in their research, where necessary,
- have a scientific approach to complex problems and ideas,
- possess intellectual skills that enable them to reflect critically, reason and form opinions,
- have the ability to communicate the results of their learning, thinking and decision-making processes at an international level,
- are aware of the temporal and societal context of science and technology (comprehension and analysis) and can integrate this context in their scientific work,
- in addition to a recognizable domain-specific profile, possess a sufficiently broad basis to be able to work or collaborate in an interdisciplinary and multidisciplinary context. In this context, multidisciplinary means being focused on other relevant disciplines needed to solve the design or research problem in question,
- have the ability and attitude to seek new potential applications, taking the societal context into consideration.

Art 3.2	**Specifieke opleidingsbepalingen**	**Requirements specific to the degree program**
1.	Nadere specifieke opleidingsbepalingen zijn opgenomen in bijlage 1, artikel 2.	Further stipulations concerning the degree program are set forth in Appendix 1, Article 2.
2.	Regels en procedures in verband met de schakelprogramma's zijn opgenomen in bijlage 2. De inhoud van schakelprogramma is opgenomen in bijlage 3. De toelichting op regels in bijlage 2 zijn opgenomen in bijlage 4.	Appendix 2 contains the rules and procedures for pre-master's programs are set forth in Appendix 2. A description of the contents of the pre-master's degree program is included in Appendix 3. Explanatory notes regarding the rules pertaining in Appendix 2 are included in Appendix 4.
Art 3.3	**Taal**	**Language**
	Het onderwijs wordt geheel in het Engels gegeven en de tentamens en examens worden afgenomen in het Engels.	The program is delivered entirely in English and the examinations and final examinations are administered in English.
Art 3.4	**Opbouw van de opleiding**	**Structure of the degree program**
1.	Elke opleiding is een samenhangend geheel van onderwijseenheden gericht op de verwezenlijking van de eindtermen van de opleiding.	Each degree program is a coherent set of study components designed to achieve the learning outcomes of the degree program.
2.	Elke opleiding heeft een studielast van 120 studiepunten en is onderverdeeld in verschillende onderwijseenheden zoals vermeld in de geldende Richtlijn masteropleidingen TU/e Graduate School. In bijlage 1 is het programma van elke opleiding verder uitgewerkt (zie bijlage 1, lid 1 en 2 onder a).	Each degree program has a study load of 120 credits and is divided into various study components as stated in the applicable Guideline for TU/e Graduate School Master's Programs. Appendix 1 contains details on each degree program (see Appendix 1 and 2 under a).
Art 3.5	**Mentor**	**Mentor**
1.	Elke student wordt gedurende de opleiding begeleid door een mentor van het betreffende programma. Uiterlijk vijf maanden na aanvang van de opleiding is de student gekoppeld aan een mentor. Dat koppelen gebeurt	Students will receive program-related supervision from a mentor from the degree program for the duration of the program. Students will be linked to a mentor no later than five months after the degree program has

door middel van de Master Allocatie Procedure, zoals beschreven in de studiegids.

commenced. Allocation happens by means of the Master Allocation Procedure, as described in the education guide.

2. Een mentor
- begeleidt studenten bij het invullen van de specialistische keuze-onderwijseenheden, stelt hieromtrent een advies op voor studenten en tekent het formulier met het examenprogramma dat de student inlevert bij de examencommissie,
- begeleidt studenten bij de verdere invulling van het examenprogramma,
- heeft in het kader van de ontwikkeling van professionele vaardigheden een individueel gesprek met studenten en bespreekt met hen het door hen opgestelde ontwikkelingsplan professionele vaardigheden.

A mentor:
- supervises students in their choice of specialization electives, prepares advice on this for the student and signs the course form before students hand it in to the examination committee,
- supervises students as they compose the rest of the program of examinations,
- within the framework of developing professional skills, meets with the students individually to discuss the professional skills development plan they have developed.

3. Wanneer studenten er niet voor kiezen minimaal 15 studiepunten aan internationale ervaring in hun examenprogramma op te nemen, bespreken zij dit individueel met hun mentor.

If students have not chosen to include a minimum of 15 credits worth of international experience in their program of examinations, they must discuss this with their mentor.

Art 3.6 **Examenprogramma**

Program of Examinations

1. Studenten dienen een keuze te maken uit de in de bijlage 1 onder j, opgenomen specialistische keuzeonderwijseenheden en vrije keuzeonderwijseenheden. Voor de invulling van de vrije keuze-onderwijseenheden kunnen maximaal 15 studiepunten aan bachelor onderwijseenheden worden gebruikt voor het wegwerken van deficiënties (homologatie-onderwijseenheden).

Students must choose the specialized study components and free elective study components included in Appendix 1 under j. Within the free electives, a maximum of 15 credits of bachelor's study components may be used to compensate deficiencies (homologation study components).

1a.	Bij de te maken keuzes houden studenten rekening met het profiel, het beroepsperspectief en/of de academische accenten c.q. verbreding die zij in hun studie willen aanbrengen.	In making those program of examination choices, students must take account of the profile, career prospects and/or the academic emphases or broadening they wish to incorporate in their program.
2.	De specialistische keuzeonderwijseenheden worden pas na een advies van de mentor aan het examenprogramma toegevoegd.	The specialized elective study components are only added to the program of examinations after advice from the mentor.
3.	Studenten bieden uiterlijk zes maanden na de start van hun masteropleiding hun voorlopige examenprogramma, waarvan een advies van de mentor onderdeel uitmaakt (zoals bedoeld in lid 2), ter kennisgeving aan bij de examencommissie. Bij de samenstelling van dit individuele programma dient de samenhang geborgd te worden in samenspraak tussen studenten en hun mentor.	No later than six months after the start of their master's degree program, students must submit their provisional program of examinations, including the advice issued by the mentor (as referred to in paragraph 2), to the examination committee for information. When composing this personal program of examinations, students should consult with the mentor to ensure that sufficient coherence is achieved.
3a.	Studenten bieden hun definitieve examenprogramma, waarvan een advies (zoals bedoeld in lid 2) van de mentor onderdeel uitmaakt, ter goedkeuring aan bij de examencommissie.	Students must submit their definite program of examinations including the advice issued by the mentor (as referred to in paragraph 2), to the examination committee for approval.
3b.	De examencommissie controleert het examenprogramma op coherentie en niveau, alsmede of het voldoet aan de eisen die gesteld worden aan een masterprogramma. Hierbij betrekt zij het advies van de mentor en de eisen van de facultaire toelatingscommissie (indien van toepassing).	The examination committee checks the program of examinations for coherence and quality as well as to ensure it meets the requirements for a master's degree program. This involves the advice of the mentor and the requirements of the departmental admission committee (if applicable).
Art 3.7	**Aanmelden en afmelden onderwijseenheden**	**Registering and deregistering study components**
1.	Een student kan zich voor een maximum van 20 studiepunten per kwartiel aan onderwijseenheden aanmelden en daarin tentamens afleggen. De student die voor meer onderwijseenheden wil aanmelden dient toestemming te verkrijgen van de examencommissie.	A student can register for a maximum of 20 study credits of study components per quarter and take examinations in those study components. A student who wishes to register for more study components must obtain permission from the examination committee.

2.	Voor onderwijseenheden geldt een uiterste aanmeldtermijn van vijf werkdagen voor aanvang van het eerste kwartiel en twintig werkdagen voor het tweede, derde en vierde kwartiel.	For study components there is a registration deadline of up to five working days before the first quarter and twenty working days before the second, third and fourth quarter.
3.	In uitzonderlijke gevallen heeft een onderwijseenheid een capaciteitsbeperking. De capaciteitsbeperking is zodanig dat in ieder geval studenten voor wie de onderwijseenheid deel uitmaakt van het verplichte deel van het examenprogramma kunnen deelnemen. De onderwijseenheden met een capaciteitsbeperking worden na toestemming van de Dean of the Graduate School uiterlijk 1 april voor kwartiel 1 en 2 en uiterlijk 1 oktober voor kwartiel 3 en 4 bekend gemaakt via de digitale studiegids.	In exceptional cases a study component may have a capacity limit. The capacity limit is such that there is capacity for all students for whom the study component is a mandatory part of the program of examinations. The study components for which there is a capacity limit are published in the digital education guide April 1 latest for quarters 1 and 2 and October 1 for quarters 3 and 4 after approval of the Dean of the Graduate School.
	Voor een onderwijseenheid met een capaciteitsbeperking kan een wachtlijst gelden. Indien een wachtlijst voor een onderwijseenheid is geopend, worden studenten die op de wachtlijst staan en die ingedeeld kunnen worden, na de aanmeldtermijn geplaatst in de betreffende onderwijseenheid. De procedure en criteria voor indeling worden bekend gemaakt in de onderwijscatalogus. Wanneer een student niet geplaatst is, dan is het niet mogelijk voor die student om de onderwijseenheid in dat kwartiel te volgen.	For a study component with a capacity limit, a waiting list may apply. If a waiting list is opened for a study component, students on the waiting list who can be assigned will be placed after the registration date. The procedure and criteria for placement will be announced in the course catalogue. If a student is not placed, it is not possible for that student to take the study component in that quarter.
4.	Studenten dienen, wanneer zij de onderwijseenheid toch niet (meer) willen volgen, voorafgaand aan de in artikel 5.3 lid 3 genoemde momenten zich af te melden voor een reeds aangemelde onderwijseenheid.	If students decide not (or no longer) to participate in a study component for which they have registered, they are required to deregister in OSIRIS prior to the terms mentioned in Article 5.3 paragraph 3.
Art 3.8	**Aanmelden voor onderwijseenheid na verstrijken aanmeldtermijn**	**Registering for a study component after the registration term**
1.	Wanneer een student bij het aanmelden voor een onderwijseenheid de in artikel 3.7 genoemde termijnen niet in acht heeft genomen, kan niet	A student who fails to register for a study component within the period specified in Article 3.7 shall not be allowed to participate in the study

	worden deelgenomen aan deze onderwijseenheid, tenzij de student uiterlijk voor 17.00 uur op donderdag voor de start van het onderwijs in het eerste kwartiel dan wel uiterlijk vijftien werkdagen voor de start van het onderwijs in het tweede, derde of vierde kwartiel een vergoeding van €20 administratiekosten per onderwijseenheid heeft betaald. Na betaling van de administratiekosten wordt de student meteen aangemeld, mits de capaciteit voor het betreffende vak niet is overschreden.	component, unless the student has paid administration costs totaling €20 per study component no later than 5.00 pm on the Thursday prior to the beginning of teaching in the first quarter, or no later than fifteen working days prior to the beginning of teaching in the second, third or fourth quarter. After payment of the administration costs students are immediately registered unless the maximum capacity for a course has been reached.
2.	In overmachtsituaties, hetgeen ter beoordeling is van de directeur ESA, kan besloten worden dat de student die zich meldt na de in lid 1 genoemde termijnen, alsnog voor de onderwijseenheid wordt aangemeld. Daarnaast kan de directeur ESA de administratiekosten genoemd in lid 1 kwijtschelden.	In cases of force majeure, at the discretion of the ESA Director, it may be decided that the student who reports after the terms mentioned in paragraph 1 may nevertheless be registered for a study component. In addition, the ESA Director may waive the administration costs stated in paragraph 1.
3.	In geval sprake is van een situatie zoals bedoeld in artikel 3.7, vierde lid, is geen vergoeding van de administratiekosten verschuldigd.	In the case of a situation as described in Article 3.7, paragraph 4, no supplementary administration costs will be incurred.
4.	Wanneer de student door overmacht (toch) niet kan deelnemen aan een onderwijseenheid waarvoor de student reeds administratiekosten heeft betaald, worden deze op verzoek van de student gerestitueerd.	In the case that (in the end) due to force majeure, the student cannot participate in a study component for which administration costs have already been paid, the fee will be refunded at the request of the student.
Art 3.9	**Vrij onderwijsprogramma**	**Flexible degree program**
1.	Een student die is ingeschreven voor een opleiding kan zelf uit onderwijseenheden die door een universiteit worden verzorgd een onderwijsprogramma samenstellen waaraan een examen is verbonden, zoals bedoeld in artikel 7.3h, van de WHW.	A student who is enrolled in a degree program may select study components from a university to compose a curriculum that involves a final examination, as referred to in Article 7.3h of the WHW.
2.	Een gemotiveerd verzoek tot toestemming voor het volgen van een vrij onderwijsprogramma wordt ten minste twaalf weken voor de aanvang van	A substantiated request for permission to take a flexible program must be submitted to the examination committee of the program in which the

het desbetreffende onderwijs ingediend bij de examencommissie van de opleiding waar de student staat ingeschreven.

student is enrolled no later than twelve weeks before the relevant teaching begins.

3. Indien nodig wijst het College van Bestuur op verzoek van die examencommissie een examencommissie van een andere opleiding aan die met deze beslissing wordt belast.

If necessary, at the request of the examination committee, the Executive Board can delegate this decision to the examination committee of another program.

4. Het besluit vermeldt de opleiding waartoe het vrije onderwijsprogramma behoort.

The decision shall state the degree program to which the flexible curriculum is deemed to belong.

Art 3.10 Vrijstelling

Exemption

1. Studenten die in aanmerking willen komen voor een vrijstelling tot het afleggen van een tentamen, dan wel een praktische oefening, dienen een schriftelijk verzoek tot vrijstelling in te dienen bij de examencommissie. Het verzoek gaat vergezeld van de documenten die nodig zijn (zie artikel 2.4 van het Reglement van de Examencommissie) voor de beoordeling of de desbetreffende student vrijstelling kan worden verleend.

Students who wish to be eligible for an exemption for taking an exam or a practical exercise must submit a written request for exemption to the examination committee. The request shall be accompanied by the documents necessary (see Article 2.4 of the Regulations of the Examination Committee) to determine whether the student in question may be granted an exemption.

2. De gronden waarop de examencommissie vrijstelling kan verlenen voor het afleggen van een bepaald tentamen of van een praktische oefening hebben uitsluitend betrekking op het niveau, de inhoud en de kwaliteit van de eerder door de desbetreffende studenten behaalde tentamens of examens, dan wel van de door studenten buiten het hoger onderwijs opgedane kennis, inzicht, vaardigheden of competenties.

The grounds on which the examination committee can grant an exemption for taking a particular examination or for a practical exercise are exclusively related to the level, the content and the quality of the examinations the students in question have already passed, or to the students' knowledge, insight, skills or competencies acquired outside higher education.

3. Er kan geen vrijstelling worden verleend voor een masteronderwijseenheid die als onderdeel van het curriculum in een bacheloropleiding is behaald. Wanneer deze reeds behaalde masteronderwijseenheid als verplicht onderdeel van een track binnen een masteropleiding geldt, dient de

An exemption cannot be granted for a master's study component passed as part of the curriculum of a bachelor's program. If this master's study component is a compulsory component of a certain track within a master's program, the examination committee should indicate an alternative

	examencommissie voor die reeds behaalde masteronderwijseenheid een vervangend onderdeel binnen de masteropleiding aan te wijzen dan wel toestemming te verlenen voor een door studenten gekozen vervangende onderwijseenheid.	component within the track, or provide permission for a substitute study component chosen by the students.
4.	Het besluit tot het verlenen van vrijstelling voor het afleggen van een tentamen of van een praktische oefening wordt gelijkgesteld met de beoordeling “voldoende” en aangeduid met: VR (vrijstelling). Dit betekent dat de betreffende studiepunten worden toegekend zonder cijfer.	The decision to grant an exemption for taking an examination or a practical exercise shall correspond to the grade ’sufficient’ and be marked: EX (exemption). This means the respective credits are allocated without a grade.
5.	In afwijking van lid 4, kunnen studenten die reeds aan de TU/e behaalde onderwijseenheden hebben behaald, de examencommissie verzoeken deze behaalde onderwijseenheden met behoud van cijfer en tentamendatum mee te nemen naar een andere TU/e opleiding, wanneer er sprake is van interne switchers dan wel omzwaaiers binnen de TU/e masteropleidingen.	In derogation of paragraph 4, students who have already obtained study components at TU/e may request the examination committee to take these obtained study components with them to another TU/e degree program while retaining the grade and date of examination, in case of internal transfer students or intra-university transfer students within TU/e master’s degree programs.
6.	Nadere voorwaarden voor het verlenen van vrijstellingen zijn opgenomen in het Reglement van de Examencommissie.	Further conditions that apply to the granting of exemption are set out in the Regulations of the Examination Committee.
3.11	**Interne bi-diplomering**	**Internal double diplomas**
	Studenten kunnen in aanmerking komen voor twee of meer mastergraden met bijbehorende getuigschriften. De regels omtrent bi-diplomering zijn opgenomen in bijlage 5 van deze regeling.	Students may acquire two or more master's degrees with accompanying diplomas. The regulations regarding double diplomas are incorperated in Appendix 5 of these regulations.

H4/C4	**H4 HONORS ACADEMY**	**C4 HONORS ACADEMY**
	Er is een honors programma voor studenten die een extra uitdaging willen. De regels omtrent dit programma zijn opgenomen in het reglement TU/e Honors Academy in masteropleidingen.	There is an honors program for students who want an additional challenge. The regulations pertaining to this program are incorporated in the TU/e Honors Academy Regulations for Master's Honors Tracks.
H5/C5	**H5 TOETSING**	**C5 TESTING**
Art 5.1	**Frequentie, vorm en volgorde van tentamens**	**Frequency, structure and sequence of examinations**
1.	Van de gelegenheden tot het afleggen van schriftelijke tentamens in het eerste en tweede kwartiel wordt jaarlijks, voor 15 augustus, door het faculteitsbestuur een tentamenrooster vastgesteld dat uiterlijk 15 augustus wordt bekendgemaakt. Van de gelegenheden tot het afleggen van schriftelijke tentamens in het derde en vierde kwartiel van de opleiding wordt jaarlijks vóór 15 december door het faculteitsbestuur een rooster vastgesteld dat uiterlijk 15 december wordt bekendgemaakt.	Annually, before August 15, the Department Board will determine a timetable for written examinations in the first and second quarter, which will be published no later than August 15. Annually, before December 15, the Department Board will determine a timetable for written examinations in the third and fourth quarter, which will be published no later than December 15.
2.	Het faculteitsbestuur kan in bijzondere omstandigheden tot uiterlijk acht weken voordat een schriftelijk tentamen plaatsvindt, afwijken van het in het vorige lid bedoelde rooster. De betrokken studenten worden door het faculteitsbestuur onder opgaaf van redenen onverwijld in kennis gesteld van de wijziging in het rooster.	In special circumstances, the Department Board may deviate from the timetable referred to in the previous paragraph, yet no later than eight weeks before the written examinations take place. The Department Board must inform the students of the change without delay, giving reasons.
3.	Mondeling af te nemen tentamens worden op een door de examinator, na zo veel mogelijk overleg met de student, te bepalen tijdstip afgenomen	Examinations to be administered orally will be administered at a time determined by the examiner, wherever possible in consultation with the

	binnen het studiejaar waarin de student is ingeschreven voor de onderwijseenheid.	students in question, within the academic year in which students are registered for the study component.
4.	Tot het afleggen van de tentamens wordt per onderwijseenheid ten minste twee maal per studiejaar de gelegenheid geboden. De deadlines van de eerste en tweede gelegenheid voor inlevering/afronding van een praktische oefening als onderwijseenheid, worden bekendgemaakt via de studeerwijzer.	There shall be at least two opportunities per study component in each academic year to take exams. The deadlines for the first and second opportunity to submit/complete a final test of a practical exercise are published in the study guide.
5.	In afwijking van het bepaalde in het voorgaande lid, wordt tot het afleggen van een praktische oefening als onderwijseenheid zoals vermeld in bijlage 1 onder o, slechts eenmaal per studiejaar de gelegenheid geboden.	In derogation of the stipulations of the previous paragraph, only one opportunity is offered to take practical exercises as a study component as listed in Appendix 1 under o.
6.	Indien een onderwijseenheid uit een studieprogramma vervalt, wordt in het eerste studiejaar dat het onderwijs in die onderwijseenheid niet meer wordt verzorgd nog ten minste tweemaal de gelegenheid geboden het tentamen in die onderwijseenheid af te leggen.	If a study component is removed from the curriculum, at least two more opportunities shall be given to take the examination in that study component during the first academic year in which the study component is no longer taught.
7.	Indien een onderwijseenheid uit een studieprogramma in een bepaald studiejaar niet wordt verzorgd, dan wordt in dat studiejaar ten minste tweemaal de gelegenheid geboden de onderwijseenheid af te ronden. Beide gelegenheden zijn uitsluitend mogelijk, wanneer het een herkansing betreft. Dit lid is niet van toepassing op competentiegerichte opleidingen.	If a study component from a degree program is not provided in a certain academic year, at least two opportunities are offered to complete the study component (see Article 5.11, paragraph 2, point 3 and Article 5.11, paragraph 3). Both opportunities are only possible when it concerns a resit. This does not apply to competency-centered programs.
Art 5.2	**Mondelinge tentamens**	**Oral examinations**
1.	Bij een mondeling tentamen wordt niet meer dan één student tegelijk getentamineerd.	No more than one student shall be given an oral examination at a time.

2.	Bij het afnemen van een mondeling tentamen zijn twee examinatoren dan wel een examinator en een materiedeskundige aanwezig.	When an oral examination is taken, two examiners or an examiner and a subject specialist shall be present.
3.	Het mondeling afnemen van tentamens is openbaar.	Oral examinations shall be administered publicly.
4.	De examencommissie kan in bijzondere omstandigheden afwijken van het bepaalde in de leden 1 en 3 van dit artikel.	In special cases, the examination committee may deviate from the provisions in the paragraphs 1 and 3 of this article.
Art 5.3	**Deelname en aanmelding tentamens**	**Participation in and registration for exams**
1.	Studenten kunnen slechts deelnemen aan een tentamen van de opleiding indien zij zijn ingeschreven voor de opleiding, met inachtneming van de in bijlage 1 onder e, h en i, voorgeschreven volgtijdelijkheid.	Students must be enrolled in a degree program in order to take the examinations offered by that program, taking into account the sequence specified in Appendix 1 under e, h and i.
2.	In afwijking van lid 1, kunnen bachelor- en schakelstudenten die voldoen aan de vereisten van artikel 2.2, specifieke masteronderwijseenheden volgen (zonder voor die masteropleiding te zijn ingeschreven). Voor deelname aan het tentamen is het volgende lid van overeenkomstige toepassing.	In derogation of paragraph 1, bachelor's and pre-master's students who meet the requirements of Article 2.2, may take specific master's components (without being enrolled in that degree program). The following paragraph shall apply mutatis mutandis to participation in the examination.
3.	Voor een tentamen geldt dat inschrijving voor de betreffende onderwijseenheid automatisch leidt tot aanmelding voor het eerstvolgende tentamen. In alle andere gevallen dienen studenten die aan een tentamen wensen deel te nemen, zich vóór de datum van het tentamen via OSIRIS in te schrijven. Voor centraal georganiseerde schriftelijke tentamens geldt dat zij zich uiterlijk tien werkdagen voor de desbetreffende tentamenperiode daarvoor aanmelden via OSIRIS. De aanmelding voor deze tentamens is mogelijk vanaf tenminste 15 augustus voorafgaand aan het studiejaar voor het eerste en tweede kwartiel en 15 december voor het derde en vierde	For an examination, registration for the study component in question automatically results in registration for the first opportunity to take the examination. In all other cases, students wishing to take part in an examination must register through OSIRIS before the examination date. For centrally organized written examinations students must register through OSIRIS, no later than ten (10) working days before the scheduled date of the relevant examination period. Students can register for examinations from at least August 15 preceding the start of the academic year for the first and second

	kwartiel. De aanmeld- en sluitdata worden jaarlijks door ESA centraal bekend gemaakt.	quarter and December 15 for the third and fourth quarter. The registration and closing dates shall be made known annually by ESA.
4.	Studenten zijn verplicht zich voorafgaand aan of tijdens het tentamen op verzoek van de examinatoren dan wel surveillanten te legitimeren met hun campuskaart.	Students are obliged, before or during the examination, and at the request of the examiner or the invigilator, to identify themselves by showing their campus card.
5.	Bij gebreke van een campuskaart kunnen studenten zich ook identificeren met een geldig legitimatiebewijs. Wanneer studenten hiertoe niet in staat zijn, mogen zij niet deelnemen aan het tentamen. Uitsluiting betekent dat het tentamen in OSIRIS wordt verwerkt als een ‘Niet Voldaan’ (NVD).	Students who do not bring a campus card can also identify themselves using a valid means of identification. Students who are unable to do this, will not be permitted to take part in the examination. Exclusion means that the examination will be processed in OSIRIS as a "Not met requirements" (NMR).
6.	Studenten die reeds vier keer een tentamen zonder goed gevolg (waaronder ook de in artikel 5.6 lid 5 vastgelegde tentamenuitslagen) hebben afgelegd, dienen voorafgaand aan de daarop volgende keer dat zij zich voor dat tentamen wensen aan te melden, met de studieadviseur afspraken te maken over hun studie-aanpak aan de hand van een door studenten opgesteld individueel studieplan.	Students who have already taken an examination four times, without passing (including the exam results, as stipulated in Article 5.6, paragraph 5), should consult with the academic advisor before registering for the examination in question again, to discuss how the problem is to be addressed on the basis of a study plan drawn up by the students.
7.	Het zich aanmelden voor een tentamen maar niet verschijnen of het gemaakte tentamenwerk voor de deadline niet inleveren wordt voor toepassing van het zesde lid, beschouwd als het niet met goed gevolg hebben afgelegd van het tentamen.	For implementation of paragraph 6 of this article, students who register for an examination but fail to turn up, or who do not hand in the completed examination work before the deadline, will be deemed to have failed the examination.
8.	Het werk van studenten die zonder zich te hebben aangemeld deelnemen aan een tentamen, wordt niet beoordeeld. De student wordt beschouwd als niet te hebben deelgenomen aan het tentamen.	The work of students who take part in an examination without having registered for it will not be assessed. In such cases, the students shall be deemed not to have taken the examination.

9.	Indien er sprake is van bijzondere persoonlijke redenen waarom studenten zich niet tijdig hebben aangemeld voor deelname aan een tentamen, kan de examencommissie besluiten dat de examinator het ingeleverde werk toch moet beoordelen.	If there are extenuating personal circumstances that prevented the students from registering for the examination in time, the examination committee can decide that the examiner must assess the students' work after all.
10.	De examencommissie stelt vast of studenten voldoen aan de voorwaarden voor toelating tot een tentamen.	The examination committee determines whether students fulfill the conditions for admission to the examination.
11.	Ter vervanging van een centraal georganiseerd schriftelijk tentamen kan de examencommissie in bijzondere omstandigheden studenten een vervangend tentamen toestaan.	In exceptional circumstances, the examination committee can permit students to take an alternative examination to the centrally organized examination.
Art 5.4	**Aanmelden voor tentamens na verstrijken aanmeldtermijn**	**Registering for exams after the registration period has passed**
1.	Wanneer een student bij het aanmelden voor een tentamen de in artikel 5.3, derde lid, genoemde termijn niet in acht heeft genomen, kan niet worden deelgenomen aan dat tentamen, tenzij de student uiterlijk 5 werkdagen voor de tentamenperiode een vergoeding van van € 20 administratiekosten per onderwijseenheid heeft betaald. Na betaling van de administratiekosten wordt de student meteen aangemeld.	Students who fail to register for an exam within the period specified in Article 5.3 paragraph 3 shall not be allowed to participate in the exam, unless the students have paid administration costs totaling € 20 per study component no later than five working days before the examination period. After payment of the administration costs the students are immediately registered.
2.	In overmachtsituaties, hetgeen ter beoordeling is van de directeur ESA, kan besloten worden dat de student die zich aanmeldt na de in lid 1 genoemde termijnen, alsnog voor het tentamen wordt aangemeld. Daarnaast kan de directeur ESA de administratiekosten genoemd in lid 1 kwijtschelden.	In cases of force majeure, at the discretion of the ESA Director, it may be decided that students who register after the terms mentioned in paragraph 1 may nevertheless be registered for an exam. In addition, the ESA Director may waive the administration costs stated in paragraph 1.
3.	Wanneer de student door overmacht (toch) niet kan deelnemen aan een tentamen waarvoor de student reeds administratiekosten heeft betaald, worden deze gerestitueerd.	In the case that students cannot participate (after all) in a study component, due to force majeure, for which they have already paid administration costs, the fee will be refunded.

Art 5.5	**Terugtrekking**	**Withdrawal**
1.	Studenten kunnen zich na aanmelding uiterlijk tien werkdagen voor de tentamenperiode terugtrekken voor een tentamen via OSIRIS.	After registering for an examination, students can withdraw no later than ten working days before the examination period, via OSIRIS.
2.	Terugtrekking voor een tentamen korter dan vijf werkdagen voor de tentamenperiode wordt voor de toepassing van artikel 5.3, zesde lid, beschouwd als het niet met goed gevolg hebben afgelegd van dit tentamen.	With reference to Article 5.3, paragraph 6, students who withdraw within five working days before the examination period shall be deemed to have failed this examination.
Art 5.6	**Beoordeling van tentamens**	**Assessment of examinations**
1.	Beoordeling van tentamens en praktische oefeningen vindt plaats door een (of meerdere) examinator(en).	The assessment of examinations and practical exercises is carried out by one or more examiners.
2.	De vaststelling van het resultaat van tentamens en praktische oefeningen geschiedt per individuele student, waarbij dit verdeeld kan zijn in een aantal componenten.	The results of examination and practical exercises will be determined for individual students, and may be divided into a number of parts.
a.	De beoordeling van een tentamen, alsmede van het onderzoek, genoemd in artikel 6.1, tweede lid, wordt uitgedrukt in hele getallen volgens de beoordelingsschaal 0 t/m 10 dan wel met een ‘vrijstelling’ (VR) of ‘Niet Voldaan’ (NVD).	The assessment of an examination, as well as the investigation mentioned in Article 6.1, paragraph 2, shall be expressed in whole numbers on a scale of 0 to 10 or with “exemption” (EX) or “Not met requirements” (NMR).
b.	De beoordeling van praktische oefeningen wordt uitgedrukt in tienden, in halve getallen, in hele getallen volgens de beoordelingsschaal 0 t/m 10, of in Onvoldoende (ON), Voldoende (VO), Goed (GO), Zeer Goed (ZG), Gedaan (GN) of Niet Verschenen (NV).	The assessment of practical exercises is expressed in tenths, in half numbers, in whole numbers on a scale of 0 to 10, or using the designations Fail (FL), Pass (PA), Good (GO), Very Good (VG), Done (DN), or No Show (NS).

d.	Wanneer het tentamen verdeeld is in een aantal componenten, blijkt uit de onderwijscatalogus welke componenten dat zijn en op welke wijze zij meetellen voor de berekening van het eindcijfer.	If the exam is divided into a number of parts, the subject description in the course catalogue shall describe those parts and indicate how they count with respect to the final grade.
e.	De beoordeling van het afstudeerproject en de stage wordt uitgedrukt op halve getallen nauwkeurig op de beoordelingsschaal 0 t/m 10. Het afstudeerproject of de stage is met goed gevolg afgelegd indien het is beoordeeld met een eindcijfer 6 of hoger (een beoordeling met een eindcijfer 5.5 of lager betekent niet met goed gevolg afgelegd). De beoordeling van de professionele vaardigheden die tijdens het afstuderen afgerond worden, maakt onderdeel uit van de beoordeling van het afstudeerproject. In de studeerwijzer is vermeld of en op welk moment tussentijdse evaluaties van het afstudeerproject plaatsvinden.	The assessment of the graduation project and the internship shall be rounded to the nearest half grade on a scale of 0 to 10. The graduation project or the internship is considered successfully completed if it is assessed with a final grade of 6 or more (an assessment with a grade of 5.5 or lower means not successfully completed). The assessment of professional skills that are completed during graduation are part of the assessment of the graduation project. The study guide indicates if and when interim evaluations of thegraduation project take place.
f.	Het voldoen aan de vereisten van professionele vaardigheden alsmede het behaald hebben van alle onderwijseenheden behorende bij het examenprogramma, is een formele voorwaarde om toegelaten te worden tot de beoordeling van het afstudeerproject.	Meeting the requirements of professional skills as well as having passed all study components belonging to the program of examinations, is a formal requirement for admission to assessment of the graduation project.
3a.	Een tentamen is met goed gevolg afgelegd, indien het is beoordeeld met een cijfer 6 of hoger, dan wel wanneer daarvoor een VR is verleend.	Students pass an examination by scoring a 6 or higher on the examination or with a grade of EX (exemption).
b.	Een praktische oefening als onderwijseenheid is met goed gevolg afgelegd, indien het is beoordeeld met een cijfer 6.0 of hoger of Voldoende (VO), Goed (GO), Zeer Goed (ZG) of Gedaan (GN), dan wel wanneer daarvoor een vrijstelling, VR, is verleend.	Students pass a practical exercise as a study component if the grade is 6.0 or higher, or with an assessment of Pass (PA), Good (GO), Very Good (VG) or Done (DN) or, in the case of an exemption, EX.

4.	Indien studenten zich wel voor een tentamen hebben aangemeld, maar niet zijn verschenen, of zich niet tijdig hebben teruggetrokken, wordt de tentamenuitslag voor de toepassing van artikel 5.3, zevende lid, beschouwd als het niet met goed gevolg hebben afgelegd van een tentamen en wordt de uitslag aangeduid met ‘niet verschenen’ (NV). Het eindcijfer is dan ‘Niet Voldaan’ (NVD).	If students register for an examination but fail to appear, have not withdrawn in time, they will be deemed to have failed the examination under the provisions of paragraph 5 of Article 5.3, paragraph 7, and the examination result will be marked as a "No Show" (NS). The final grade then is ‘Not met requirements’ (NMR).
5.	Indien de examencommissie heeft vastgesteld dat een student heeft gefraudeerd, zoals bedoeld in hoofdstuk 3 van het Reglement van de Examencommissie, kan/kunnen de tentamenuitslag ‘ongeldig’ (ONG) worden verklaard.	If the examination committee has established that a student has committed fraud, as referred to in Chapter 3 of the Regulations of the Examination Committee, the exam result may be declared ‘invalid’ (INV).
6.	De beoordelingsnormen worden uiterlijk bij aanvang van de tentamens, of de praktische oefeningen als onderwijseenheid bekend gemaakt. Voor de aanvang van een tentamen wordt de puntenverdeling van een tentamen bij de vragen bekendgemaakt. In bijzondere omstandigheden kan de examinator besluiten de puntenverdeling achteraf aan te passen.	The assessment standards are announced no later than immediately before the start of the examinations, or the practical exercises as a study component. The weight of the individual questions will be announced immediately before the start of a written test or an examination. In exceptional circumstances, the examiner may decide to adjust the weight of the questions after the examination.
7.	De wijze van beoordeling is zodanig dat studenten kunnen nagaan hoe de uitslag van de tentamens of praktische oefeningen als onderwijseenheid tot stand is gekomen.	The method of assessment should enable students to ascertain how the results of the examinations or the practical exercises as a study component were determined.
8.	De examencommissie is bevoegd individueel dan wel voor alle studenten die op dat moment het tentamen hebben afgelegd, een tentamen ongeldig te verklaren (ONG) wanneer er sprake is van ernstige onregelmatigheden.	The examination committee has the authority to declare an examination invalid (INV) for individual students or for all students who took the exam at that time in case of serious irregularities.

Art 5.7	**Vaststelling uitslag / nakijktermijnen**	**Determining results/marking periods**
1.	De examinatoren stellen de uitslag van een schriftelijk tentamen op een zodanig moment vast dat uiterlijk binnen vijftien werkdagen na afloop van het tentamen het eindcijfer geregistreerd is in OSIRIS.	The examiners shall determine the result of a written examination as soon as possible but no later than 15 working days after the examination has taken place such that the final grade is recorded in OSIRIS.
2.	De examinatoren stellen niet later dan één dag na het afnemen van een mondeling tentamen de uitslag vast en delen deze direct mede aan de studenten.	The examiners shall determine the results of an oral examination no more than one day later and will communicate these immediately to the students.
3.	Ten aanzien van een op andere wijze dan mondeling of schriftelijk af te leggen tentamen bepaalt de examencommissie tevoren op welke wijze en binnen welke termijn studenten in kennis worden gesteld van de uitslag.	In the case of examinations taken in other than oral or written form, the examination committee shall determine beforehand how and within what period the students will receive a written statement giving the result.
4.	De examinatoren stellen de uitslag van een praktische oefening als onderwijseenheid zo spoedig mogelijk doch uiterlijk binnen vijftien werkdagen na ontvangst ervan vast dan wel, wanneer een deadline is afgesproken, vijftien werkdagen na die deadline en delen het (eind)cijfer mede aan de studenten. In het geval van een stage is dat 15 werkdagen na het inleveren van het definitieve verslag ofwel vijf werkdagen na de eindpresentatie; de laatste datum van deze twee mogelijkheden.	The examiners will determine the result of a practical exercise that serves as a study component as soon as possible, but no later than fifteen working days after it has been submitted or, if a deadline has been agreed, fifteen working days after this deadline, and they will communicate the mark (or final mark) to the students. In case of an internship, that is either 15 working days after the final report has been submitted or five working days after the final presentation; the latter date of these two possibilities.
	Wanneer voor de inlevering van een praktische oefening een termijn of datum is bepaald en wanneer de studenten vanwege bijzondere omstandigheden een praktische oefening niet tijdig hebben ingeleverd, kan de examencommissie, op verzoek van de studenten, besluiten die praktische oefening toch te laten beoordelen.	If a term or date has been determined for the submission of a practical exercise and if the students have not submitted the practical exercise on time due to special circumstances, the examination committee can, on the students' requests, decide to have the practical exercise assessed anyway.
5.	Indien de desbetreffende examinatoren door bijzondere omstandigheden niet in staat zijn te voldoen aan het bepaalde in de voorgaande leden,	If the examiners in question are unable to meet the requirements in the previous paragraphs due to special circumstances, they shall notify the

	melden zij dit met redenen omkleed aan de examencommissie. De betrokken studenten worden door de examencommissie onverwijld van de vertraging op de hoogte gesteld, onder vermelding van de termijn waarbinnen de uitslag alsnog bekend wordt gemaakt.	examination committee, stating the reasons. The students involved will immediately be informed of the delay by the examination committee, and of the term within which the results will be made known.
6.	Indien er sprake is van buitengewone omstandigheden kan de examinator een eerder vastgesteld en bekendgemaakt tentamencijfer binnen vier weken na bekendmaking, aanpassen, welke aanpassing zowel in het voor- als nadeel van studenten kan zijn.	In the case of exceptional circumstances, the examiner may alter the grade of an examination previously determined within four weeks of its initial announcement both to the advantage or disadvantage of the students.
	Wanneer de bijstelling van een eindcijfer gevolgen heeft voor de afronding van de masteropleiding of een reeds uitgereikt getuigschrift dient de examinator in overleg met de examencommissie een beslissing te nemen.	If the alteration to the final grade has consequences for the completion of the master's program or for a certificate already issued, the examiner must consult the examination committee before taking a decision.
7.	Voor de datering van een tentamen geldt de datum waarop het schriftelijke tentamen is gehouden of het mondeling tentamen is afgelegd. Voor de datering van een tentamen in de vorm van een praktische oefening geldt de datum waarop het verslag definitief is ingeleverd dan wel de presentatie is gehouden, dan wel, indien er geen sprake is van een verslag of een presentatie, de praktische oefening is afgerond.	The examination will be dated in accordance with the date on which the written or oral examination is administered. An examination in the form of a practical exercise shall be dated in accordance with the date on which the final report is submitted or the date of the presentation, or, if there is no report or final presentation, the day on which the practical exercise is completed.
8.	De uitslagen, zoals bedoeld in dit artikel, moeten in OSIRIS vastgelegd worden.	The results, as referred to in this article, must be recorded in OSIRIS.
Art 5.8	**Inzagerecht schriftelijke tentamens**	**Right of inspection for written examinations**
1.	Gedurende ten minste twintig werkdagen na de bekendmaking van de uitslag van een schriftelijk tentamen in OSIRIS krijgen studenten op hun	Students shall be given the opportunity, on request, to inspect their assessed work for a period of at least twenty working days after the

verzoek inzage in hun beoordeelde werk. Op verzoek van de studenten wordt een kopie van het beoordeelde werk verstrekt.

announcement of the result of a written examination in OSIRIS. At the students' request, a copy of the assessed work will be provided.

2. Lid 1 is niet van toepassing, voor zover een student middels een ander systeem dan OSIRIS in kennis is gesteld van het cijfer en in navolging daarvan een mogelijkheid heeft gehad voor een nabespreking.

Paragraph 1 of this Article does not apply insofar as a student has been informed of the grade by means of a system other than OSIRIS and, following this, has had an opportunity for an evaluation.

3. Gedurende de termijn genoemd in het eerste lid kan elke belanghebbende op verzoek kennisnemen van de vragen en opdrachten van het desbetreffende tentamen alsmede van de normen aan de hand waarvan de beoordeling heeft plaatsgevonden.

During the term mentioned in paragraph 1, any interested person may, on request, inspect the questions and assignments of a given examination, as well as the standards on which the assessment was based.

4. De examinator maakt, binnen vijf werkdagen nadat het desbetreffende verzoek is ontvangen, bekend op welke plaats en tijd de in het eerste en derde lid bedoelde inzage of kennisneming geschiedt.

Within five working days after the request for inspection has been received, the examiner shall announce the venue and the time of the inspection referred to in paragraphs 1 and 3.

5. Indien studenten of belanghebbenden aantonen buiten hun schuld verhinderd te zijn of te zijn geweest op de vastgestelde plaats en tijd te verschijnen, wordt hen een andere mogelijkheid geboden, zo mogelijk binnen de in het eerste lid genoemde termijn.

If students or interested persons can prove that they were prevented from appearing at the fixed place and time through no fault of their own, they shall be offered another opportunity, if possible within the term mentioned in paragraph 1 of this article.

Art 5.9 Nabespreking

Evaluation

Zo spoedig mogelijk na de bekendmaking van de uitslag in OSIRIS van een mondeling tentamen vindt op verzoek van de student dan wel op initiatief van de examinator een nabespreking plaats tussen de examinator en de student. In dat geval wordt de gegeven beoordeling gemotiveerd. Een examinator kan een collectieve nabespreking beleggen.

As soon as possible after the announcement of the result in OSIRIS of an oral examination, at the request of the student concerned or on the initiative of the examiner, an evaluation will take place between the examiner and the student. In such cases, the assessments given shall be substantiated. An examiner can organize a collective evaluation.

Art 5.10	**Geldigheidsduur en bewaartermijnen**	**Term of validity and retention periods**
1.	De geldigheidsduur van een tentamenresultaat is in beginsel onbeperkt.	In principle, examination results are valid for an unlimited period.
2.	In afwijking van lid 1, kan de examencommissie, wanneer een tentamenresultaat ouder is dan zes jaar en de getentamineerde kennis of het getentamineerde inzicht aantoonbaar verouderd is, of indien de getentamineerde vaardigheden aantoonbaar verouderd zijn, een aanvullend of een vervangend tentamen opleggen.	In derogation of paragraph 1, if an examination result is older than six years and the examined knowledge or examined insight is demonstrably dated, or if examined skills are demonstrably dated, the examination committee may require that the students take a supplementary or alternative examination.
3.	De resultaten van componenten van tentamens afzonderlijk zijn slechts geldig in het studiejaar waarin die componenten zijn afgelegd.	The results of parts of exams separately are only valid in the academic year in which the parts were taken.
4.	In afwijking van lid 3, kan een component van een tentamen geldig blijven in het studiejaar volgend op het studiejaar waarin de component is afgelegd, indien: - de verruiming van de geldigheidsduur van de component met één studiejaar in de studeerwijzer expliciet is vermeld, én - de student hiertoe een verzoek heeft ingediend bij de examinator van de desbetreffende component.	In derogation of paragraph 3, a part of an exam can remain valid in the academic year following the academic year in which the part was taken if: - the extension of validity of a part of an exam by one academic year is explicitly mentioned in the study guide, and - students have made a request to this purpose to the examiner of the part in question.
5.	Indien geen informatie is opgenomen over de geldigheidsduur van een component in de studeerwijzer, kan de examinator van het desbetreffende component beslissen of de component één studiejaar langer geldig blijft, wanneer een student hiertoe een verzoek indient.	If no information is recorded on the validity of a part in the study guide, the examiner can decide for the part in question whether it remains valid for an extra academic year if students submit a request to this purpose.
6.	Beoordeelde schriftelijke tentamens dienen gedurende ten minste twee jaren na vaststelling van de uitslag te worden bewaard, met uitzondering van huiswerkopdrachten.	Written examinations must be retained for at least two years following determination of the grade, with the exception of homework assignments.

7. (Driedimensionale) werkstukken dienen gedurende ten minste zes weken na vaststelling van het cijfer, doch in ieder geval gedurende een eventuele bezwaar- en beroepsprocedure te worden bewaard.

8. Afstudeerverslagen, en portfolio's, die zijn vervaardigd met het oog op het afsluiten van de masteropleiding, dienen gedurende ten minste zeven jaar te worden bewaard.

(Three-dimensional) projects must be retained for at least six weeks after the grade has been determined but, in any event, for the duration of any objection and appeal procedures.

Graduation reports, portfolios, produced in completion of the master's degree program must be retained for at least seven years.

H6/C6 H6 EXAMEN

C6 FINAL EXAMINATION

Art 6.1 Beoordeling en uitslag examen

Assessment and results of examination

1. De examencommissie stelt de uitslag van het examen vast, zodra de student aan de eisen van het examenprogramma heeft voldaan, tenzij de student op grond van het zesde lid de examencommissie heeft verzocht nog niet over te gaan tot het vaststellen van de uitslag van het examen. In dat geval vindt de bepaling van de uitslag van het examen en de uitreiking van het getuigschrift op een later moment plaats (zie zesde lid). De uitslag van het examen is 'geslaagd' dan wel 'niet geslaagd met behoud van de behaalde resultaten'. Indien een student een tentamen meer dan eenmaal heeft afgelegd, neemt de examencommissie voor de vaststelling van de uitslag van dat tentamen het hoogst behaalde resultaat in aanmerking.

The examination committee determines the results of the final exam as soon as the students have met the requirements of the program of examinations unless, on the grounds of paragraph 6, the student has asked the examination committee to defer determination of the final exam. In such a case, the determination of the results of the final exam and the issue of the certificate take place at a later date (see paragraph 6) . The result of the final examination shall be "passed" or "did not pass but the results attained shall be retained". If a student has taken an examination more than once, the examination committee shall take into account the highest grade obtained in determining the result of the exam.

2. Beoordeling van het examendossier, bestaande uit alle informatie die de examencommissie nodig heeft om de uitslag van het examen vast te kunnen stellen, maakt deel uit van het examen. Als datum voor het examen geldt de datum waarop een student de laatste onderwijsactiviteit heeft verricht (zie artikel 5.7, zevende lid). In afwijking van het voorgaande

Assessment of the examination dossier, consisting of all information the examination committee requires to determine the result of the final examination, is part of the final examination. The date of the final examination shall be the date on which the students carried out the final program activity (see Article 5.7, paragraph 7). In derogation of the

geldt als de datum voor het examen de datum waarop de uitslag van het examen door de examencommissie is vastgesteld, indien:

- de student de examencommissie op grond van het zesde lid heeft verzocht nog niet over te gaan tot het vaststellen van de uitslag van het examen, én
- de uitslag van het examen is vastgesteld op een datum later dan acht weken na de datum waarop de student de laatste onderwijsactiviteit heeft verricht.

previous, the date of the final examination is the date on which the result of the final examination was determined by the examination committee, if:

- the student has asked the examination committee to defer determination of the final exam in accordance with paragraph 6, and
- the result of the final exam was determined on a date later than eight weeks after the date on which the student finished the final educational activity.

3. Voor het behalen van het examen geldt als voorwaarde dat voor alle onderdelen een voldoende cijfer is behaald, met inachtneming van de verleende vrijstellingen en de compensatieregeling uit artikel 4.2 van het Reglement van de Examencommissie. De examencommissie kan onder door haar te stellen voorwaarden bepalen dat niet ieder tentamen met goed gevolg hoeft te zijn afgelegd om vast te kunnen stellen dat het examen met goed gevolg is afgelegd (zie artikel 4.3 van het Reglement van de Examencommissie). Voor de bijbehorende professionele vaardigheden kunnen studenten vrijstelling aanvragen bij de examencommissie.

In order to pass the final examination, the students must obtain the 'sufficient' grade, in compliance with the exemptions granted and the compensation arrangement from Article 4.2 of the Regulations of the Examination Committee. The examination committee can determine, under conditions established by the committee itself, that not every examination has to be passed in order for students to pass the final examination (see Article 4.3 of the Regulations of the Examination Committee). For the corresponding professional skills, students can apply for exemption from the examination committee.

4. Wanneer de examencommissie de uitslag van het examen heeft vastgesteld, wordt op een later moment het getuigschrift uitgereikt als bedoeld in artikel 6.3.

Once the examination committee has determined the results of the final exam, the certificate as referred to in Article 6.3 will be issued on a later date.

5. Voor het behalen van het examen en de afgifte van het getuigschrift geldt tevens als voorwaarde dat de student ingeschreven was voor een TU/e-opleiding gedurende de periode dat de tentamens zijn afgelegd.

A further condition for passing the examination and receiving the degree certificate is that the student was enrolled for a TU/e degree program at the time the examinations were taken.

6. De student die heeft voldaan aan de eisen van het examenprogramma en aanspraak maakt op uitreiking van een getuigschrift, kan de

A student who has passed the final examination, and is eligible for the award of a degree certificate, can request the examination committee to

examencommissie verzoeken daartoe nog niet over te gaan. Dit verzoek moet worden ingediend binnen uiterlijk één week nadat het laatste resultaat op basis waarvan de student voldoet aan de eisen van het examenprogramma bekend is gemaakt in OSIRIS. De examencommissie willigt het verzoek in ieder geval in wanneer de student:

- een bestuursfunctie vervult ten tijde van het voldoen aan de voorwaarden van het getuigschrift, waarvoor een bestuursbeurs van de TU/e beschikbaar is,
- extra onderwijseenheden wil volgen, die opgenomen worden op het diplomasupplement,
- een stage of onderdeel in het buitenland wil gaan volgen,

- cum laude wil afstuderen en voor enkele onderwijseenheden nogmaals tentamen wil afleggen.

delay its award. This request must be submitted within a week of when the final result is made known in OSIRIS on the basis of which the student meets the requirements of the program of examinations. The examination committee shall in any event comply with the request if the following situations apply:

- the student is a board officer, for which a TU/e board grant is available, at the time the requirements for the degree certificate are met,
- the student plans to take extra study components that will be included in the diploma transcript,
- the student wishes to do a traineeship or take a study component abroad

- the student wants to try to graduate with the cum laude classification and want to re-take examinations for certain study components to this end.

7. Indien de student de examencommissie heeft verzocht nog niet over te gaan tot het vaststellen van de uitslag van het examen (zie zesde lid), dan stelt de examencommissie de uitslag van het examen vast, indien

- de student hiertoe minimaal vijf weken voor de betreffende vergadering van de examencommissie een verzoek heeft ingediend bij de examencommissie, en
- de student op de datum van de examenvergadering is ingeschreven voor een TU/e opleiding als de examenvergadering plaatsvindt op een datum later dan acht weken na de datum waarop de student de laatste onderwijsactiviteit heeft verricht.

If the student has requested the examination committee not to determine the result of the examination (see paragraph 6), the examination committee determines the result of the examination, if

- the student has submitted a request to this end to the examination committee at least five weeks before the meeting of the examination committee in question, and
- the student is enrolled in a TU/e degree program on the date of the examination meeting if the examination meeting takes place on a date later than eight weeks after the date on which the student performed the last educational activity.

Art 6.2	**Frequentie examen**	**Frequency of final examinations**
	Tot het afleggen van het examen wordt maandelijks de gelegenheid gegeven, met uitzondering van de maand juli. Competentiegerichte opleidingen bieden tweemaal per jaar de gelegenheid tot het afleggen van het examen. De data van de zittingen van de examencommissies worden voor aanvang van het studiejaar door de examencommissie bekend gemaakt.	There shall be monthly opportunities to take the final examination with the exception of July. Competency-centered programs offer two opportunities per year to take the final examination. The dates of the examination committee sessions shall be announced by the examination committee before the beginning of the academic year.
Art 6.3	**Getuigschrift en supplement**	**Certificate and transcript**
1.	De uitreiking van het getuigschrift per opleiding geschiedt in het openbaar.	The degree certificates for each program shall be awarded in public.
2.	Op het getuigschrift worden in ieder geval de gegevens vermeld als genoemd in artikel 7.11, tweede lid, van de WHW, alsmede, indien van toepassing, de kwalificatie van artikel 6.4, van deze regeling.	The degree certificate shall, in any event, contain the information specified in Article 7.11, paragraph 2, of the WHW, together with the qualifications specified in Article 6.4 of these regulations.
3.	Per opleiding wordt per student één getuigschrift uitgereikt. Aan de student wordt bij de uitreiking van het getuigschrift tevens een supplement uitgereikt.	One degree certificate is awarded per student for each degree program. When the degree certificate is awarded, the student shall also receive a transcript.
4.	Op het supplement worden de gegevens vermeld als genoemd in artikel 7.11, derde lid, van de WHW, alsmede de cijfers behaald voor de onderdelen van het examen, en desgevraagd tevens andere niet tot het examen behorende onderwijseenheden, mits de student de tentamens, die aan die onderwijseenheden zijn verbonden, met goed gevolg heeft afgelegd voordat de examencommissie de uitslag van het examen heeft vastgesteld. Indien van toepassing wordt op het supplement vermeld voor welke schoolvakken en voor welk voortgezet onderwijs de student	The transcript shall contain the information specified in Article 7.11, paragraph 3, of the WHW, as well as the grades obtained for parts of the final examination and, if required, for other study components that are not part of the examination, if the students in question have passed the examinations for those study components before the examination committee determines the final examination result. If applicable the transcript shall state for which school subjects and for which level of secondary education the holder is authorized to teach (Article 33 and 36 of the Secondary Education Act).

bevoegd is les te geven (artikel 33 en 36 van de Wet op het voortgezet onderwijs).

Art 6.4	**Bijzondere kwalificaties masteropleiding**	**Special qualifications for the master's program**
1.	Niet van toepassing.	Not applicable.
2.	Niet van toepassing. .	Not applicable.
3.	De examencommissie kent het judicium 'cum laude' toe aan studenten die op of na 1 september 2019 met de opleiding zijn gestart, wanneer: - het gewogen (op basis van studiepunten) rekenkundig gemiddelde een niet-afgeronde 8,0 of hoger is, met betrekking tot de door de student afgelegde onderwijseenheden die tot het examenprogramma behoren, met uitzondering van het afstudeerproject, én - het afstudeerproject met een cijfer 9,0 of hoger is beoordeeld, én - geen van de onderwijseenheden die tot het examenprogramma behoren zijn beoordeeld met een eindcijfer lager dan een 6, én - het examen binnen 32 maanden na aanvang van de opleiding is afgelegd. De examencommissie kan in bijzondere omstandigheden van dit laatste vereiste afwijken. Bij de beoordeling van het verzoek van de student (tot verlenging van de termijn van 32 maanden) kan de examencommissie rekening houden met de erkende persoonlijke omstandigheden zoals genoemd in bijlage 2, artikel 5, van deze regeling.	The examination committee awards the classification "cum laude" to students who started their degree programs on or after September 1, 2019 under the following conditions: - they achieve a weighted mathematical average (based on credits) that is a unrounded 8.0 or higher in relation to the study components takes by students that belong to the program of examinations, with exception of the graduation project, - they have a grade of 9.0 or higher for the graduation project, and - none of their study components belonging to the program of examinations has a final grade lower than a 6 and - they must finish the final examination within 32 months of the commencement of the degree program. The examination committee may deviate from this latter requirement in special cases. To assess the student's request (for an extension of the 32-month term), the examination committee can take into account the acknowledged personal circumstances as referred to in Appendix 2, Article 5 of these regulations.

H7/C7	**H7 STUDIEBEGELEIDING EN STUDIEVOORTGANG**	**C7 STUDY COUNSELING AND STUDY PROGRESS**
Art 7.1	**Studiebegeleiding**	**Study counseling**
1.	Het faculteitsbestuur draagt zorg voor studiebegeleiding van de studenten, mede ten behoeve van de oriëntatie op tracks binnen of buiten de opleiding, zulks onder meer door middel van benoeming van één of meer studieadviseurs.	The Department Board shall provide counseling to students for several matters, including orientation on tracks and other options inside or outside the degree program, including appointing one or more academic advisors.
2.	De studieadviseur adviseert studenten gevraagd of ongevraagd over alle aspecten van hun opleiding en draagt, mede aan de hand van de studievoortgang en indien daar aanleiding toe is, zorg voor adequate verwijzing naar bevoegde organen van de TU/e, naar studentenadviseurs en/of studentendecanen van ESA, of naar vertrouwenspersonen van de TU/e.	The academic advisor will advise students, either on request or on the advisor's own initiative, on all the aspects of the degree program, and will ensure, partly based on the students' study progress and whenever necessary, adequate referral to the qualified bodies of TU/e, to ESA student advisors and/or student counsellors or TU/e confidential counselors.
Art 7.2	**Bewaking van de studievoortgang**	**Monitoring study progress**
1.	Het faculteitsbestuur draagt zorg voor registratie en tijdige bekendmaking van de tentamenresultaten van de individuele studenten in OSIRIS.	The Department Board will ensure that the examination results of the individual students are registered and made known in good time in OSIRIS.
2.	In voorkomende gevallen zorgt het faculteitsbestuur voor bespreking van de studievoortgang tussen de student en de studieadviseur van de opleiding die de student volgt.	Where appropriate, the Department Board will organize a discussion of the study progress between the students and their academic advisor of the degree program the students are taking.
3.	Bij studievertraging kan de studieadviseur de desbetreffende studenten wijzen op de mogelijkheden voor extra ondersteuning dan wel manieren om verdere vertraging zo beperkt mogelijk te houden.	The academic advisor can inform students who fall behind in their studies of the opportunities to receive extra support or ways to limit the delay as much as possible.

Art 7.3	**Studeren met een functiebeperking**	**Studying with a functional impairment**
1.	Een schriftelijk verzoek om aanpassing van het onderwijs of de tentamens of om speciale faciliteiten op grond van een blijvende of tijdelijke functiebeperking dient door de desbetreffende studenten zo mogelijk twaalf weken doch uiterlijk zes weken voordat studenten zullen deelnemen aan het onderwijs of de tentamens te worden ingediend bij studentcounselors@tue.nl.	Students wishing to request an adjustment to the way of teaching or examinations, or for special facilities because of a permanent or temporary functional impairment, should submit such a request to studentcounselors@tue.nl in writing before they are scheduled to take part in the program or the exams. The request should be submitted twelve weeks in advance if possible, but in any event no later than six weeks in advance.
2.	Het verzoek gaat vergezeld van de bescheiden die redelijkerwijs nodig zijn voor de beoordeling van het verzoek. Daaronder wordt in ieder geval begrepen een recente verklaring van een arts of een psycholoog of een orthopedagoog van een BIG- (Beroepen in de Individuele Gezondheidszorg), NIP-(Nederlands Instituut van Psychologen), of NVO-(Nederlands Vereniging van Pedagogen en Onderwijskundigen) geregistreerd testbureau. Zo mogelijk geeft deze verklaring een schatting van de mate en de duur van de functiebeperking.	The request should be accompanied by any documents reasonably required to assess the request. These should include at least a recent statement from a physician or psychologist or from a remedial educationalist registered with BIG (Individual Health Care Professions), NIP (Dutch professional association of psychologists) or NVO (Association of Educationalists in the Netherlands). If possible, the statement should provide an estimation of the extent and likely duration of the functional impairment.
3.	De studentendecaan stuurt verzoeken van studenten, samen met het advies van de studentendecaan, aan het faculteitsbestuur voor zover het verzoek betrekking heeft op faciliteiten. In geval het verzoek betrekking heeft op het verlenen van aanpassingen van de opleiding of ten behoeve van het afleggen van tentamens stuurt de studentendecaan verzoeken van studenten en het bijbehorende advies aan de examencommissie.	Student counselors will send students' requests accompanied by the recommendations of the student counselor to the Department Board in so far as the request relates to facilities. In the event that the request relates to granting adaptations of the degree program to enable the students to take examinations, the student counselor will send the students' request and the related recommendations to the examination committee.
4.	Het besluit omtrent het verlenen van faciliteiten danwel het verlenen van aanpassingen van de opleiding of ten behoeve van het afleggen van	The decision regarding the granting of facilities or granting adaptations of the degree program to enable students to take examinations or CAs shall be taken by the Department Board or the examination committee,

tentamens wordt binnen twintig werkdagen na ontvangst van het verzoek genomen door het faculteitsbestuur respectievelijk de examencommissie.

5. De eventuele aanpassing is zoveel mogelijk afgestemd op de individuele functiebeperking. De te verlenen faciliteiten kunnen bestaan uit een op de individuele situatie afgestemde vorm of duur van het onderwijs en/of de tentamens, of het ter beschikking stellen van praktische hulpmiddelen.

respectively, no later than twenty working days after the request has been received.

Any adaptations shall be attuned as much as possible to the individual's functional impairment. Facilities provided may consist of adjustments to the individual situation of the form or duration of the teaching and/or examinations, or of the provision of practical aids.

H8/C8 H8 PROCEDUREVOORSCHRIFTEN EXAMENCOMMISSIE

C8 RULES OF PROCEDURE FOR THE EXAMINATION COMMITTEE

Art 8.1 Besluit examencommissie

Examination Committee decision

1. De examencommissie besluit op een verzoek van een student binnen de reactietermijn en het besluit wordt met redenen omkleed.

The examination committee shall decide on a student's request within the response term and the decision shall be substantiated

2. De examencommissie kan in bijzondere omstandigheden, onder mededeling daarvan aan de student, van de in het eerste lid gestelde termijn afwijken.

In special circumstances, the examination committee may deviate from the deadline set in paragraph 1, while notifying the student.

3. De student wordt door de examencommissie in de gelegenheid gesteld een zienswijze naar voren te brengen, wanneer:

- de examencommissie voornemens is een verzoek van een student (geheel of gedeeltelijk) af te wijzen; én
- het voorlopig afwijzend besluit van de examencommissie steunt op gegevens die (1) afwijken van de gegevens die de student zelf heeft verstrekt, en/of (2) die verkregen zijn uit andere bronnen dan die de student zelf heeft verstrekt.

The student is given the opportunity to present a view by the examination committee, if:

- the examination committee intends to reject a student's request (in whole or in part); and
- the preliminary rejection decision of the examination committee is based on data that (1) differ from the data provided by the student himself, and/or (2) that were obtained from sources other than those provided by the student himself.

4.	In afwijking van lid 3, krijgt de student altijd de gelegenheid een zienswijze naar voren te brengen wanneer het verzoek betrekking heeft op een vrij onderwijsprogramma.	In derogation of paragraph 3, the student is always given the opportunity to express a view when the request concerns a flexible degree program.
Art 8.2	**Bijzondere omstandigheden**	**Special circumstances**
1.	De examencommissie kan in bijzondere gevallen besluiten af te wijken van het bepaalde in de artikelen 5.1 lid 4 en bijlage 1, artikel 2 onder e (frequentie tentamen) en bijlage 1, lid 2 onder g (vorm tentamen), hetgeen dan geldend is voor alle studenten.	In special cases, the examination committee may decide to deviate from the provisions of Articles 5.1 paragraph 4 (frequency examination) and Appendix 1, Article 2, under g (type of examination), which then applies to all students.
2.	De examencommissie kan in bijzondere gevallen, op verzoek van de student of op eigen initiatief, besluiten af te wijken van het bepaalde in de artikelen 3.5 (mentor), 5.2 lid 1 en 3 (mondeling), 6.3 lid 1 (uitreiking getuigschrift) en de volgtijdelijkheid en vorm, zoals bedoeld in bijlage 1, lid 2 onder e, g en h.	In special cases, at the student's request or on the student's own initiative, the examination committee may decide to deviate from the provisions of Articles 3.5 (mentor), 5.2 paragraph 1 and 3 (oral), 6.3 paragraph 1 (awarding of degree certificate) and the sequentiality and format, as referred to in appendix 1, Article 2 under e, g and h, at the student's request.
3.	Nadere besluiten van de examencommissie, waarbij bijzondere omstandigheden zich kunnen voordoen, zijn vastgelegd in de artikelen 5.3 lid 11 (vervangend tentamen), 5.7 lid 4 (inleveren praktische oefening) en 6.4 lid 3, laatste gedachtestreepje (cum laude).	Further decisions of the examination committee, where special circumstances may arise, are laid down in Articles 5.3 paragraph 11 (alternative examination), 5.7 paragraph 4 (submission practical exercise) and 6.4 paragraph 3, last point (cum laude).
Art 8.3	**Fraude**	**Fraud**
	Indien (vermoedelijke) fraude, zoals bedoeld in artikel 3.1 van het Reglement van de Examencommissie, wordt geconstateerd, dient dit conform de bepalingen in het Reglement van de Examencommissie te worden afgehandeld.	If (suspicion of) fraud, as referred to in Article 3.1 of the Regulations of the examination committees, is found, this should be handled in accordance with the provisions of the Regulations of the Examination Committee.

H9/C9	**H9 OVERGANGSREGELINGEN EN SLOTBEPALINGEN**	**C9 TRANSITIONAL ARRANGEMENTS AND FINAL PROVISIONS**
Art 9.1	**Overgangsregeling**	**Transitional arrangements**
1.	Indien deze regeling wordt gewijzigd, daaronder begrepen een wijziging van de bijlage, wordt door het faculteitsbestuur zo nodig een overgangsregeling vastgesteld. De overgangsregeling wordt opgenomen in de bij deze regeling behorende bijlage.	If these regulations, including the Annex, are amended, the Department Board shall, if necessary, make a transitional arrangement. The transitional arrangement shall be incorporated in the Appendix to these Regulations.
2.	In de overgangsregeling wordt in ieder geval opgenomen: - een regeling omtrent vrijstellingen die verkregen kunnen worden op grond van reeds behaalde tentamens, en - de geldigheidsduur van de overgangsregeling.	The transitional arrangement shall always include: - regulations regarding exemptions that may be obtained based on examinations already passed, and - the term of validity of the transitional arrangement.
Art 9.2	**Wijziging**	**Amendments**
1.	Een wijziging van deze regeling is niet van toepassing op het lopende studiejaar, indien de belangen van de studenten hierdoor redelijkerwijze worden geschaad.	Amendments made to these regulations shall not apply in the current academic year if they unduly harm the interests of students.
2.	Een wijziging van deze regeling kan niet met terugwerkende kracht een reeds ten aanzien van een student genomen besluit beïnvloeden.	An amendment of these regulations may not backdate any decision already taken in regard to students.

APPENDICES

APPENDIX 1 SPECIFIC DEGREE PROGRAM STIPULATIONS (ARTICLE 3.2, PAR 1 PER)

1. Domain specific disciplines (article 3.1)

Domain specific disciplines, as referred to in Article 3.1, second bullet of these regulations:

MASTER MECHANICAL ENGINEERING

Mechanical Engineering, i.e.

▪have a profound understanding of at least one of the core disciplines of Mechanical Engineering: Systems, Dynamics & Control, Mechanics & Materials, Energy & Flow,

• are able to maintain and expand their expertise in this field,

• have good knowledge of the basic sciences that underlie this field,

▪are able to apply this knowledge and understanding to analyse and synthesize structures, machines, devices, systems or processes that accomplish a desired objective in a safe, ethical and sustainable way.

MASTER AUTOMOTIVE TECHNOLOGY

Automotive Technology, i.e.

• have a system overview and are able to work from a systems engineering perspective.

• have a profound knowledge in one of the automotive related engineering sciences (electrical engineering, mechanical engineering, computer science, human factors) and are able to apply this knowledge in the automotive field.

MASTER SUSTAINABLE ENERGY TECHNOLOGY

Sustainable Energy Technology, i.e.

▪have a thorough understanding of at least one sub-area of Sustain-able Energy Technology and are able to maintain and expand their expertise in this field

• have the necessary knowledge and skills to evaluate a broad range of energy technologies and energy systems, taking into account technological, societal, economic and sustainability aspects.

• are able to analyse and understand the role of sustainable energy technologies/sources in a system, either as part of:

a. an electrical system (connection to the grid);
b. as part of a decentralized system (like a building);
c. or the society as a system with opportunities and barriers for the development of sustainable energy technologies.

MASTER SYSTEMS AND CONTROL

The discipline of Systems and Control studies dynamic systems and the optimization of their performance through modelling, sensing and actuation, data processing, and control design. Masters of Science graduates of this degree program:

• have a broad and profound scientific and technical knowledge of the discipline of systems and control and the skills to use this knowledge effectively;

• have the capability to master the discipline of systems and control at different levels of abstraction, including a reflective understanding of its structure and relations to engineering disciplines, including electrical engineering, mechanical engineering, applied physics, mathematics and computer science and chemical engineering;

• have a thorough knowledge of paradigms, methods and tools as well as the skills to actively apply this knowledge to innovative technological dynamical systems, with an appreciation of different application areas.

2. Specific degree program stipulations (article 3.2)

a.a Content of the degree program Mechanical Engineering and related final examination

The degree program Mechanical Engineering comprises the following examination components with corresponding credits:

Examination component	EC	Reference
Core study components	20	App. 1.a.a.1
Specialized elective study components	20	App. 1.a.a.2
Free elective study components	15	App. 1.a.3
Internship	15	App. 1.a.4
Graduation project	45	App. 1.a.5
Professional skills	5	App. 1.a.6

a.a.1 Core study components Mechanical Engineering (20 credits)

For the master's program Mechanical Engineering, in consultation with the mentor, students need to select 20 credits from the following list as core courses. Each course is 5 credits:

4UM00 - Microfabrication methods
4CM00 - Control Engineering
4BM60 - Interfacial Transport Phenomena in Engineering Flows
4BM00 - Advanced Engineering Mathematics
4MM10 - Advanced Computational Continuum Mechanics
4DM10 - Multibody and Non-linear Dynamics
4BM20 - Experimentation for Mechanical Engineering
4EM70 - Sustainable Energy Sources
4DM20 – Engineering Optimization
4EM30 - Scientific Computing for Mechanical Engineering
4CM50 - Applications of Design Principles
4MM50 - Fracture Mechanics – Theory and Application

For the master's program Mechanical Engineering, in consultation with the mentor, a student chooses at least 20 credits in courses from the following list of specialization courses. In addition to the courses listed here, students can also take another course from the core courses listed, as a specialized elective course.

Course	**EC**
4DM00 – Structural Dynamics and Vibro-Acoustics	5
4MM00 -Composite and Light-weight Materials	5
4CM10 – System Theory for Control	5
4RM00 – Introduction to Computational Fluid Dynamics	5
4LM60 – Structural performance of polymers and their composites	5
4EM10 – Gasdynamics	5
4LM30 – Multiscale Modelling for Polymer Mechanics	5
4EM40 – Heat and Flow in Microsystems[1]	5
4SE20ONL- Microscale modeling of heat storage materials[1]	5
4BM30 – Modelling Combustion	5
4MM20 – Computational and Experimental Micro-mechanics	5
4CM70 – Integrated Systems Design	5
4CM60 – Advanced Motion Control	5
4SC000 -Optimal control and reinforcement learning	5
4CM100 – Optics for Mechanical Engineers	5
4CM110-Design of optical instrumentation	5
4DM30 – Non-linear Control	5
4UM10 – Lab on a Chip Microdevices	5
4LM20 – Soft Materials Processing	5
4SC080 – Supervisory Control of cyber-physical systems	5
4EM50 – Thermal Energy Storage[2]	2.5

4SE30ONL-Thermal energy storage and demand[2]	5
4BM10 – Hydraulic Turbomachines	5
4DM60 – Control of Distributed Parameter Systems	2.5
4CM40 – Physical and data-driven modelling	5
4BM50 – Energy Geoscience	2.5
4CM120 – Data-based optimization of control systems	5
4CM90 – OptoMechatronics	5
4AT020 – Clean engines and future fuels	5
4DM40 – Modelling and Control of Manufacturing Systems	5
4BM40 – Optical Diagnostics for Combustion and Fluid Flow	5
4EM60 – Advanced Discretization Techniques	5
4DM70 – Analysis and design of networked dynamical systems	5
4CM20 – Hybrid Systems and Control	5
4LM50 - Rheology	5
4MM60 – Advanced and Additive Manufacturing	5
4EM80 – Monte Carlo Simulations for Energy Application	5
4DM80 - Fault detection and isolation for control systems	2.5
4TM00 – Robot motion planning and control	5
4EM90 – Modelling high-tech systems with thermos-mechanical effects	5
4SC020 – Mobile robot control	5
4SC100 – Haptics and soft robotics	5

1 When selecting the course 4EM40 the course 4SE20ONL cannot be selected (and the other way around).
2 When selecting the course 4EM50 the course 4SE30ONL cannot be selected (and the other way around).

a.b. **Content of the degree program Automotive Technology and related final examination**

The degree program Automotive Technology comprises the following examination components with corresponding credits:

Examination component	EC	Reference
Compulsory study components (core program)	30	App. 1.a.b.1
Specialized elective study components	15	App. 1.a.b.2
Free elective study components	15	App. 1.a.3
Internship	15	App. 1.a.4
Graduation project	45	App. 1.a.5

a.b.1 **Compulsory study components Automotive Technology (30 credits)**

Code	Title	EC
0HM310	Automotive human factors	5
4AT090	Smart Vehicles	5
2IN70	Real-time software systems engineering	5
4AT060	Sustainable vehicles	5
4AT100	Automotive systems engineering project	10

a.b.2 **Specialized elective study components Automotive Technology (15 credits)**

In consultation with the mentor, a student chooses at least 15 credits in courses from the following list of specialization courses:

Code	Title	EC
5LWE0	Control of rotating field machines	5
5LWH0	Modelling & control of power converters	5
5LIC0	Networked embedded systems	5
4CM10[1]	System theory for Control	5
4DM00	Structural dynamics and vibro-acoustics	5
4MM00	Composite & light-weight materials: design and analysis	5
2IMF30	System Validation	5
2IMF25	Automated reasoning	5
2IMF05	Capita Selecta FSA	5
2IMP05	Capita selecta software engineering and technology	5
2IMN10	Architecture of Distributed Systems	5
2IMN05	Capita selecta Interconnected Resource-aware Intelligent Systems	5
DBM140	Embodying Intelligent Behavior in Social Context	5

DDM110	Design for Behavioral Change	5
0HM110	User experience design (design track A)	5
5SMC0[1]	Control principles for engineered systems	5
5SWA0	Rotary permanent magnet machines	5
5LIG0	Applied Combinatorial Algorithms	5
5SSD0	Bayesian Machine Learning and Information Processing	5
5LSH0	Computer Vision and 3D Image Processing	5
4SC000	Optimal control and reinforcement learning	5
4BM30	Modelling combustion	5
4BM20	Experimentation for MW	5
4DM10	Multibody and non-linear dynamics	5
4EM70	Sustainable Energy Sources	5
4MM10	Advanced Computational Continuum Mechanics	5
4MM20	Computational and Experimental Micromechanics	5
2IMF35	Algorithms for model checking	5
2IMN20	Real-Time Systems	5
2IMS20	Cyberattacks crime and defenses	5
2IMN15	Internet of things	5
5SMB0	System identification	5
5LMB0	Model predictive control	5
5SWB0	Advanced power electronics	5
5LWF0	FEM for electromagnetic devices	5
5LIJ0	Embedded control systems	5
5LIL0	Intelligent Architectures	5
5LSM0	Convolutional neural networks for computer vision	5
4CM00*	Control engineering	5
4DM20	Engineering Optimization	5
4CM120	Extremum seeking control for data-based performance optimization	5

4SC080[3]	Supervisory control of cyber physical systems	5
4CM40[3]	Physical and data-driven modelling	5
4DM30	Non-linear control	5
4EM30	Scientific computing for MW	5
DDM150	User Experience Theory and Practice	5
DDM140	Research Methods	5
0HM150	Advanced Cognitive Engineering	5
5LEJ0	Secondary batteries and hydrogen storage	2.5
5LWC0	Advanced actuator design	5
5LIB0	Embedded systems laboratory	5
5LIA0	Embedded visual control	5
5LSL0[2]	Machine learning for Signal processing	5
4CM20	Hybrid systems and control	5
4AT070	Advanced control for future HD powertrains	5
4AT030	Advanced Full-Electric & Hybrid Powertrain Design	5
4BM40	Optical diagnostics for combustion and fluid flow	5
4AT020	Clean engines and future fuels	5
4AT080	Vehicle control	5
4DM70	Analysis and design of networked dynamical systems	5
4SC050	Performance of nonlinear control systems	2.5
4MM50	Fracture Mechanics: theory and application	5
2IMP30	System Design Engineering	5
2IMP20	Domain Specific Language Design	5
0HM280	Human-Robot Interaction	5
4AT000	Vehicle dynamics	5
4EM90	Modelling high-tech systems with thermo-mechanical effects	5

[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.
[2] This course has a capacity limit
[3] This course is scheduled in the same timeslot as a core course, but can be followed simultaneously.
*limited capacity

a.c. **Content of the degree program Sustainable Energy Technology and related final examination**

The degree program comprises the following examination components with corresponding credits:

Examination component	EC	Reference
Compulsory study components (core program)	30	App. 1.a.c.1
Specialized elective study components	15	App. 1.a.c.2
Free elective study components	15	App. 1.a.3
Internship	15	App. 1.a.4
Graduation project	45	App. 1.a.5

a.c.1 **Compulsory study components Sustainable Energy Technology (30 credits)**

Code	Title	EC
7LY3M0	Building performance and energy systems simulation	5
5LEE01[1]	Electrical power engineering and system integration	5
4EM70[2]	Sustainable energy sources	5
0EM140	Energy, economy and society	5
5LEF0	System integration project	10

[1]Not for students who did 5EWB0 electrical power systems in their bachelor's program. These students take an additional specialization course, recommended are Electrical Energy Systems in Transition (2.5 EC) and Planning & Operation of Electrical Power Systems (2.5 EC)

[2] Homologation 'Heat, Flow and Thermodynamics' is strongly advised for students who did not have Heat, Flow and Thermodynamics courses in their bachelor's program'. *(see a.3 and educationguide.tue.nl).*

a.c.2

Specialized elective study components Sustainable Energy Technology (15 credits)

In consultation with the mentor, a student chooses at least 15 EC in courses from the following list of specialization courses:

Code	Title	EC
3MB010	Physics of Plasma and Radiation	5
3MS010	Advanced fluid dynamics	5
7XC1M0[1]	Circularity in the built environment	5
7LY5M0	Data science for intelligent buildings	5
7LS3M0	Sustainable Buildings/Physical Aspects of Building Materials	5
6EMA53[2, 3]	Molecular photophysics	5
5LWE0	Control of Rotating Field Machines	5
5LWH0[3]	Modelling & control of power converters	5
5LEL0	Power Quality Phenomena	5
1ZM20	Technology entrepreneurship	5
4BM60[3]	Interfacial transport phenomena for engineering flows	5
4RM00[5]	Introduction to Computational Fluid Dynamics	5
3MT160	Introduction to NMR/MRI for imaging and flow visualization	5
7S880	Lighting Technology	5
7ZW5M0	Smart healthy urban environments	5
6EMA08[2, 3]	Multiphase computational fluid dynamics	5
5AT010	Electrical components	2.5
5SWA0	Rotary permanent magnet machines	5
5SEE0	Planning & Operation of Electrical Power Systems	2.5
5SED0	Electrical energy systems in transition	2.5
4BM30	Modelling combustion	5
4BM20[3]	Experimentation for MW	5
4EM10	Gasdynamics	5
4EM40[6]	Heat and flow in microsystems	5

4SE20ONL[6]	Microscale modeling of heat storage materials (online)	5
3MP170[3]	Plasma processing science and technology	5
3MP110	Solar cells	5
3MT170	Machine Learning for Fluid Mechanics	5
3MT150	Environmental Fluid Mechanics	5
7LS9M0[3, 5]	Heat, Air & Moisture Transfer/CFD 1	5
5SWB0	Advanced power electronics	5
5LEG0	Pulsed power technology	5
5SEF0	Smart grids, ICT and electricity markets	5
5LEA0	Protection and automation of distribution networks	2.5
0EM150	Sustainable transitions and responsible innovation	5
0EM230	Globalisation, sustainability and justice	5
0EM200	International development and sustainability	5
0EM210	Governing sustainable technology and innovation	5
OEM220	Sustainability assessments for emerging technologies and business models	5
1ZM65	System dynamics	5
1JM60	Leadership of innovation and change	5
6EMAC2[2]	Modern concepts in catalysis	5
6EMAC6[2]	Electrochemical engineering	5
4BM50	Energy Geoscience	2.5
4BM10	Hydraulic turbomachines	5
4EM50[7]	Thermal energy storage	2.5
4SE30ONL[7]	Thermal energy storage and demand (online)	5
3MT130	Transport in porous media	5
7LS6M0[5]	Heat, Air & Moisture Transfer/CFD 2	5
6EMA06[2, 3]	Advanced process design	5
5LEJ0	Secondary batteries and hydrogen storage	2.5

5LWG0[3]	Power electronics for high-precision applications	5
5LEM0	Dynamic control of power conversion in renewable energy systems	5
5LEN0	Power System Stability and Dynamics	2.5
1BM150	Green and digital transformation: sustainability in the era of AI	5
4BM40	Optical diagnostics for combustion and fluid flow	5
4AT020	Clean engines and future fuels	5
4EM80	Monte Carlo Simulations for Energy Applications	5

[1] When selecting the course 7XC1M0 the course 0EM310 cannot be selected
[2] For students with a bachelor in Chem. Eng. Or comparable; other students please check the entrance requirements. As prior knowledge for courses 6EMAC6 and 6EMA06, 6P3X0 (Chemical Reactors) is recommended
[3] This course is scheduled in the same time slot as a core course
[4] Mandatory specialization course for students specializing within the 'Energy & Society' profile
[5] When selecting the course 4RM00 the course(s) 7LS9M0 and/or 7LS6M0 cannot be selected
[6] When selecting the course 4EM40 the course 4SE20ONL cannot be selected
[7] When selecting the course 4EM50 the course 4SE30ONL cannot be selected

a.d. **Content of the degree program Systems and Control and related final examination**

The degree program comprises the following examination components with corresponding credits

Examination component	EC	Reference
Core study components	30	App. 1.a.d.1
Specialized elective study components	15	App. 1.a.d.2
Free elective study components	15	App. 1.a.3
Internship	15	App. 1.a.4
Graduation project	45	App. 1.a.5

a.d.1 **Core study components Systems and Control**

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

Code	Title	EC
4CM00	Control Engineering	5
4CM10	System theory for control	5
4SC080	Supervisory Control of Cyber Physical Systems	5
5CSA0	Modeling Dynamics	5
4DM10	Multi-body and Non-linear Dynamics	5
5SMB0	System Identification	5
5SC29	Stochastic processes, filtering and estimation	5

Mandatory CBL project for all S&C students (5 Credits):

Code	Title	EC
5SC26	Systems and Control integration project	5

a.d.2 **Specialized elective study components Systems and Control**

For their specialized elective study components, students choose 15 credits of the following list:

Code	Title	EC
4AT000[4]	Vehicle Dynamics	5
5LWE0	Control of Rotating-field Machines	5
5LWH0	Modelling & Control of power converters	5
8CM00[4]	Systems Medicine	5
4CM60	Advanced Motion Control	5
4SC000	Optimal control and reinforcement learning	5
4SC010	Control and operation of tokamaks	2.5
5LMA0	Model reduction	5
5SMC0[1][4]	Control principles for engineered systems	5
5SWA0[2]	Rotary Permanent Magnet Machines	5
5AT010	Electrical Components (1/2 Powertrains 4AT060)	2.5
5SWC0[2]	Linear and planar motors for high-precision systems	5
4DM30	Non-linear Control	5
4DM60	Control of distributed parameter systems	2.5
4DM20	Engineering Optimization	5
4CM120	Data-based optimization of control systems	5
4CM40[4]	Physical and data-driven modelling	5
4EM30	Scientific Computing for Mechanical Engineering	5
5LMC0	Robust Control	5
5LMB0	Model predictive Control	5
5LMG0	Advanced Process Control	5
5SWB0	Advanced Power Electronics	5
5LIJ0	Embedded Control Systems	5
4DM40	Modelling and control of manufacturing networks	5

4SC050	Performance of Nonlinear Control Systems	2.5
4DM70	Analysis and design of networked dynamical systems	5
4AT080	Vehicle control	5
4SC100	Haptics and soft robotics	5
4SC090	Control and operation of future energy system	5
4CM20	Hybrid systems and control	5
4AT030	Advanced full-electric and hybrid powertrain design	5
4SC070[3]	Learning control	5
4SC020[3]	Mobile Robot Control	5
4AT070	Advanced control for future HD powertrains	5
4DM80	Fault detection and isolation for control systems	2.5
5SC28	Machine learning for Systems and Control	5
5LWC0	Advanced actuator design	5
5LWG0	Power electronics for high-precision applications	5
4AT090	Smart Vehicles	5
4TM00	Robot motion planning and control	5
4EM90	Modelling high-tech systems with thermo mechanical effects	5

[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 5SMC0.
[2] Both courses can be followed simultaneously
[3] Both courses can be followed simultaneously
[4] This course is scheduled in the same timeslot as a core course

a.3 Free elective study components (15 EC)

Free elective study components for all master's programs are:

- courses on Master level;
- TU/e courses on Bachelor level if
  - indicated as necessary by the departmental admissions committee upon admission to the program and/or
  - necessary as personal deficiency courses and/or
  - necessary as homologation module for specific groups of students.

The following restrictions apply:

- Only bachelor's courses level 3 can be chosen
- Courses should not overlap considerably with other courses from the students' program of examinations or with the students' Bachelor's program, to be judged by the Examination Committee.

Homologation study components Mechanical Engineering

In the Master Mechanical Engineering no homologation study components are offered.

Homologation study components Automotive Technology

Some homologation courses can be necessary in order to be able to follow the core program and/or specialization.

Code	Title	EC
2IHC10[1]	Homologation C++ and Computer Organization	2.5
4SE010[1]	Homologation heat, flow & thermodynamics	2.5
5XWC0[2]	Energy management	5
5XWB0[2]	Electric drive systems	5
2IX20[2]	Software specification	5

[1] Homologation is strongly advised, depending on student's background. See information in the online education guide for target groups.

[2] Bachelor course, approval by Examination Committee depends on bachelor profile and specialization.

Homologation study components Sustainable Energy Technology

Some homologation courses can be necessary in order to be able to follow the core program and/or specialization.

Code	Title	EC
4SE010[1]	Homologation Heat, Flow and Thermodynamics	2.5
34TWI	Turbulence, Waves and Instabilities	5
5XWB0[2]	Electric drive systems	5
5XWA0[2]	Power System Analysis and Optimization	5

[1] Homologation is strongly advised, depending on student's background. See information in the online education guide for target groups.

[2] Bachelor course, approval by Examination Committee depends on bachelor profile and specialization

Homologation study components Systems and Control

Some homologation courses can be necessary in order to be able to follow the core program and/or specialization.

Code	Title	EC
4SC060[1]	Homologation dynamics of mechanical systems	2.5

[1] Homologation is strongly advised, depending on student's background. See information in the online education guide for target groups.

a.4 Internship (15 credits)

A student must complete an internship of 15 credits. The internship can be extended with 5 EC, that will be registered as part of the free electives space. This extension must be approved as part of the program of examinations (by the Examination Committee) before the start of the internship. The internship is supervised by a supervisor who is appointed as an examinator by the Examination Committee.

Credits	Internship period
15	11 weeks
15+5	14 weeks

The internship is finalized with a report and presentation.

- At the end of the internship period a draft version of the report is sent to the responsible TU/e internship supervisor and Academic advisor..
- Within maximum four weeks after the internship period, the final version of the report must be sent to the TU/e internship supervisor and uploaded in SharePoint.
- The date of the presentation has to be scheduled in consultation with the TU/e internship supervisor.

If students fail to submit the report in time, they must contact the academic advisor and inform the TU/e internship supervisor before the submission deadline. In consultation with the TU/e internship supervisor, a short extension period (maximum of 2 weeks) may be allowed by the academic advisor.

In case this extension is insufficient, the students need to request the Examination Committee for a possible further extension. If the examination committee grants this extension, the final grade of the internship can also be maximized to a “7”- grade. If the examination committee does not grant this extension the internship is graded with a “Failed” grade.

The course codes for the internships and its extensions are the following:

Mechanical Engineering:	4ZM20	extension 4YM10
Automotive Technology:	4AT99	extension 4AT96
Sustainable Energy Technology:	4SE30	extension 4SE35
Systems and Control:	4SC03	extension 4SC97

Students need to register for the internship using a form, available in the education guide (in deviation of article 3.7.1, and 3.7.2 of the PER).
Intended learning outcomes of the internship and other information can be found on the education guide pages of the SET, AT and S&C Master’s programs and in the Osiris course description for the ME Master’s program.

a.5 Graduation Project (45 credits)

The Graduation Project is a 45 EC project (1260 hrs; 7.5 months fulltime) and is the culmination of the master’s program. This project is supervised by a thesis supervisor who is appointed as an examinator by the Examination Committee from the allocated division (in the case of the masters ME, SET and S&C) or section (in the case of master AT) of a student. The thesis supervisor is not necessarily the same person as the mentor.
The graduation project consists of three phases:

- Phase 1: preparation phase
- Phase 2: project phase
- Phase 3: defense and grading phase

Phase 1: preparation phase
The end of this phase is marked by submission of the preparation phase report of the graduation project.
The preparation phase of the project takes typically 2-6 full working weeks. The preparation phase is concluded with a preparation phase report containing:

- The background and already obtained results in the topic

- The project goal (based on literature and/or previous work)
- Research method (means, steps, results)
- Project planning (including the preparation phase planning. Project planning of at least 6 and at most 8 months for the project phase)

This plan is to be graded with “PA”/”FL” by the thesis supervisor and has to be uploaded in the SharePoint student reports.

Phase 2: project phase

The end of this phase is marked by submission of the final report of the graduation project.
A student has to formally register for a start of the project phase. Students may not commence with the second phase (project phase) of the graduation project until:

- The program of examinations has been approved.
- At least 70 EC of the formal program of examinations (art.3.6.3) has been completed, including the internship.
- The internship report has been uploaded in the SharePoint student reports.
- The approved preparation phase report of phase 1 has been uploaded in the SharePoint student reports.
- The form ‘Registration graduation project’, also stating the end date, when the final version of the graduation project has to be submitted, has been signed by the TU/e thesis supervisor and submitted to the Center for Student Administration (CSA) of Mechanical Engineering and timely submitted before the starting date recorded on the registration form.

The examination committee must indicate whether students may commence with their graduation project.
The project phase starts according to the starting date as recorded on the registration form for phase 2, provided all requirements have been met. The student will receive formal approval for the start of the project phase.
The project phase ends within a time period of 6 to 8 months after the approved starting date and is marked by the submission of the final graduation project report in the SharePoint student reports. The final report is the report that will be published in the library.

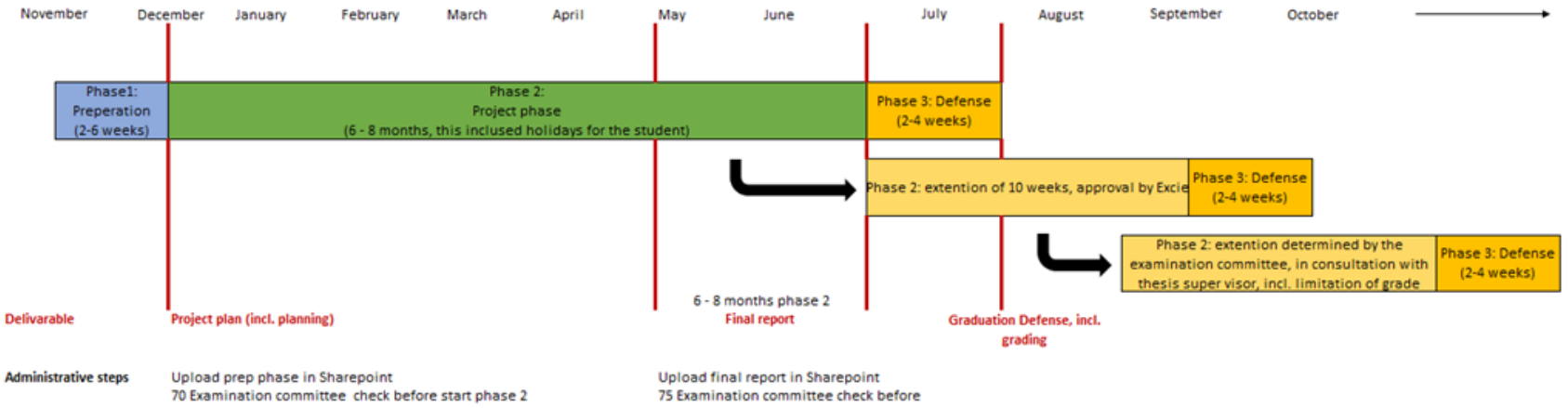
Phase 3: the defense and grading phase.

The end of the defense and grading phase is marked by the presentation, defense and grading by the graduation committee.
The graduation committees are chaired by assistant professors (from UD1), associate professors or full professors.
Students may not commence with the third phase of the graduation project until:

- 75 EC of the formally approved program of examinations (art.3.6.3) has been completed.
- Phase 2 final report is uploaded into the SharePoint student reports.

Students register for the final exam by sending an email to the CSA.MECH email address stating the ID-number to requesting the form “Registration final exam” 6 x 5 working days in advance of the date of the presentation. The filled in form has to be submitted to CSA.MECH at least 4 x 5 working days in advance of the presentation.

Additional rules



If the project phase result (final report) is not delivered in time or in case of (personal) circumstances a student may request for a deadline extension:

- The Examination Committee can allow extensions of 10 weeks. A student needs to submit a request to the Examination Committee at least one month before the maximum end date of 8 months, as stated in the graduation project registration form deadline. The end result of the graduation project can then be maximized to a “7”- grade, to be decided by the Examination Committee.
- Should the student fail to finish the project within this extended period of 10 weeks, a request for continuation of the project has to be submitted to the Examination Committee. This request must include a binding and substantiated proposal regarding the time limit and must be supported in writing by the thesis supervisor. The end result of the graduation project can then be maximized to a “7”- grade, to be decided by the Examination Committee.

- If the student does not deliver the project result within the new time frame approved by the Examination Committee, the student receives a “Failed” grade (issued by the Graduate Program Director). After this, a proposal to start a new project (filed by the student and in consultation with the Graduate Program Director) needs to be approved by the Examination Committee.
- Students receiving a “Failed” grade (lower than a 6.0) by the graduation committee can file a motivated request for a retake of the graduation project, to be judged by the Examination Committee. This retake can either be a new project or an extension of the ‘failed’ project, with the same or another graduation project supervisor. The request must be formulated in consultation with the Graduate Program Director and it must be approved by the intended thesis supervisor.
- The Examination Committee can deviate from these rules based on specific circumstances.

Further requirements to the graduation project are described in the Examination Regulations (ER). More details of content and examination can be found on TU/e’s education information system.

The course codes for the graduation project are the following:

Mechanical Engineering:	4ZM10	For an international graduation project: 4ZM15
Automotive Technology:	4AT98	
Sustainable Energy Technology:	4SE40	
Systems and Control:	4SC98	

Students need to register for the graduation project as described above, using a form.

a.6 Professional skills

Mechanical Engineering (5 credits)

As part of the master's program Mechanical Engineering, students have to finish two mandatory courses on professional skills:

- 4WM00 Coaching and tutoring (2.5 credits)
- 4WM10 Career development (2.5 credits)

For the first course, 4WM00 Coaching and Tutoring, experience in Design based learning or Challenge Based Learning is a requirement. Students who do not have relevant experience, an alternative course is mandatory:

- 4WM50 Group work and academic writing (2.5 credits)

These courses are offered several times during the academic year. The number of available places in each quartile, and the timeslot in which these courses are offered, are limited. Details of content, scheduling and examination can be found in the course catalogue.

Automotive Technology, Sustainable Energy Technology and Systems and Control

Professional skills trainings are embedded into the integration projects.

a.7 Sections per master's program

The sections involved in each master's program are listed below.

Students will be guided by a mentor from one of these sections (see art. 3.5 and 3.6).

The thesis work will be supervised by a thesis supervisor from one of these sections (see app 1 a.5).

In order to compose a specialization, a student needs to be assigned to one of the divisions (MSc ME, SET and S&C) or sections (MSc AT) involved in the program. See appendix 6 for the procedure that applies to the MSc programs. More detailed information can be found in the Education Guide, per master's program in the to do list.

The following sections are involved in the master's program **Mechanical Engineering**

Section	**Division**
Control Systems Theory	Dynamical Systems Design
Dynamics and Control	Dynamical Systems Design
Robotics	Dynamical Systems Design
Energy Technology	Thermo Fluids Engineering
Power & Flow	Thermo Fluids Engineering
Mechanics of Materials	Computational and Experimental Mechanics
Microsystems	Computational and Experimental Mechanics
Processing and Performance	Computational and Experimental Mechanics

The following sections are involved in the master's program **Automotive Technology**:

Section	**Department**
Power & Flow	Mechanical Engineering
Control Systems Technology	Mechanical Engineering
Dynamics & Control	Mechanical Engineering
Robotics	Mechanical Engineering
Control Systems	Electrical Engineering
Electromechanics and Power Electronics	Electrical Engineering
Electronic Systems	Electrical Engineering
Signal Processing Systems	Electrical Engineering
Human-Technology Interaction	Industrial Engineering & Innovation Sciences
Model Driven Software Engineering	Mathematics & Computer Science
Interconnected Resource-aware Intelligent Systems	Mathematics & Computer Science

Future Everyday	Industrial Design

The following sections are involved in the master's program **Sustainable Energy Technology:**

Section	**Department**
Building Physics and Services	Built Environment
Power & Flow	Mechanical Engineering
Energy Technology	Mechanical Engineering
Electrical Energy Systems	Electrical Engineering
Electromechanics and Power Electronics	Electrical Engineering
Technology, Innovation & Society	Industrial Engineering & Innovation Sciences
Plasma and Materials Processing	Applied Physics
Transport in Permeable Media	Applied Physics
Fluids and Flows	Applied Physics
Stimuli-responsive functional materials & devices	Chemical Engineering & Chemistry
Sustainable process engineering	Chemical Engineering & Chemistry
Multi-scale modelling of multi-phase flows	Chemical Engineering & Chemistry

The following sections are involved in the master's program **Systems and Control**:

Section	Department
Control Systems Technology	Mechanical Engineering
Dynamics and Control	Mechanical Engineering
Robotics	Mechanical Engineering
Control Systems	Electrical Engineering
Electromechanics and Power Electronics	Electrical Engineering

b. Content of the tracks

The degree program **Mechanical Engineering** contains the following optional tracks:

Advanced Manufacturing across the Scales (AMS)
Computational Engineering (CE)
Energy Conversion and Storage (ECS)
Engineering Fluid Mechanics (EFM)
Engineering Solid Mechanics (ESM)
Materials for High-Tech Systems Design (MHS)
Mechatronic Systems Design (MSD)
Robotics (Rob)

The structure of each track is the same as the regular ME master structure. Students can finish the degree program ME without completing a track.

- 20 EC Core Courses
- 20 EC specialization courses
- 15 EC free electives

- 5 EC skills courses
- 15 EC internship
- 45 EC graduation project

The composition of the tracks within ME is as follows.
For each track, students must choose 20 credits of the list of core courses and 20 credits of the list of specialization courses. In addition, for some tracks some core- or specialization courses may be **mandatory**, as indicated (**in bold)** in the list.

Advanced Manufacturing across the Scales (AMS)

Core

Code	Title
4UM00[1]	**Microfabrication Methods**
4MM10	Advanced Computational Continuum Mechanics
4BM20	Experimentation for Mechanical Engineering
4EM30	Scientific Computing for Mechanical Engineering
4DM20	Engineering Optimization
4MM50	Fracture Mechanics – Theory and Application

Specialization courses

4MM00	Composite and Light-weight Materials
4LM60	Structural performance of polymers and polymer composites
4LM30	Multiscale Modelling for Polymer Mechanics
4EM40	Heat and Flow in Microsystems
4MM20	Computational and Experimental Micro-mechanics
4CM70	Integrated System Design
4DM30	Non-linear Control

4UM10	Lab on a chip Microdevices
4LM20[1]	**Soft Materials Processing**
4CM90	Opto-Mechatronics
4DM40	Modelling and Control of Manufacturing Systems
4LM30	Multiscale modelling for polymer mechanics
4LM50	Rheology
4CM100	Optics for Mechanical Engineers
4MM60[1]	**Advanced and Additive Manufacturing**
4EM90	Modelling high-tech systems with thermo-mechanical effects

[1]Mandatory course

Computational Engineering (CE)

Core

Code	Title
4CM00	Control Engineering (DSD)
4BM00[1]	**Advanced Engineering Mathematics**
4MM10	Advanced Computational Continuum Mechanics (CEM)
4BM60	Interfacial Transport Phenomena in Engineering Flows (TFE)
4DM10	Multibody and Non-linear Dynamics (DSD)
4EM30[1]	**Scientific Computing for Mechanical Engineering**
4DM20[1]	**Engineering Optimization**
4MM50	Fracture Mechanics – Theory and Application (CEM)

Specialization Courses

4DM00	Structural Dynamics and Vibro-Acoustics (DSD)
4MM00	Composite and Light-weight Materials (CEM)
4EM10	Gas Dynamics (TFE)_
4LM30	Multiscale Modelling for Polymer Mechanics (CEM)

4EM40	Heat and Flow in Microsystems (TFE)
4BM30	Modeling Combustion (TFE)
4MM20	Computational and Experimental Micro-mechanics (CEM)
4SC000	Optimal control and reinforcement learning (DSD)
4CM40	Physical and data-driven modelling (DSD)
4EM60[1]	**Advanced Discretization Techniques**
4DM70	Analysis and design of networked dynamical systems (DSD)
4LM50	Rheology (CEM)
4MM60	Advanced and Additive Manufacturing (CEM)
4EM80	Monte Carlo Simulations for Energy Application (TFE)

[1]Mandatory course

Of the non-mandatory courses listed above, 15 EC has to be from one division, either CEM, DSD or TFE. This is the division in which also the graduation project will be carried out. It is recommended to take the other 5 EC from another division.

Energy Conversion and Storage (ECS)

Core

Code	**Title**
4BM00	Advanced Engineering Mathematics
4BM20	Experimentation for Mechanical Engineering
4EM70[1]	**Sustainable Energy Sources**
4BM60	Interfacial Transport Phenomena in Engineering Flows
4EM30	Scientific Computing for Mechanical Engineering
4DM20	Engineering Optimization

Specialization courses

4RM00	Introduction to Computational Fluid Dynamics
4EM10	Gas Dynamics
4EM40[2]	Heat and Flow in Microsystems

4SE20ONL[2]	Microscale modeling of heat storage materials
4BM30	Modeling Combustion
4EM50[3]	Thermal Energy Storage
4SE30ONL[3]	Thermal energy storage and demand
4BM10	Hydraulic Turbomachines
4BM50	Energy Geoscience
4BM40	Optical Diagnostics for Combustion and Fluid Flow
4AT020	Clean Engines and Future Fuels
4CBLM00	Energy transition – the path towards net zero

[1]Mandatory course
[2]Only one of the two courses 4EM40 and 4SE20ONL can be selected.
[3]Only one of the two courses 4EM50 and 4SE30ONL can be selected.

Engineering Fluid Mechanics (EFM)

Core

4BM00	Advanced Engineering Mathematics
4MM10	Advanced Computational Continuum Mechanics
4BM60	Interfacial Transport Phenomena in Engineering Flows
4BM20[1]	**Experimentation for Mechanical Engineering**
4EM30	Scientific Computing for Mechanical Engineering

Specialization courses

4RM00	Introduction to Computational Fluid Dynamics
4EM10	Gas Dynamics
4BM30	Modeling Combustion
4EM40	Heat and Flow in Microsystems

4UM10	Lab on a chip Microdevices
4BM10	Hydraulic Turbomachines
4CM40	Physical and data-driven modelling
4BM40	Optical Diagnostics for Combustion and Fluid Flow
4EM60	Advanced Discretization Techniques
4LM50	Rheology

[1]Mandatory course

Engineering Solid Mechanics (ESM)

Core

Code	**Title**
4BM00	Advanced Engineering Mathematics
4MM10	Advanced Computational Continuum Mechanics
4BM20	Experimentation for Mechanical Engineering
4EM30	Scientific Computing for Mechanical Engineering
4DM20	Engineering Optimization
4MM50	Fracture Mechanics – Theory and Application

Specialization courses

4MM00	Composite and Light-weight Materials
4LM60	Structural performance of polymers and polymer composites
4LM30	Multiscale Modelling for Polymer Mechanics
4MM20	Computational and Experimental Micro-mechanics
4EM60	Advanced Discretization Techniques
4MM60	Advanced and Additive Manufacturing

Materials for High-Tech Systems Design (MHS)

Core

Code	Title
4BM00	Advanced Engineering Mathematics
4MM10	Advanced Computational Continuum Mechanics
4BM20	Experimentation for Mechanical Engineering
4EM30	Scientific Computing for Mechanical Engineering
4DM20	Engineering Optimization
4CM50	Applications of Design Principles

Specialization courses

4MM00	Composite and Light-weight Materials
4LM60	Structural performance of polymers and polymer composites
4LM30	Multiscale Modelling for Polymer Mechanics
4MM20	Computational and Experimental Micro-mechanics
4LM50	Rheology
4MM60	Advanced and Additive Manufacturing

Mechatronic Systems Design (MSD)

Core

Code	Title
4CM00	Control Engineering
4DM10	Multibody and Non-linear Dynamics
4BM20	Experimentation for Mechanical Engineering
4EM30	Scientific Computing for Mechanical Engineering

4DM20	Engineering Optimization
4CM50	Applications of Design Principles

Specialization courses

4DM00	Structural Dynamics and Vibro-Acoustics
4CM10	System Theory for Control
4CM70	Integrated System Design
4CM60	Advanced Motion Control
4SC000	Optimal control and reinforcement learning
4M110	Technical Optics
4DM30	Non-linear Control
4SC080	Supervisory Control of cyber-physical systems
4CM40	Physical and data-driven modelling
4CM90	OptoMechatronics
4DM40	Modelling and Control of Manufacturing Systems
4CM20	Hybrid Systems and Control
4CM100	Optics for Mechanical Engineers
4MM60	Advanced and Additive Manufacturing

The bachelor course Design Principles is a prerequisite for the MSD master track. If you do not have this course in your ME bachelor program, you must include it as a homologation course in your master course list.

Robotics (Rob)

Core

Code	**Title**
4CM00	Control Engineering
4DM10	Multibody and Non-linear Dynamics

4BM20	Experimentation for Mechanical Engineering
4EM30	Scientific Computing for Mechanical Engineering
4DM20	Engineering Optimization
4CM50	Applications of Design Principles

Specialization courses

4CM10	System Theory for Control
4SC000	Optimal control and reinforcement learning
4DM30	Non-linear Control
4TM00[1]	**Robot motion planning and control**
4SC080	Supervisory Control of cyber-physical systems
4CM40	Physical and data-driven modelling
4DM40	Modelling and Control of Manufacturing Systems
4DM70	Analysis and design of networked dynamical systems
4CM20	Hybrid Systems and Control
4SC020[1]	**Mobile Robot control**
4SC100[1]	**Haptics and soft robotics: human-in-the-loop engineering**

[1]Mandatory course: For the Robotics track it is required to follow at least two out of the three mandatory courses.

The degree program **Automotive Technology** contains only the Master's Degree Program in Automotive Technology with the corresponding study components, course codes and credits as described in article a and no other tracks.

The degree program **Systems and Control** contains only the Master's Degree Program in Systems and Control with the corresponding study components, course codes and credits as described in article a and no other tracks

The degree program **Sustainable Energy Technology** contains the track SELECT with the corresponding study components, course code and credits (d), as described here.

SELECT is the European KIC program "Environomical Pathways for Sustainable Energy Systems". TU/e participates in this EIT InnoEnergy innovation community of European universities and offers, in this context, a SET-SELECT entry-point program and a SET-SELECT exit-point program. Completion of the TU/e SET-SELECT entry-point program and a SELECT exit-point program at one of the partner universities within the EIT InnoEnergy consortium leads to a graduation in the Master's degree program in Sustainable Energy Technology from the TU/e. Completion of a SELECT entry-point program at one of the partner universities in the EIT InnoEnergy consortium and the TU/e SET-SELECT exit-point program also leads to a graduation in the Master's degree program in Sustainable Energy Technology from the TU/e.

Apart from TU/e, the SELECT entry-point program (the first year of the two year program) can also be followed at KTH Royal Institute of Technology, Stockholm, Sweden and UPC, Barcelona, Spain. The exit-point program (second year of the two year program) can be followed at these three universities and at Aalto University, Espoo, Finland, at Politecnico di Torino, Italy, at IST, Lisbon, Portugal, and at AGH, Krakow, Poland.

The track SELECT students will receive a diploma and diploma supplement from TU/e that will mention the track SELECT as a specialization.

Standard regulations of TU/e do not apply to these SELECT students for the year they attended at a partner university.

For SET SELECT several additional regulations hold:

- To be admitted into the SET-SELECT track, students need to be selected. Details can be found on Master's in Sustainable Energy Systems (innoenergy.com)
- The two years of the SET-SELECT program have to be followed in two different countries. This means in particular that the two years of the program at TU/e cannot be combined. Also, the final project of a student who follows the exit-point program at TU/e cannot be performed in the country where the first year program has been done.
- Students in the SET-SELECT program cannot participate in the Honors program.
- Students in the SET-SELECT program cannot start a double degree program with another master's program at TU/e.
- Students in the TU/e SET-SELECT entry-point program do not participate in the master allocation procedure.

Students in the TU/e SET-SELECT entry-point program do not get a staff member from TU/e as mentor.

T**he composition of the SELECT track within SET**

	Credits	**Reference**
Core program year one KTH, UPC or TU/e	60	App. 1.b1 .
Integrated Project of the Year (IPoY)(MJ 2504; offered by KTH)	6	App. 1.b1
Specialized elective study components	9*	App. 1.b2
Graduation project	45	App. 1.b5

*Since TU/e offers only courses of 5 credits (or 2.5 credits), students will take 10 credits in specialization elective study components.

b.1 Compulsory study components (66 credits)

Students must complete the core program of 60 EC at KTH, UPC or TU/e (year 1). In addition, students must complete the MJ2504 Integrated Project of the Year (IPoY) of 6 EC (year 2), organised by KTH.

The **core program** at TU/e consists of the following courses:

Course code		**Location**	**EC**
OEM140	Energy, economy, and society	TU/e	5
4EM70	Sustainable Energy Sources	TU/e	5
7LY3M0	Building Performance and energy systems simulation	TU/e	5
5LEE0	Electrical power engineering and systems integration	TU/e	5
UPC 240209	Data science in energy innovation	UPC	5
MJ2527	PoY1	KTH	5
MJ2530	Thermal Conversion and Industrial System Analysis	TU/e	5
5SEF0	Smart grids, ICT and electricity markets	TU/e	5

MJ2418	Sustainable Energy and environment	UPC	5
XXX	Energy modeling and Climate policy	UPC + TU/e	5
MJ2532	Energy Storage	UPC + KTH	5
MJ2527	POY2	KTH	5

b.2 **Specialized elective study components (9 credits)**

In consultation with the mentor, students who take their second year at TU/e include **at least one specialization course** from the list below in their program of examinations:

Code	Course	Credits (EC)
OEM150	Sustainble Transitions	5
1ZV60	Methodology for IE research	5
0EM140	Energy, economy and society	5
4RM00	Introduction to Computational Fluid Dynamics	5
7LY3M0[3]	Building performance and energy systems simulation	5
5LEE0[2]	Electrical power engineering and system integration	5
5SEE0	Planning & Operation of Electrical Power Systems	2.5

[1]This course is mandatory for students who choose Innovation Sciences department for their thesis work.

[2] This course is mandatory for students who choose Electrical Engineering department for their thesis work. Not for students who did 5EWB0 electrical power systems or a similar course in their bachelor's program.

[3] This course is mandatory for students who choose Built Environment department for their thesis work. Not for students who did a similar course in their bachelor's program.

In consultation with the mentor, students who take their second year at TU/e choose their **second specialization elective** either from the list below, or from the list above:

Code	Course	Credits (EC)	Code
4EM40[3]	Heat and flow in microsystems	5	4EM40[3]

4SE20ONL[3]	Microscale modelling of heat storage materials (online)	5	4SE20ONL[3]
4EM50[4]	Thermal energy storage	2.5	4EM50[4]
4SE30ONL[4]	Thermal Energy Storage and demand (online)	5	4SE30ONL[4]
5SED0	Electrical Energy Systems in Transition	2.5	5SED0
5SEF0	Smart grids, ICT and electricity markets	5	5SEF0
7LS3M0	Sustainable buildings / physical aspects of building materials	5	7LS3M0
7LY5M0	Data science for intelligent buildings	5	7LY5M0
5SSD0	Bayesian machine learning and information processing	5	5SSD0

[3] When selecting the course 4EM40 the course 4SE20ONL cannot be selected.

[4] When selecting the course 4EM50 the course 4SE30ONL cannot be selected.

b.3 **Free elective study components**

The track SELECT does not include any free elective courses as part of the program at TU/e.

b.4 **Internship**

The track SELECT does not include an internship as part of the program at TU/e.

b.5 **Graduation project (45 credits)**

See appendix 1.a.5.
(only for SET-SELECT track exit-point program)

With respect to appendix 1.5.a, the following exception applies:
SELECT students are exempted from the requirement of finishing at least 70 EC of their approved course program prior to starting their graduation project, project phase. The requirement of finishing all courses prior to phase 3 does apply to SELECT as well.

Students will be guided by a thesis supervisor from one of the sections mentioned in article b.6.

b.6 **Sections**

Only for SET-SELECT track exit-point program

The following sections are involved in the SELECT track:

Section	Department
Building Physics and Services	Built Environment
Energy Technology	Mechanical Engineering
Electrical Energy Systems	Electrical Engineering
Technology, Innovation & Society	Industrial Engineering & Innovation Sciences

Students will be guided by a mentor from one of these sections (see art. 3.5 and 3.6).
SELECT students will be allocated to a mentor of TU/e, who will be available for their studies at Eindhoven University of Technology, no later than September 1st, 2024.
This is an exemption to article 3.5.1, Mentor, and the relevant articles based upon it.

c. **Organization of practical exercises**
The study components for every program that include practical exercises in the sense of Article 1.1., are published in the course catalogue

d. **Study load of the degree program and of each of the study components it comprises**
The minimum study load of the program is 120 credits. The study load of the study component is indicated under a or b, respectively.

e. **Number and frequency of the examinations, and practical exercises**
The examinations of the study components for every program are described in the course catalogue..

f. **Form of the degree program**
Every program described in this PER is a full-time program

g. **Format of examinations**
The examinations of the study components for every program are described in the course catalogue.

h. **Conditions for admission to the examination**
All examinations/practical exercises may be taken and completed in any order desired in each program, apart from the graduation project, which marks the conclusion of each program (see article a.5 of this appendix). For some courses 'prior knowledge' requirements are stated in the course catalogue.

i. **Participation in practical exercises**
The course catalogue provides the information of which examination of study components may not be taken until the corresponding practical exercises have been successfully completed, accept for the graduation project, for which the information is included in the Education guide and in these regulations.

j. **The study components from which students must choose for the elective part of their degree programs**
Details about the elective part of each degree program have been listed in paragraphs a.2 and a.3

k. **Qualitative admission requirements for issuing proof of admission**

Generic (supra-departmental) qualitative admission requirements:

Proficiency in English

Students who do not meet the diploma requirement of English at pre-university level (vwo) are obliged to submit one of the following language tests:

- TOEFL (Test of English as a Foreign Language): total score of at least 90 points, and a minimum score of 21 for each section. The TU/e only accepts the TOEFL Internet-based test. Note: the TU/e only accepts scores released on one test date. The TU/e does not accept MyBest Scores, or
- IELTS (International English Language Testing System), Academic version: with an overall band score of at least 6.5 and a minimum of 6.0 for each section, or
- University of Cambridge: proof of C2 Proficiency (previously Certificate of Proficiency in English CPE) with an overall score of 180 and minimum of 169 per section or a proof of C1 Advanced (previously Certificate in Advanced English CAE) with an overall score of 176 and a minimum of 169 per section.

Exemptions to the obligation to submit a language test are as follows:

- Students who have completed their entire bachelor's degree program in English or completed the final three years of pre-university education with English as the only working language in the following countries: Australia, Canada, Ireland, New Zealand, UK and USA.
- Students who have obtained a diploma at the Dutch vwo level.
- Students with a diploma of General Secondary Education (ASO) from a secondary school issued under the responsibility of the Flemish Ministry of Education and Training.
- Students with one of the following nationalities: Australia, Canada, Ireland, New Zealand, United Kingdom and USA.
- Students with an IB or EB degree (English as sole language of instruction).
- Students with British A levels or an International USA High School diploma.
- Students who attended an hbo bachelor's degree program in the Netherlands, in which English was the sole language of instruction throughout the bachelor's degree program (demonstrated or indicated by the degree program).

Degree program specific qualitative admission requirements:

Type	Criterion	Norm	Method	Assessed by	Score
Academic Knowledge, skills & competencies	Academic competences at the level of a BSc degree at a research university	Knowledge and skills acquired from a BSc-level research university degree, equal to a Dutch university BSc-degree level.	Bachelor's degree* final level equivalent to Dutch higher-education bachelor's level is checked. - For international BSc programs, the level of university is checked (using NUFFIC and/or UK-Naric); the CGPA level also is checked, depending on the country and institution, in order to compare the level of education (see the TU/e Regulations for Admission to Master's Programs) - Students with a Dutch University BSc degree or University of Applied Science degree can get a first indication from doorstroommatrix.nl, but note that this site is not run by our university and can only be used to get an indication.	Central admissions committee	Sufficient/ insufficient
Subject-Related Knowledge & Skills for the master ***Mechanical Engineering***	BSc degree in Mechanical Engineering or equivalent.	Specific knowledge and understanding in science disciplines, obtained within a mechanical engineering context or related. More specifically, the expertise of the candidate will be assessed in the following topics: - Mathematics Fundamentals, Calculus (including differentiation, integration, differential	Based on: Assessment of transcript of records displaying the content of previous course subjects and project work.	Departmental admissions board	Sufficient/ insufficient/ conditional; under the condition that (1) the student completes a premaster (max 30 Credits) or (2) the student gets the defined

		equations, vector calculus), Linear Algebra (including Elementary vector computations, System of linear equations, Gauss-Jordan algorithm, Matrices, Complex numbers) - Computer Programming (including algorithms, Matlab) - Dynamics, Signals, Systems, and Control (including signal processing, modeling, identification, control design and system integration) - Thermodynamics, Transport Phenomena (including first, second law, gas law, entropy, thermal cycles, convection, conduction, radiation, diffusion) - Fluid and Solid Mechanics, Mechanical Properties (including Navier-Stokes equation, Bernoulli's law,			requirement of homologation during the master (max 15 Credits). *The conditional situation always depends on educational feasibility.

		conservation laws, kinematics, equilibrium conditions, strain, stress, elasticity, FEM, boundary conditions) - Construction and Design (including design principles and solutions, dynamic and thermo-mechanical behavior, compensation mechanisms).			
Subject-Related Knowledge & Skills for the master ***Automotive Technology***	BSc degree in Mechanical Engineering, Electrical Engineering or equivalent.	Specific knowledge and understanding in science disciplines, obtained within the context of mechanical engineering, electrical engineering or related. More specifically, the expertise of the candidate will be assessed in the following topics: - Mathematics[#] Fundamentals, Calculus (including differentiation, integration, differential equations, vector calculus), Linear Algebra (including Elementary vector computations,	Based on: Assessment of transcript of records giving the content of previous course subjects and project work. The background of the candidate will be taken into account in the assessment. Not all the mentioned topics need to be mastered at the same level.	Department admissions board	Sufficient/ insufficient/ conditional; under the condition that (1) the student in possession of a Dutch Higher Vocational Education (hbo) degree certificate or a Dutch university Bachelor's degree certificate,

		System of linear equations, Gauss-Jordan algorithm, Matrices, Complex numbers) - Dynamics, Signals, Systems, and Control (including signal processing, modeling, Euler-Lagrange equations,) identification, control design and system integration) - Computer Programming (including algorithms, scientific computing, numerical optimization, MATLAB/C++ programming) - Electromechanics and Power Electronics (including electronic circuits and electromagnetics) -Construction and Design (including design principles and solutions, dynamic and thermo-mechanical behavior, compensation mechanisms).			completes a premaster's (max. 30 credits) or (2) the student meets the defined requirement of homologation during the master's (max. 15 credits). *A conditional situation always depends on educational feasibility. #Specific for the topic "Mathematics": a minimum grade 7 (Dutch grading system) or similar, to be determined based upon Nuffic- and TU/e

					criteria, is required for these mathematics courses at the level of the finished Bachelor program
Subject-Related Knowledge & Skills for the master ***Sustainable Energy Technology***	BSc degree in Mechanical Engineering, Electrical Engineering or equivalent.	Specific knowledge and understanding in science disciplines, obtained within the context of mechanical engineering, electrical engineering or related. More specifically, the expertise of the candidate will be assessed in the following topics: - Mathematics Fundamentals, Calculus (including differentiation, integration, differential equations, vector calculus), Linear Algebra (including Elementary vector computations, System of linear equations, Gauss-Jordan	Based on: Assessment of transcript of records giving the content of previous course subjects and project work. The background of the candidate will be taken into account in the assessment. Not all the mentioned topics need to be mastered at the same level.	Department admissions board	Sufficient/ insufficient/ conditional; under the condition that (1) the student in possession of a Dutch Higher Vocational Education (hbo) degree certificate or a Dutch university Bachelor's degree certificate, completes a premaster's

		algorithm, Matrices, Complex numbers) - Thermodynamics, Transport Phenomena (including first, second law, gas law, entropy, thermal cycles, convection, conduction, radiation, diffusion) - Electrical Energy Systems, Electromechanics and Power Electronics (including medium- and low-voltage networks, electronic circuits and electromagnetics) - Construction and Design (including design principles and solutions). - Fluid and Solid Mechanics, Mechanical Properties (including Navier-Stokes equation, Bernoulli's law, Conservation laws)			(max. 30 credits) or (2) the student meets the defined requirement of homologation during the master's (max. 15 credits). *A conditional situation always depends on educational feasibility.

Subject-Related Knowledge & Skills for the master ***Systems and Control***	BSc degree in Mechanical Engineering, Electrical Engineering or equivalent.	Specific knowledge and understanding in science disciplines, obtained within the context of mechanical engineering, electrical engineering, computer engineering or related. More specifically, the expertise of the candidate will be assessed in the following topics: - Mathematics Fundamentals, Calculus (including differentiation, integration, differential equations, vector calculus), Linear Algebra (including Elementary vector computations, System of linear equations, Gauss-Jordan algorithm, Matrices, Complex numbers) - Dynamics, Signals, Systems, and Control (including continuous-time and discrete-time signals and systems, modeling dynamic systems, basic feedback control design, signal	Based on: Assessment of transcript of records displaying the content of previous course subjects and project work. The background of the candidate will be taken into account in the assessment. Not all the mentioned topics need to be mastered at the same level.	Department admissions board	Sufficient/ insufficient/ conditional; under the condition that (1) the student in possession of a Dutch Higher Vocational Education (hbo) degree certificate or a Dutch university Bachelor's degree certificate, completes a premaster's (max. 30 credits) or (2) the student meets the defined requirement of homologation during the master's (max. 15 credits).

		analysis and estimation, Fourier and Laplace transforms) - Computer Programming (including algorithms, scientific computing, numerical optimization, MATLAB/C++ programming) Although not mandatory, knowledge on one or both of the following topics is appreciated. - Electromechanics and Power Electronics (including electronic circuits and electromagnetics) -Construction and Design (including design principles and solutions, dynamic and thermo-mechanical behaviour, compensation mechanisms).			*A conditional situation always depends on educational feasibility.
Language skills	Sufficient command of the English language	Students must meet the English proficiency requirements as stated in Appendix 1 under k (see generic (supra-departmental)	An assessment will be made as to whether the command of the English language is sufficient to ensure the student can follow the courses taught in English.	Central admissions committee	Sufficient/ Insufficient

		qualitative admission requirements).			

I. Bachelor's degree certificates that provide direct access to the master's program

The following Bachelor's degree certificates provide direct access to the Master's program **Mechanical Engineering**:

- Aerospace Engineering (TUD)
- Applied Physics (TU/e, TUD, UT)
- Marine Technology (TUD)
- Mechanical Engineering (TUD, TU/e, UT)

The following Bachelor's degree certificates provide direct access to the Master's program **Automotive Technology**:

- Advanced Technology (pre-mechanical engineering track) (UT)
- Aerospace Engineering (TUD)
- Applied Physics (TU/e, TUD, UT)
- Electrical engineering (TU/e, TUD, UT) (Automotive included)
- Marine Technology (TUD)
- Mechanical Engineering (TUD, TU/e, UT)

The following Bachelor's degree certificates provide direct access to the Master's program **Sustainable Energy Technology**:

- Advanced Technology (pre-mechanical engineering track) (UT)
- Aerospace Engineering (TUD)
- Applied Physics (TU/e, TUD, UT)
- Chemical Engineering and Chemistry (TU/e)
- Chemical Science & Engineering (UT)
- Electrical engineering (TU/e, TUD, UT) (Automotive included)
- Marine Technology (TUD)
- Mechanical Engineering (TUD, TU/e, UT)

- Molecular Science and Technology (TUD)

The following Bachelor's degree certificates provide direct access to the Master's program **Systems and Control**:

- Aerospace Engineering (TUD)
- Applied Mathematics (TU/e, TUD, UT)
- Applied Physics (TU/e, TUD, UT)
- Electrical Engineering (TU/e, TUD, UT) (including Automotive)
- Mechanical Engineering (TUD, TU/e, UT)

m. Transitional arrangements

- A student is exempt (EXM) from the diagnostic test for professional skills with retroactive effect (which was mandatory prior to the academic year 2020-2021) in as far as this test was not completed by the student on or after September 1, 2020.
- The degree program specific qualitative admission requirements, as stipulated in Appendix 1 under k, apply to students who wish to start a master's
- degree program on or after September 1, 2020.

For the master **Mechanical Engineering**, the following transitional arrangements apply:

- The special track Mechanical Engineering Artificial Intelligence Engineering Systems is being outphased. Students cannot enter the track since September 1st, 2022. Students who are already studying in the track program, can finish their approved program until September 1st, 2025. If they did not finish their approved program by that date, they need to discuss with the academic advisor and file a request to the examination committee to approve of their program of examinations and graduate in the regular master's program.
- The special track Manufacturing Systems Engineering is being outphased. Students cannot enter the track since September 1st, 2022. Students who are already studying in the track program, can finish their approved program until September 1st, 2025. If they did not finish their approved program by that date, they need to discuss with the academic advisor and file a request to the examination committee to approve of their program of examinations and graduate in the regular master's program.

For the master **Automotive Technology**, the following transitional arrangements apply:
The core program AT changed in 2024-2025. Students who started the Master's program Automotive Technology before September 1st, 2024, follow the program of examinations as specified in the PER of the year when they started.
Since the core courses of the previous program of examinations of the master Automotive Technology are offered in 2024-2025, no further transitional arrangements are applicable.

For the master **Systems and Control**, the following transitional arrangements apply:
The core program S&C changed in 2023-2024. Students who started the Master's program Systems and Control before September 1st, 2023, follow the program of examinations as specified in the PER of the year when they started.
Since the core courses of the previous program of examinations of the master Systems and Control are offered in 2024-2025, no further transitional arrangements are applicable.

n. The way in which education in the degree program is evaluated and the results are made available to the relevant official bodies

The degree program shall describe the process of quality care in the departmental quality care plan, as determined by the Program Committee on July 4, 2024.

o. One opportunity practical exercises

Only one opportunity is offered each academic year to take the practical exercise(s) listed below:

Program	Code	Course	Credits
ME	4EM30	Scientific computing for Mechanical Engineering	5
AT	4AT10	Automotive systems engineering project	10
S&C	5SC26	Systems and Control integration project	5
SET	5LEF0	System integration project	10

Due to the teamwork of the project and a practical exercise that is considered to be the final test, there are no opportunities for resits of (parts of) this course in the same academic year. During the course regular feedback is given and/or there is sufficient opportunity for repair in certain parts. The first opportunity to re-do the whole course is in the next academic year.

Bijlage 2/ Appendix 2 **APPENDIX 2 PRE-MASTER'S PROGRAM (ARTICLE 3.2, PAR 2 PER)**

Rules concerning the pre-master's program

Art 1 **Enrollment and admission**

1. The admission and registration for a pre-master's program relating to a master's program chosen by students are open to those in possession of a Dutch Higher Vocational Education (hbo) degree certificate or a Dutch university bachelor's degree certificate from a university as well as a maximum of a 30-credit deficiency to be able to participate in the master's degree program. If the certificate has not yet been actually awarded, the prospective students may still enroll in the pre-master's program on condition that in due time before the start of the pre-master's program the students are in the possession of a statement by the examination committee of the institution in question declaring that they have fulfilled the conditions for obtaining the Dutch university or hbo degree.

1a. In derogation of paragraph 1, a departmental admission committee may exceptionally advise that a student with a foreign hbo certificate or a foreign university bachelor's degree is still eligible for a pre-master's program. Upon a positive recommendation by the departmental admissions committee, the student will be admitted and enrolled in a pre-master's program.

2. Students who have a hbo diploma (with exception of students with a pre-university (vwo) with a N+G or N+T profile) must meet the English proficiency requirements as stated in Appendix 1 under k as a supplement to the requirements in Art 1 to be admitted and enrolled in a pre-master's program.

2a. Students who have a hbo diploma (with exception of students with a vwo prior education with a N+G or N+T profile) must, in order to be admitted and enrolled in a pre-master's program, as a supplement to the requirements in Art 1, have the required minimum level of mathematics: pre-university (vwo) mathematics B or T.

Students are therefore obliged to either:
a. pass the mathematics B test that is offered by TU/e;
b. submit a certificate for Mathematics B or T from an external institute, such as:

- Preliminary examinations via the Open University (mathematics T)
- Boswell-Bèta in Utrecht (mathematics B);
- Korteweg-de Vries Institute for Mathematics (vwo Wiskunde B);
- De Centrale Commissies Voortentamen (vwo wiskunde B).

c. submit examinations/certificates obtained that are acknowledged by the Departmental Admissions Committee as proof that the student meets the required level of mathematics.

3. Students will be admitted to their chosen master's degree programs only after they have successfully completed the study components of the pre-master's program.

4. The registration period as included in the applicable Regulations for Registration, Academic Career Check, Enrollment, and Termination of Enrollment shall apply for re-registration in the pre-master's program.

Art 2 Conditions for the pre-master's program

1. A pre-master's program has a maximum of 30 credits. The study components belonging to a pre-master's program must be scheduled within maximally two semesters from the moment of enrollment.

2. For students who have a Higher Vocational Education (hbo) degree certificate of a degree program
- listed in Appendix 3, the pre-master's program encompasses a maximum of 30 credits
- not listed in Appendix 3, the Departmental Admissions Committee shall determine if the deficiency is 30 credits.

If this is the case, the Departmental Admissions Committee shall decide whether admission to and 103nrolment in the regular pre-master's program is permitted.

3. If the deficiency of students with a university degree certificate is maximally 30 credits, the Departmental Admissions Committee determines the size and content of the applicable pre-master's program no later than August 15. If there is a second registration period for the pre-master's program as of February 1, the pre-master's program must be determined before January 15.

4. There shall be at least two opportunities per study component in a period of two semesters to take final tests or CAs.

5. If students with prior education at university level have a deficiency of a maximum of 15 credits, the departmental Admissions Committee determines whether the students must follow a pre-Master´s program or that the subjects can be taken within the master's degree program.

6. If students cannot complete the pre-master's program within six months of the start of the program and therefore are placed at a demonstrable disadvantage, and have obtained a minimum of 15 credits at that time, the students may submit a request to expand the program with a maximum of 15 credits worth of master's study components. The credits obtained for master's study components during the pre-master's program may, at the request of the students, be recorded, retaining the grade and date of examination, on the students' Master's transcript.

Art 3 Pre-master's program

1. A pre-master's program is a set of study components that constitute students' program.

2. Before the start of the pre-master's program, the Departmental CSA shall inform all pre-master's students of the study components they are required to take a program of examinations.

3. The composition of the pre-master's program for students of an adjoining Higher Vocational Education (hbo) program is included in Appendix 3.

4. Individual pre-master's programs may be composed for pre-master's students with an academic/university background.

Art 4 Study progress requirement for pre-master's students

1. All pre-master's students must complete the pre-Master's program within the term set for the program (maximally two semesters). If students do not meet this requirement, they shall not be admitted to the same or another pre-master's program that belongs to the same bachelor's program for a period of three years. In special cases the examination committee may deviate from this.

2. The study progress requirement does not apply to students who have submitted a request to the ESA to withdraw before December 1 (if it is a pre-master's program that can be completed in one semester) or before March 1 (if it is a pre-

master's program that can be completed in two semesters) and who have not re-registered for another pre-master's program at TU/e.
Furthermore the academic progress requirement does not apply to students who have submitted a request to the ESA to withdraw who started February 1 and have submitted a request to ESA to withdraw before May 1 (if it is a pre-master's program that can be completed in one semester) and did not re-register for another pre-master's program at TU/e or do not re-register as of September 1 (if it is a pre-master's program that can be completed in two semesters).

3. Pre-master's students shall receive a written pre-recommendation from the examination committee on their study progress at the mid-point of the determined term. This pre-recommendation serves as a warning in the event that the student is making insufficient study progress.

4. Within the determined term (maximally two semesters), students shall receive a binding written study progress decision from the examination committee relating to their continuation of the pre-master's program. The study progress decision is:
a) positive if the pre-master's students have passed the complete pre-master's program within the determined term, and it is
b) negative if the pre-master's students have failed to meet the provisions stated under a). Any credits obtained from master's study components do not count in this regard. The pre-master's students shall not be allowed to continue the pre-master's program.

5. In the event of acknowledged personal circumstances, as referred to in Article 5, the examination committee determines when the standard must be satisfied.

6. Students who still have to successfully complete one study component can make a single request for one additional opportunity to complete the study component from the examination committee during enrolment as pre-master's students, preferably directly after not receiving a pass during the resit.

7. If students have not met the academic progress requirement, their enrollment is terminated at the beginning of the next month.

Art 5 **Acknowledged personal circumstances**

1. When a study progress decision is issued, acknowledged personal circumstances are taken into account.

2. Students who, based on acknowledged personal circumstances, want to be considered for a postponement of the study progress decision must, after referral by the academic advisor, report this to a student counselor and submit a request to the Examination Committee.

3. Acknowledged personal circumstances are:

a. illness, physical, sensory or other forms of functional impairment;
b. pregnancy;
c. exceptional family circumstances;
d. membership or presidency of the University Council, the Department Council, a program board or committee, or membership of the board of a foundation whose statutes allow for the operation of facilities or services intended for students, or a body that, in the opinion of the Executive Board, has equivalent status considering its tasks;
e. membership of the board of a student organization of a reasonable size and with full legal status, or of a comparable organization of reasonable size, where priority is given to promoting the general common interest and activities are genuinely performed to that end;
f. other personal circumstances than those described in a to d that would lead to unreasonable hardship if they were not taken into account.

4. The acknowledged personal circumstances referred to in the previous paragraph will only be taken into account if they are reported to the academic advisor as soon as possible and no later than twenty working days after they arise, by or on behalf of the students. In the case of pregnancy, the student must give notification as soon as possible, once she knows she is pregnant, but preferably no later than three months before the due date.

5. Students who wish extenuating acknowledged personal circumstances to be taken into account must submit documentary proof that these circumstances exist or existed. The documentary proof must be submitted to the Central Committee on Personal Circumstances through CPO@tue.nl.

6. The examination committee shall ask the Central Committee on Personal Circumstances for advice on the extenuating personal circumstances submitted by students.

7. In its letter of intent to issue a negative study progress decision, the examination committee must specify, giving reasons, whether the personal circumstances can be acknowledged and what consequences this has for the students concerned.

Art 6 Application of the PER for the bachelor's degree program within the Bachelor College

1. These PER apply to master's study components (with exception to pre-master's study components) that are included in the program of examinations of pre-master's students.

2. The pre-master's program contains study components belonging to a bachelor's degree program within the Bachelor College, as well as pre-master's study components belonging to the Graduate school. The following articles from the PER of the bachelor's degree program shall apply mutatis mutandis to these study components:

- Article 5.1 registration for and withdrawal from study components
- Article 5.2 registration for study components after the appointed time limit for registration
- Article 6.1 (with the exception of paragraph 3) frequency, form and sequence of mid-term tests and final tests
- Article 6.3 oral final tests
- Article 6.4 participation in and registration for examinations
- Article 6.5 withdrawal
- Article 6.6 retakes
- Article 6.7 grading of examinations
- Article 6.8 determining results/marking periods
- Article 6.9 right of inspection for written (final) tests
- Article 6.10 evaluation
- Article 6.11 term of validity and retention periods
- Article 8.1 student counseling (general)
- Article 8.2 academic advisor/monitoring study progress/study planning

Bijlage 3/ Appendix 3

APPENDIX 3 CONTENTS OF PRE-MASTER'S PROGRAM (ARTICLE 3.2, PAR 3 PER)

Contents of pre-master's program

The pre-Master's programs all consist of 30 credits of courses and training.

Contents of pre-Master's program Mechanical Engineering

Compulsory courses: 25 EC

Elective course: 5 EC Students have to select one of the elective courses listed.

Course code	Course name	EC	Status	PER*
2DL60	Linear algebra	2.5	Compulsory	MSc
2WBB0	Calculus variant 2	5	Compulsory	BSC AR
2DL40	Advanced calculus 1	2.5	Compulsory	MSc
4DB00	Dynamics and control of mechanical systems	5	Compulsory	BSc AR
4EB00	Thermodynamics	5	Compulsory	BSc AR
4MB00	Solid mechanics	5	Compulsory	BSc AR
4CC10	Mechatronic design	5	Elective	BSc BR
4DC00	Dynamics and control of robotic systems	5	Elective	BSc BR
4RC00	Structure and flow	5	Elective	BSc BR
4PB00	Heat and Flow	5	Elective	BSc AR
Training courses for pre-master students				
4HH00	RSI-training	0	Compulsory	-
4HH00	Health and safety	0	Compulsory	-

*The applicable PER with regard to appendix 2, art. 6.2

Contents of pre-Master's program Automotive Technology

Compulsory courses: 25 EC

Elective course: 5 EC Students have to select one of the elective courses listed.

Course code	Course name	EC	Status	PER*
2DL60	Linear algebra	2.5	Compulsory	MSc
2WBB0	Calculus variant 2	5	Compulsory	BSc AR
2DL40	Advanced Calculus I	2.5	Compulsory	MSc
4DB00	Dynamics and control of mechanical systems	5	Compulsory	BSc AR
4CBLB10	Sustainable Fuels Plan A or B?	5	Compulsory	BSc AR
4CA20	Signals and systems	5	Compulsory	BSc AR
5APA0	Power Electronics	5	Elective	BSc BR
5AIB0	Sensing computing & actuating	5	Elective	BSc BR
4PB00	Heat and Flow	5	Elective	BSc AR
Training courses for pre-master students				
4HH00	RSI-training	0	Compulsory	-
4HH00	Health and safety	0	Compulsory	-

*The applicable PER with regard to appendix 2, art. 6.2

Contents of pre-Master's program Sustainable Energy Technology

Compulsory courses: 25 EC

Elective course: 5 EC Students have to select one of the elective courses listed.

Course code	Course name	EC	Status	PER*
2DL60	Linear algebra	2.5	Compulsory	MSc
2WBB0	Calculus variant 2	5	Compulsory	BSc AR
2DL40	Advanced Calculus I	2.5	Compulsory	MSc
4EB00	Thermodynamics	5	Compulsory	BSC AR
4CBLB10	Sustainable Fuels Plan A or B?	5	Compulsory	BSc AR

4PB00	Heat and Flow	5	Compulsory	BSc AR
5APA0	Power electronics[#]	5	Elective	BSc BR
0SV40	Managing sustainable technology	5	Elective	BSc BR
7S9X0	Introduction building performance	5	Elective	BSc BR
5XWA0	Power system analysis and optimization[#]	5	Elective	BSc BR
Training courses for pre-master students				
4HH00	RSI-training	0	Compulsory	-
4HH00	Health and safety	0	Compulsory	-

*The applicable PER with regard to appendix 2, art. 6.2

[#]Option for students with a HBO bachelor in EE or comparable. Students with another HBO bachelor background please check the entrance requirements of this course in OSIRIS. In addition, the responsible lecturer can be contacted to determine whether it is possible to follow in this course

Contents of pre-Master's program Systems and Control.

Compulsory courses: 30 EC

Course code	**Course name**	**EC**	**PER***
2DL60	Linear Algebra	2.5	MSc
2WBB0	Calculus variant 2	5	BSc AR
2DL40	Advanced Calculus I	2.5	MSc
5ESG0	Signal processing	5	BSc AR
4DB00	Dynamics and control of mechanical systems	5	BSc AR
4CC10	Mechatronic Design	5	BSc BR
4CA20	Signals and systems	5	BSc AR
Training courses for pre-master students			**PER**
4HH00	RSI-training	0 Compulsory	-

4HH00	Health and safety	0	Compulsory	-

*The applicable PER with regard to appendix 2, art. 6.2

Admissible to the pre-master's program

Students with a diploma from one of the HBO bachelors below are eligible to the pre-Master's program **Mechanical Engineering**

Automotive
Aviation / Aeronautical Engineering
Electrical and Electronic Engineering
Engineering Physics
Mechanical Engineering
Mechatronics

Students with a diploma from one of the HBO bachelors below are eligible to the pre-Master's program **Automotive Technology**

Automotive
Aviation / Aeronautical Engineering
Electrical and Electronic Engineering
Engineering Physics
Mechanical Engineering
Mechatronics

Students with a diploma from one of the HBO bachelors below are eligible to the pre-Master's program **Sustainable Energy Technology**

Aviation / Aeronautical Engineering
Chemical Engineering / Technische scheikunde
Electrical and Electronic Engineering
Engineering Physics
Mechanical Engineering
Mechatronics

Students with a diploma from one of the HBO bachelors below are eligible to the pre-Master's program **Systems and Control**:

Automotive
Aviation / Aeronautical Engineering
Electrical and Electronic Engineering
Engineering Physics
Mechanical Engineering
Mechatronics

Bijlage 4/ Appendix 4 **APPENDIX 4 EXPLANATORY NOTES PRE-MASTER'S PROGRAMS**

In connection with the inclusion of the rules concerning the pre-master's program in Appendix 2 of this PER, additional information is provided below.

Art 1 **Enrollment and admission**

1. In order to participate, students must at least possess a bachelor's degree or master's degree from a university (or a statement from the examination committee that they meet the requirements to obtain a Higher Vocational Education (hbo) degree certificate or university degree before September 1 but that the degree certificate has not yet been issued) and has a maximum deficiency of 30 credits. Appendix 3 states the hbo programs that allow direct access to the pre-master's program. Pre-master's students must register through 'Studielink' before May 1 for the pre-master's programs that they would like to follow (for the Eindhoven School of Education this is August, 1).

2. Supplementary to the requirements stated in Article 1, paragraph 1, hbo students must meet the English proficiency requirements as stated in Appendix 1 under k, and have a Maths B or T at vwo level for most Pre-master's programs. These admission requirements apply for students who started the pre-master's program on or after September 1, 2021.

Art 2 **Conditions for the pre-master's program**

1. Students with a degree certificate from a hbo program, as stated in Appendix 3, who request registration for a pre-master's program are directly admissible. Before commencement of the program, the students must pay a fee for this. If the hbo program is not listed in Appendix 3, or the students have a prior university background, the Departmental Admissions Committee shall assess what the level of deficiency is of students. For a deficiency that exceeds 30 credits, the students shall not be admitted to a pre-master's program and shall be advised to enroll in the preparatory bachelor's degree program.
For a deficiency with a maximum of 30 credits, the students with a degree certificate from a hbo program must register for a regular pre-master's degree program.
For students with previous university training who have a deficiency of 15 credits or fewer, the departmental Admissions Committee determines whether they are directly admissible to the master's degree program and must remedy the deficiencies within the master's degree program.

2. The Departmental Admissions Committee shall establish the pre-master's programs to be followed by students, based on the registration application and prior education of university bachelor's or master's students, as stated in paragraph 2 of this article. The Committee will do this after having given the students the opportunity to state the reasons that they consider themselves eligible for admission to the pre-master's program and whether they would like to apply for exemptions based on competencies, knowledge, insight, or skills acquired elsewhere. Before commencement of the pre-master's program, the students shall pay a fee. For regulations pertaining to this, please refer to the applicable Regulations for Registration, Academic Career Check, Enrollment, and Termination of Enrollment. This also applies to the master's study components the students are allowed to take on the basis of paragraph 5.

3. Paragraph 6 states that at the request of students and with approval of the examination committee students may expand their pre-master's programs with a maximum of 15 credits worth of master's study components if the students

- cannot complete the pre-master's program within six months of its commencement due to the scheduling of study components;
- and 15 credits within the pre-master's program have been completed;
- and the Examination Committee has grounds to believe the students have sufficient prior knowledge to participate in master's study components.

Students who have been granted permission to take additional study components will receive confirmation from the examination committee, which will also notify the ESA and the Departmental CSA. The Departmental CSA will add these study components to the program of examinations, as referred to in Article 3.

Art 3 Program of Examinations for pre-master's students

Students may not take or be examined in study components that are not part of the program of examinations. The students can only register for those study components that are included in their program of examinations. They must therefore be careful to ensure that their program of examinations includes the study components that they would like to take and that they are allowed to take.

University students, as referred to in paragraph 4, are students with previous training that has been assessed by the Departmental Admissions Committee to be equivalent to three years of scientific education in the Netherlands.

Art 4 **Study progress requirement for pre-master's students**

Since the introduction of the Bachelor-before-Master rule, pre-master's students may no longer be admitted to a master's degree program until they have completed the pre-master's program. For this reason, a study progress requirement for pre-master's students has become part of the regulations. These students must complete the pre-master's program within the set term (maximally two semesters). Students who have been issued with a negative study progress decision may not re-register for the same TU/e program to which the pre-master's program belongs for a period of three years.

At the mid-point of the pre-master's program, the department may issue a provisional positive or negative recommendation, known as a pre-recommendation. If students receive a provisional negative pre-recommendation, this gives them a reasonable term in which to meet the study progress norm.

If students do not successfully complete the first year of the pre-master's program, they shall receive a negative decision.

In the case of a postponed recommendation, the examination committee may establish an amended norm, in accordance with paragraph 5.

The examination committee may grant pre-master's students one additional opportunity to take an exam, if the examination committee is of the opinion that the students will be able to complete the pre-master's program by means of this extra opportunity to take an exam.

Art 5 **Acknowledged personal circumstances**

Personal circumstances may play a role when issuing a study progress decision. These personal circumstances correspond to those that may play a role when issuing a binding recommendation on the continuation of studies. They are laid down in Article 2.1 of the 2008 WHW Implementation Decree. This article describes the procedure by which the students can put forward personal circumstances, if applicable. In order to assess those personal circumstances, the examination committee will seek the advice of the Central Committee on Personal Circumstances. Based on this advice, the examination committee will decide whether a postponed binding recommendation, as referred to in Article 3.4, applies.

Art 6 **Application of the PER for the Bachelor's degree program within the Bachelor College**

Students who will be following a pre-master's program will be registered in a bachelor's degree program that prepares for a master's program. The PER for this bachelor's degree program shall thus also apply to the bachelor's study components taken by the students.

Bijlage 5/ Appendix 5 **APPENDIX 5 DOUBLE DIPLOMAS (ARTICLE 3.11 PER)**

Art. 1 **Internal double diplomas for the intake as of September 1, 2017, but before 1 September 2020**

1. This Article applies to students who have started one or more degree programs on or after September 1, 2017, and before September 1, 2020.

2. In order to qualify for internal double diplomas students need to successfully complete at least 45 credits and at most 75 credits in study components and the graduation project/MSc Final Project on top of the regular workload of a degree program in order to meet the final qualifications of both degree programs. Therefore, in order to acquire two master's degrees with their accompanying certificates, a total workload of at least 165 credits and at most 195 credits applies.

3. In order to acquire more than two master's degrees with accompanying certificates (e.g. internal triple diplomas) the study load is further increased with 30-60 credits in study components as well as an additional 15 credits for the MSc graduation project/Final Project for each additional master's degree program.

4. If a single joint graduation project or Final Project is taken, the core aspects of both master's degree programs involved have to be clearly identifiable in the project. This will be assessed by each of the examination committees for their own degree program. The size of a joint graduation project is always 45, 60 or 75 credits (this means the regular study load is increased by 15 credits, based on the highest study load of both degree programs). The contribution of each degree program is always 50 percent. When a student opts for a single joint graduation project that project is concluded with 2 final grades (one assessment per degree program).

5. Students compose a package of study components with a total study load described in Appendix 5, Article 1, paragraph 2, and if applicable a joint graduation project or final project as referred to in paragraph 3. Students submit this package to the examination committee(s) before the beginning of the second year of enrollment to the degree programs involved for approval. Students follow the procedure described in the education guide. The program proposal form must be sent to both examination committees via the web form. In order to grant approval, the examination committees concerned check, each for their own degree program, whether the program meets the double diploma requirements and the requirements laid down in their PER and therefore meets the learning outcomes of the degree program. Students need not be enrolled in either program until the package is approved.

6. If there are existing agreements concerning a combined program of both degree programs (double diploma program), this shall replace the package composed by the student, as referred to in paragraph 4, and the student does not require approval.

Art. 2 Internal double diplomas for the intake as of September 1, 2020

1. This Article applies to students who have started one or more degree programs on or after September 1, 2020.

2. Appendix 5, Article 1, par 2, 3 and 3a apply mutatis mutandis to students, as referred to in paragraph 1.

3. If a single joint graduation project or Final Project is taken, the core aspects of both master's degree programs involved have to be clearly identifiable in the project. This will be assessed by each of the examination committees for their own degree program. The size of a joint graduation project is always 45, 60 or 75 credits (this means the regular study load is increased by 15 credits, based on the highest study load of both degree programs). The contribution of each degree program is always 50 percent. When a student opts for a single joint graduation project that project is concluded with 2 final grades (one assessment per degree program).

4. Students compose a package of study components with a total study load described in Appendix 5, Article 1, paragraph 2, and if applicable a joint graduation project or final project as referred to in paragraph 3. Students submit this package to the examination committee(s) before the beginning of the second year of enrollment to the degree programs involved for approval. Students follow the procedure described in the education guide. The program proposal form must be sent to both examination committees via the web form. In order to grant approval, the examination committees concerned check, each for their own degree program, whether the program meets the double diploma requirements and the requirements laid down in their PER and therefore meets the learning outcomes of the degree program. Students need not be enrolled in either program until the package is approved.

5. A double diploma program may contain homologation courses proportionate to the number of credits that program consists of. For example:
- A double diploma program of 165 credits may contain a maximum of 20 credits of homologation courses;
- A double diploma program of 180 credits may contain a maximum of 22.5 credits of homologation courses.

6. If there are existing agreements concerning a combined program of both degree programs (double diploma program), this shall replace the package composed by the student, as referred to in paragraph 4, and the student does not require approval.

7. The student following a double diploma program, will receive both certificates according to the applicable procedure, if the total study load of the double diploma program has been completed and the student has been declared to have a pass by both Examination Committees.

8. Students taking the double diploma program, shall be awarded the classification "cum laude" per degree program in accordance with Article 6.4 paragraph 3 on the basis of the regular study load that applies to the degree program in question (the extra study load is excepted here). If there is a joint graduation project, as referred to in paragraph 3, then the final assessment given per degree program applies.

9. In derogation of Article 6.4 paragraph 3, for students taking the double diploma program, in determining the classification "cum laude", the maximum enrollment period is calculated (from the start of the first degree program) in proportion to the number of credits contained in the double diploma program. For example:

- For a master's double diploma program of 165 credits, students must graduate within a maximum of 44 months (regular study period + 20 months).
- For a master's double diploma program of 180 credits, students must graduate within a maximum of 48 months (regular study period + 24 months).

10a. For a student combining the master **Mechanical Engineering** with another master's program into an internal double degree, the master's program of Mechanical Engineering needs to consist of the following components:

- 20 EC core courses;
- 20 EC specialisation courses;
- 5 EC skills courses 4WM10 and 4WM00 or 4WM50;
- 15 EC internship;

60 EC combined graduation project.

10b. For a student combining the master **Automotive Technology** with another master's program into an internal double degree, the master's program of Automotive Technology needs to consist of the following components:

- 30 EC core courses;
- 15 EC specialisation courses;
- 15 EC internship;

60 EC combined graduation project.

10c. For a student combining the master **Sustainable Energy Technology** with another master's program into an internal double degree, the master's program of Sustainable Energy Technology needs to consist of the following components:

- 30 EC core courses;
- 15 EC specialisation courses;
- 15 EC internship;

60 EC combined graduation project.

10d. For a student combining the master **Systems & Control** with another master's program into an internal double degree, the master's program of Systems & Control needs to consist of the following components:

- 30 EC core courses;
- 15 EC specialisation courses;
- 15 EC internship;

60 EC combined graduation project

10e. The contents of the study components of both programs combined cannot have a significant overlap.

The graduation project for the second master's program needs to have a thesis supervisor that is not employed by the department where the thesis supervisor from the master ME/AT/SET/S&C is employed. In addition, if one of the two graduation supervisors is employed by the research sections Control Systems Technology or Dynamics and Control of the department Mechanical Engineering, the other supervisor cannot be employed by the research group Control Systems of the department Electrical Engineering.

10f. If students graduate with a joint graduation project 60 EC, the student will be allowed to take a project phase of 8-10 months. For a graduation project of more than 60 EC the term for completion of the graduation project, project phase, will be increased proportionally.

Bijlage 6/ Appendix 6 **APPENDIX 6 PILOTS (ARTICLE 1.1, PAR 4 PER)**

No pilots are applicable