

IMPLEMENTATION REGULATIONS

2016-2017

**INTERFACULTY
MASTER OF SCIENCE
TRANSPORT, INFRASTRUCTURE AND LOGISTICS**

DELFT UNIVERSITY OF TECHNOLOGY

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Chapter 1 – Compiling the study programme

Article 1 – The study load

The study load for the master's degree programme is 120 credits, excluding subjects or equivalent subjects students completed as part of their bachelor's degree programme.

Article 2 – The composition

1. The examination programme of 120 credits comprises the following components:
Courses, 80 credits
 - a. Fundamentals, 27 credits as laid down in Article 3
 - b. Specialisations, 26-27 credits as laid down in Article 4
 - c. Electives, 26-27 credits as laid down in Article 5Projects and thesis, 40 credits
 - d. Projects, 10 credits as laid down in Article 6
 - e. Thesis, 30 credits as laid down in Article 7
2. The student may opt for the following annotation programmes of 15 credits:
 - Technology in Sustainable Development, as laid down in Article 8
 - Entrepreneurship, as laid down in Article 9
 - Infrastructure and Environment, as laid down in Article 10
 - Integral Design and Management, as laid down in article 11
 - Rail, as laid down in article 12Apart from the programmes of 15 credits, there are additional requirements. Parts of the annotation programme may become extracurricular.
3. The student may be eligible for a special programme of 20 credits on top of the master's degree programme:
 - Honours Programme Master, an individual programme as laid down in Article 13
 - Honours Programme Master Research, as laid down in Article 13, paragraph 7
 - Honours Programme Master Infrastructures and Environment, as laid down in Article 13, paragraph 8
4. As soon as possible, but at the latest before starting with the thesis as stipulated in Article 7, the student must draw up his entire examination programme and present it to the board of examiners for approval after consultation with the programme coordinator.

Article 3 – Fundamentals

1. The examination programme includes a set of basic compulsory subjects, the so-called fundamentals, amounting to 27 credits in total.
2. The compulsory subjects mentioned in paragraph 1 are:

<u>code</u>	<u>subject</u>	<u>credits</u>
CIE4801	transportation and spatial modelling	6
ME44000	introduction transport engineering and logistics	3
ME44205	quantitative methods for logistics	5
SEN1221	statistical methods of choice behaviour	5
TIL4010-16	TIL seminars	1
TIL4030-16	TIL research and design methods	7

Article 4 – Specialisations

1. The examination programme includes one subject specialisation, amounting to 26 or 27 credits in total. The student chooses one out of four subject specialisations available in the degree programme. The subject specialisations are specified in paragraph 2.
2. The degree programme comprises four subject specialisations. Within a subject specialisation all subjects are compulsory. These subject specialisations are:

- Specialisation P – Policy: infrastructure, planning and environment, 26 credits, as laid down in paragraph 3
- Specialisation D – Design: transport systems and networks, 27 credits, as laid down in paragraph 4
- Specialisation O – Operations: traffic, technology and control, 27 credits, as laid down in paragraph 5
- Specialisation E – Engineering: transport, logistics and supply chains, 26 credits, as laid down in paragraph 6.

3. *Specialisation P – Policy: infrastructure, planning and environment*

In this subject specialisation all subjects, amounting to 26 credits in total, are compulsory. The composition of this subject specialisation is as given below.

<u>code</u>	<u>subject</u>	<u>credits</u>
AR0093	infrastructure and environment method module	3
AR0551	people, movement and public space	3
CIE4760	assessment of transport infrastructure and systems	6
CIE5750	transport and spatial planning for urbanized regions	4
SEN1711	advanced evaluation methods for transport decision-making	5
SEN9715	designing transport policies	5

4. *Specialisation D – Design: transport systems and networks*

In this subject specialisation all subjects, amounting to 27 credits in total, are compulsory. The composition of this subject specialisation is as given below.

<u>code</u>	<u>subject</u>	<u>credits</u>
AE4423	airline planning & optimization	4
AE4446	airport operations	4
CIE4811-09	planning and operations of public transport systems	6
CIE4872	railway operations and control	4
CIE5802-09	advanced transportation modelling	4
SEN1721	travel behaviour research	5

5. *Specialisation O – Operations: traffic, technology and control*

In this subject specialisation all subjects, amounting to 27 credits in total, are compulsory. The composition of this subject specialisation is as given below.

<u>code</u>	<u>subject</u>	<u>credits</u>
CIE4821-09	traffic flow theory and simulation	6
CIE5804-09	innovations in dynamic traffic management	4
CIE5805	intelligent vehicles for safe and efficient traffic: design and assessment	4
ME41000	automated driving, automotive human factors & safety	3
ME44305	delft systems and simulation approach	5
SEN9110	simulation master class	5

6. *Specialisation E – Engineering: transport, logistics and supply chains*

In this subject specialisation all subjects, amounting to 26 credits in total, are compulsory. The composition of this subject specialisation is as given below.

<u>code</u>	<u>subject</u>	<u>credits</u>
CIE4840	freight transportation systems: analysis and modelling	4
ME44200	intelligent control for transport technology	3
ME44300	coordination for real-time logistics	3
ME44310	advanced operations and production management	6
SEN9710	multi-modal freight transport policy	5
SEN9720	logistics and supply chain innovations	5

Article 5 – Electives

1. The examination programme includes elective subjects, amounting to 26 or 27 credits in total. The student chooses elective subjects from several lists of elective subjects available in the degree programme. The elective lists are specified in paragraph 3.

2. The amount of credits mentioned in paragraph 1 depends on the size of the chosen subject specialisation as indicated in Article 4. The total amount of credits of the elective subjects, together with the fundamental subjects as indicated in Article 3 and the subject specialisation as indicated in Article 4 must add up to a total of at least 80 credits.
3. The degree programme comprises several lists of elective subjects. From every list of elective subjects at least one subject must be chosen. These lists of elective subjects are:
 - Electives T&P – Transport and Planning, at least 1 subject, as laid down in paragraph 4
 - Electives T&L – Transport and Logistics, at least 1 subject, as laid down in paragraph 5
 - Electives TEL – Transport Engineering and Logistics, at least 1 subject, as laid down in paragraph 6
 - External electives, at least 1 subject, as laid down in paragraph 7

4. *Electives T&P – Transport and Planning*

At least one subject, not already taken as part of the chosen subject specialisation as stipulated in Article 4, must be chosen from the elective subject list as given below.

<u>code</u>	<u>subject</u>	<u>credits</u>
CIE4760	assessment of transport infrastructure and systems	6
CIE4811-09	planning and operations of public transport systems	6
CIE4821-09	traffic flow theory and simulation	6
CIE4822-09	traffic management and control	6
CIE4831-09	empirical analysis for transport and planning	6
CIE4840*	freight transportation systems: analysis and modelling	4
CIE4872	railway operations and control	4
CIE5730	spatial and transport economics	4
CIE5750	transport and spatial planning for urbanized regions	4
CIE5802-09	advanced transportation modelling	4
CIE5803-09	railway traffic management	4
CIE5804-09	innovations in dynamic traffic management	4
CIE5805	intelligent vehicles for safe and efficient traffic: design and assessment	4
CIE5810-09	traffic safety	4
CIE5811	transport safety	4

* *part of SEN1731. SEN 1731 is not allowed in examination programme*

5. *Electives T&L – Transport and Logistics*

At least one subject, not already taken as part of the chosen subject specialisation as stipulated in Article 4, must be chosen from the elective subject list as given below.

<u>code</u>	<u>subject</u>	<u>credits</u>
SEN1311	institutional economics for designing in socio-technical systems	3
SEN1711	advanced evaluation methods for transport decision-making	5
SEN1721	travel behaviour research	5
SEN1741	innovations in transport and logistics	5
SEN9110	simulation master class	5
SEN9710	multi-modal freight transport policy	5
SEN9715	designing transport policies	5
SEN9720	logistics and supply chain innovations	5

6. *Electives TEL – Transport Engineering and Logistics*

At least one subject, not already taken as part of the chosen subject specialisation as stipulated in Article 4, must be chosen from the elective subject list as given below.

<u>code</u>	<u>subject</u>	<u>credits</u>
ME44100	dynamics of material and equipment interaction	3
ME44105	structural design with FEM	4
ME44110	design of transport equipment	5
ME44115	discrete element method (DEM) simulation	4
ME44120	advanced design of baggage handling systems	3
ME44125	structural integrity assessment for transport equipment	3
ME44200	intelligent control for transport technology	3
ME44300	coordination for real-time logistics	3
ME44305	delft systems and simulation approach	5
ME44310	advanced operations and production management	6

7. External electives

At least one subject, not already taken as part of the chosen subject specialisation as stipulated in Article 4, must be chosen from the external elective subject lists. The student can make a choice of subjects from several external elective lists. These lists of external electives are:

- Electives C&O – Control & Operations, as laid down under a
- Electives U – Urbanism, as laid down under b
- Electives TIL – Other TIL fields, as laid down under c.

a. Electives C&O – Control & Operations

<u>code</u>	<u>subject</u>	<u>credits</u>
AE4321-15	air traffic management	4
AE4423	airline planning & optimization	4
AE4424	network scheduling	3
AE4446	airport operations	4
AE4454-16	life cycle analysis and production	3
AE4465	maintenance modeling & analysis	4

b. Electives U – Urbanism

<u>code</u>	<u>subject</u>	<u>credits</u>
AR0093	infrastructure and environment method module	3
AR0190	urban sustainability	2
AR0551	people, movement and public space	3
AR8002TU	legal and governance	7

c. Electives TIL – Other TIL fields

<u>code</u>	<u>subject</u>	<u>credits</u>
CIE4330	ports and waterways 1	4
CIE5306	ports and waterways 2	4
ME41000	automated driving, automotive human factors & safety	3
ME41105	intelligent vehicles	4
MT44070	shipping management	5

8. Free electives and internship

If the elective subjects selected according to paragraph 3 from the lists in paragraphs 4 to 7 add up to an amount of credits that is smaller than the amount of credits stipulated in paragraph 2, the student is required to select additional elective subjects. The student can make a choice from:

- free elective subjects, as laid down under a
- an internship, as laid down under b.

a. Free electives

i. As free elective subjects the student may choose:

- subject from the list as given below:

<u>code</u>	<u>subject</u>	<u>credits</u>
TIL6010	TIL programming / matlab	2
TIL6020	TIL scientific assignment	7

- subjects that are part of an annotation and explicitly mentioned in Articles 8 to 12
- all subjects offered at master level at Delft University of Technology
- all subjects offered at master level at another Dutch university.

ii. As free elective subjects the student may not choose:

- all subjects that have significant overlap with any other subject in the examination programme
- subjects focussing on the development of skills *
- language courses. *

* *skills related and language courses may, however, be chosen as extra courses. In that case they will be considered extracurricular.*

iii. The student can get approval for his free electives by presenting his examination programme to the board of examiners as stipulated in Article 2, paragraph 4. The approval is only valid on the condition that the selected free elective subjects meet the criteria as mentioned under i. and ii.

b. *Internship*

i. The student may opt for an internship as mentioned below:

<u>code</u>	<u>subject</u>	<u>credits</u>
CIE4040-09	internship	10

ii. An internship consists of a project defined in consultation with a scientific staff member of the university and the internship coordinator before it is carried out at an institution outside the university.

iii. Further stipulations regarding internships are given in the Rules and Guidelines laid down by the board of examiners.

9. All elective subjects that are not part of the elective lists as stated in paragraphs 4 to 7, but that were part of an elective subject list in the Implementation Rules 2015-2016 or earlier or that will be part of an elective subject list in the Implementation Rules 2017-2018 or later are in the examination programme considered as free elective subjects as stipulated in paragraph 8.

Article 6 – Projects

1. The examination programme includes a set of compulsory projects, amounting to 10 credits in total.

2. The compulsory projects mentioned in paragraph 1 are:

<u>code</u>	<u>subject</u>	<u>credits</u>
TIL4020-16	TIL research project	3
TIL5050-12	TIL design project	7

3. The student is allowed to start the projects mentioned in paragraph 2, once he has successfully completed the subject as given below:

<u>code</u>	<u>subject</u>	<u>credits</u>
TIL4030-16	TIL research and design methods	7

4. The student is allowed to start the second project mentioned in paragraph 2, once he has successfully completed subjects amounting to a total of at least 45 credits four weeks before the first day of the educational period in which the project will commence.

5. Further stipulations regarding to projects are given in the Rules and Guidelines laid down by the board of examiners.

Article 7 – Thesis

1. The final subject included in the examination programme is a master thesis:

<u>code</u>	<u>subject</u>	<u>credits</u>
TIL5060	TIL thesis	30

2. The content of the thesis has a relationship to the fields of at least two of the faculties involved in the programme: the faculty of Civil Engineering and Geosciences, the faculty of Technology, Policy and Management and the faculty of Mechanical, Maritime and Materials Engineering. This is reflected in the composition of the assessment committee for the thesis project.

3. The assessment committee will consist of at least three examiners. The members of the committee will originate from at least two of the above mentioned faculties.

4. The graduation work consists of a thesis project, a thesis report and a thesis presentation. The thesis report includes a summary.

5. The project is subject to a strict planning and timetable; specific dates and deadlines need to be set for the kick off, mid term and green light evaluations as well as for the final assessment and presentation of the project.
6. Before embarking on the thesis project the student must present the composition of the assessment committee for approval by the board of examiners.
7. The student is allowed to start the thesis project mentioned in paragraph 1, once:
 - all the obligations mentioned in Articles 3, 6 and 16 have been met, under the understanding that a total of not more than 1 credit may not have been completed yet;
 - all the obligations mentioned in Articles 4 and 5 have been met, under the understanding that a total of not more than 10 credits may not have been completed yet.
8. If the student does not meet the criteria as indicated in paragraph 7, the chair of the assessment committee as indicated in paragraph 3 may give exceptional access to the project mentioned in paragraph 1. If parties fail to reach agreement, the board of examiners decides.
9. Any changes made to the approved assessment committee should be presented to the board of examiners.
10. Further stipulations regarding the thesis are included in the Rules and Guidelines laid down by the board of examiners.

Chapter 2 – Annotations and Honours Programme

Article 8 – The Technology in Sustainable Development annotation

1. The examination programme for students who have opted for the annotation Technology in Sustainable Development must at least include the following:
 - a. A sustainable development colloquium:

<u>code</u>	<u>subject</u>	<u>credits</u>
WM0939TU	engineering for sustainable development	5
 - b. Subjects within or outside the realm of the degree programme adding up to a total of at least 10 credits to be selected from the two clusters:
 - design, analysis and tools
 - organisation and society.
 At least 3 credits should derive from each of both clusters.
 Further information on the subjects to be selected and on the clusters is available from the programme coordinator, from the manual and from website of Delft University of Technology.
 - c. A thesis carrying 30 credits in line with what is stipulated in Article 7. The thesis must focus on the topic of sustainable development. The Sustainable Development (SD) referent of the degree programme will test the hypothesis of the thesis project and the way in which it has been tackled against the extent to which sustainable development issues have been integrated into the project.
2. For obtaining the annotation within the examination programme of 120 credits the student may use the free elective space, mentioned in Article 5, paragraph 8, to accommodate the annotation subjects mentioned in paragraph 1 under a and b. However, if the amount of credits in the free elective space, mentioned in Article 5, paragraph 8, is not sufficient to accommodate the annotation subjects mentioned in paragraph 1 under a and b that are not already part of the components of the degree programme mentioned in the Articles 3 and 4 and in Article 5, paragraphs 4 to 7, the surplus of credits of the annotation subjects will be extracurricular.
3. The examination programme for the Technology in Sustainable Development annotation needs prior approval by the Sustainable Development (SD) referent of the degree programme and the board of examiners.
4. Students who complete the annotation successfully, receive an annotation Technology in Sustainable Development with their degree certificate.

Article 9 – The Entrepreneurship annotation

1. The examination programme for students who have opted for the annotation Entrepreneurship must at least include the following:
 - a. Participation in the Entrepreneurship Annotation Week:

<u>code</u>	<u>subject</u>	<u>credits</u>
WM4001TU	entrepreneurship annotation week	2
 - b. Subjects related to entrepreneurship adding up to at least 13 credits.
 - c. Graduation work carrying 30 credits in line with what is stipulated in Article 7, partly focusing on the topic of entrepreneurship.
2. For obtaining the annotation within the examination programme of 120 credits the student may use the free elective space, mentioned in Article 5, paragraph 8, to accommodate the annotation subjects mentioned in paragraph 1 under a and b. However, if the amount of credits in the free elective space, mentioned in Article 5, paragraph 8, is not sufficient to accommodate the annotation subjects mentioned in paragraph 1 under a and b that are not already part of the components of the degree programme mentioned in the Articles 3 and 4 and in Article 5, paragraphs 4 to 7, the surplus of credits of the annotation subjects will be extracurricular.
3. The examination programme for the Entrepreneurship annotation needs prior approval by a coordinator of Delft Centre for Entrepreneurship and the board of examiners.
4. Students who complete the annotation successfully, receive an annotation Entrepreneurship with their degree certificate.

Article 10 – The Infrastructure and Environment Design annotation

1. The examination programme for students who have opted for the annotation Infrastructure and Environment Design must at least include the following:
 - a. The Infrastructure and Environment Design annotation course, a choice of one subject out of:

<u>code</u>	<u>subject</u>	<u>credits</u>
AR0086	infrastructure and environment design	12
AR0093	infrastructure and environment method module	3
 - b. Subjects together with the subject chosen under a adding up to at least 15 credits relating to one or more of the following fields:
 - water
 - transport
 - spatial development
 - c. A thesis carrying 30 credits in line with what is stipulated in Article 7, partly focusing on the topic of at least one of the under b mentioned fields.
2. For obtaining the annotation within the examination programme of 120 credits the student may use the free elective space, mentioned in Article 5, paragraph 8, to accommodate the annotation subjects mentioned in paragraph 1 under a and b. However, if the amount of credits in the free elective space, mentioned in Article 5, paragraph 8, is not sufficient to accommodate the annotation subjects mentioned in paragraph 1 under a and b that are not already part of the components of the degree programme mentioned in the Articles 3 and 4 and in Article 5, paragraphs 4 to 7, the surplus of credits of the annotation subjects will be extracurricular.
3. The examination programme for the Infrastructure and Environment Design annotation needs prior approval by the annotation coordinator and the board of examiners.
4. Students who complete the annotation successfully, receive an annotation Infrastructure and Environment Design with their degree certificate.

Article 11 – The Integral Design and Management annotation

1. The examination programme for students who have opted for the annotation Integral Design and Management must at least include the following:

a. Subjects adding up to a total of 8 credits:

<u>code</u>	<u>subject</u>	<u>credits</u>
CIE3380*	infrastructure management	4
CIE4480	integral systems design	4

* *not if CTB3380 has been completed as part of bachelor's degree programme. In that case the student has to complete at least 11 credits from the subjects mentioned under b.*

b. Subjects from the list below adding up to a total of at least 7 credits:

<u>code</u>	<u>subject</u>	<u>credits</u>
AR8002TU	legal and governance	7
CIE4120	information systems for the construction industry	4
CIE4130	probabilistic design and risk management	4
CIE4170	construction technology of civil engineering structures	4
CIE4760	infrastructure projects: assessment and planning	6
CIE5981	forms of collaboration in civil engineering	4
CME1210-14	infrastructure asset management	7
CME2300	financial engineering	4
IN4170	database and data mining	6
IN4325	information retrieval	5
ME44205	quantitative methods for logistics	5
SPM8000	project management	7
WI4138	decision theory/expert judgement	6

c. A group project carrying at least 7 credits as mentioned in Article 6.

The project must focus on the topic of integral design management. The annotation coordinator will test the hypothesis of the project and the way in which it has been tackled against the extent to which integral design management issues have been integrated into the project.

d. A thesis carrying 30 credits in line with what is stipulated in Article 7, partly focusing on the topic of integral design management. The annotation coordinator will test the hypothesis of the project and the way in which it has been tackled against the extent to which integral design management issues have been integrated into the project.

2. For obtaining the annotation within the examination programme of 120 credits the student may use the free elective space, mentioned in Article 5, paragraph 8, to accommodate the annotation subjects mentioned in paragraph 1 under a and b. However, if the amount of credits in the free elective space, mentioned in Article 5, paragraph 8, is not sufficient to accommodate the annotation subjects mentioned in paragraph 1 under a and b that are not already part of the components of the degree programme mentioned in the Articles 3 and 4 and in Article 5, paragraphs 4 to 7, the surplus of credits of the annotation subjects will be extracurricular.

3. The examination programme for the Integral Design and Management annotation needs prior approval by the board of examiners.

4. Students who complete the annotation successfully, receive an annotation Integral Design Management with their degree certificate.

Article 12 – The Rail annotation

1. The examination programme for students who have opted for the annotation Rail must at least include the following:

a. Compulsory subjects adding up to a total of 8 credits:

<u>code</u>	<u>subject</u>	<u>credits</u>
CIE4872	railway operations and control	4
CIE4874	elements of railway engineering	4

b. Elective subjects from the list below adding up to a total of at least 7 credits:

<u>code</u>	<u>subject</u>	<u>credits</u>
CIE4811-09	planning and operations of public transport systems	6
CIE4870	structural design of railway track	4
CIE4871	design and maintenance of railway vehicles	4
CIE4873	wheel-rail interface	4
CIE5803-09	railway traffic management	4
CIE5811	transport safety	4
CIE5874	mechanical and material engineering in railway asset management	4
CIE5875	railway asset management	4

c. A group project carrying at least 7 credits as mentioned in Article 6. The project must focus on at the topics of railways operation and/or railway engineering. The annotation coordinator will test the hypothesis of the project and the way in which it has been tackled against the extent to which railways operation and/or railway engineering issues have been integrated into the project. As an alternative for this project requirement, the student may opt for choosing additional subjects from the list mentioned under b, adding up to at least 7 credits extra. In this case subjects chosen from the list mentioned under b, add up to at least 14 credits in total.

d. A thesis carrying 30 credits in line with what is stipulated in Article 7, partly focusing on the topics of railway operations and/or railway engineering. The annotation coordinator will test the hypothesis of the project and the way in which it has been tackled against the extent to which railway operations and/or railway engineering issues have been integrated into the project.

2. For obtaining the annotation within the examination programme of 120 credits the student may use the free elective space, mentioned in Article 5, paragraph 8, to accommodate the annotation subjects mentioned in paragraph 1 under a and b. However, if the amount of credits in the free elective space, mentioned in Article 5, paragraph 5, is not sufficient to accommodate the annotation subjects mentioned in paragraph 1 under a and b that are not already part of the components of the degree programme mentioned in the Articles 3 and 4 and in Article 5, paragraphs 4 to 7, the surplus of credits of the annotation subjects will be extracurricular.

3. The examination programme for the Rail annotation needs prior approval by the board of examiners.

4. Students who complete the annotation successfully, receive an annotation Rail with their degree certificate.

Article 13 – The Honours Programme Master

1. Motivated students who have finished their bachelor's degree programme with a weighted averaged mark of 7.5 or higher, and students who have excelled during the first semester (no fails and a weighted average of 7.5 or higher) are eligible for a special individual programme of 20 credits on top of the master's degree programme: the Honours Programme Master.

2. The Honours Programme Master has to be completed during the student's master's degree programme.

3. The content of the Honours Programme Master should be thematically consistent.

4. One subject is compulsory for all Delft University of Technology Honours Programme Master students:

<u>code</u>	<u>subject</u>	<u>credits</u>
UD2010	critical reflection on technology	5

The study goal is to develop competence in forming an independent, well-argued position with regard to ethical and methodological problems that concern the professional practice of engineers.

5. One subject is compulsory specific for the degree programme's Honours Programme Master students:

<u>code</u>	<u>subject</u>	<u>credits</u>
TIL6020	TIL scientific assignment	7

6. The student chooses, taking paragraph 3 into account, the remaining subjects, amounting to 8 credits in total, unless he participates in the Honours Programme Master Research as specified in paragraph 7 or the Honours Programme Master Infrastructures and Environment as specified in paragraph 8.

7. Honours Programme Master Research

The Honours Programme Master Research is a special Honours Programme Master for students that want to prepare for a scientific career. This programme has additional requirements:

- a. instead of what is stipulated in paragraph 6, the student successfully completes:

<u>code</u>	<u>subject</u>	<u>credits</u>
TIL7000	TIL writing a research proposal	8

- b. the student completes one or more subjects provided by the TRAIL Graduate School Training and Education program. The choice needs prior approval from the supervisor of the subject mentioned under a. However, these subjects are considered not to be part of the Honours Programme Master, but are considered to be free electives in the regular examination programme as mentioned in Article 5, paragraph 5.

8. Honours Programme Master Infrastructures and Environment

The Honours Programme Master Infrastructures and Environment is a special Honours Programme Master for students that are interested in potential employment in public or private organisations which deal with issues related to infrastructures and the environment. This programme has additional requirements:

instead of what is stipulated in paragraph 6, the student successfully completes:

<u>code</u>	<u>subject</u>	<u>credits</u>
4413UEINFY	urban environments and infrastructures	6
AR9050HPM	infrastructures and environment seminar	2

9. Students who fulfill, or will fulfill, the requirements laid down in paragraph 1, and are interested in the Honours Programme Master can send their application to the programme director for approval together with an essay in English language, containing their motivation and a proposal for the programme.

10. Students who have successfully completed the Honours Programme Master will receive a special certificate from the university with their degree certificate.

Chapter 3 – Bridging and other deficiency programmes

Article 14 – Bridging programme for students with a Dutch higher vocational bachelor's degree

1. Students with a relevant Dutch higher vocational institute bachelor's degree have to complete a bridging pre-master programme before they will be admitted to the master's degree programme.
2. The bridging programme as referred to in paragraph 1, comprises the following deficiency subjects amounting to 31 credits in total:

<u>code</u>	<u>subject</u>	<u>credits</u>
CTB1420-14	transport & planning	5
TB111b	probleemanalyse	5
WI1708TH1	analyse 1	3
WI1708TH2	analyse 2	3
WI1708TH3	analyse 3	3
WI1807TH1	lineaire algebra 1	3
WI1807TH2	lineaire algebra 2	3
WI1909TH	differentiaalvergelijkingen	3
WI2031TH	kansrekening en statistiek voor HBO-instromers	3

Article 15 – Bridging minor programme for students with a Dutch university bachelor's degree

1. Students with a relevant bachelor of science degree of a Dutch university that does not standard give direct admission to the master's degree programme may be eligible for a special bridging minor programme. Degrees qualifying for the transitional minor programme are mentioned in the Teaching and Examination Regulations.

- Students eligible for the bridging minor programme mentioned in paragraph 1 have to complete this programme before they will be admitted to the master's degree programme.
- Students admitted to the bridging minor programme mentioned in paragraph 1 must include the subjects of this minor programme in their bachelor's degree programme, amounting to 30 credits in total:

<u>code</u>	<u>programme</u>	<u>credits</u>
CT-MI-184	schakelminor transport, infrastructuur en logistiek voor BK en IO	30

- The subjects as mentioned in paragraph 3 can be obtained within the in the bachelor's degree programme of 180 credits if the student includes them as chosen minor programme.

Article 16 – Convergence programme for students with a Dutch university bachelor's degree

- Students with a relevant bachelor of science degree of a Dutch university that does not give direct admission to the master's degree programme may be eligible for a special deficiency programme of convergence subjects. Degrees qualifying for the deficiency programme are mentioned in the Teaching and Examination Regulations.
- Students admitted to the deficiency programme mentioned in paragraph 1 must include convergence subjects in their master's degree programme, amounting to 9 credits in total.
The student is required to select one subject from each of the three lists as given below:

Analyse, 1 subject

<u>code</u>	<u>subject</u>	<u>credits</u>	
CTB1001-16 Toets 1	analyse	analyse module 1	3
W11048WBMT-T2	wiskunde 1	analyse 1 – deeltentamen	3
W11708TH1	analyse 1		3

Lineaire algebra, 1 subject

<u>code</u>	<u>subject</u>	<u>credits</u>	
CTB1002 Toets 1	lineaire algebra	toets 1	3
W11048WBMT-T1	wiskunde 1	lineaire algebra 1 – deeltentamen	3
W11807TH1	lineaire algebra 1		3

Kansrekening en statistiek, 1 subject

<u>code</u>	<u>subject</u>	<u>credits</u>	
CTB2200	kansrekening en statistiek		3
W12031TH	kansrekening en statistiek voor HBO-instromers		3
W12031WBMT-T3	wiskunde 4	kansrekening en statistiek – deeltentamen	3

- The convergence subjects as mentioned in paragraph 2 can be obtained within the examination programme of 120 credits if the student includes them as free elective subjects, mentioned in Article 5, paragraph 8, under a.
- Students admitted to the deficiency programme mentioned in paragraph 1 have to comply with additional admission rules. These rules are given below.
 - The student must have successfully completed his chosen subjects 'Analyse' and 'Lineaire Algebra', as mentioned in paragraph 2, before he gets permission to take:

<u>code</u>	<u>subject</u>	<u>credits</u>
CIE4801	transportation and spatial modelling	6

- The student must have successfully completed his chosen subject 'Kansrekening en statistiek', as mentioned in paragraph 2, before he gets permission to take:

<u>code</u>	<u>subject</u>	<u>credits</u>
SEN1221	statistical methods for behavioural choice analysis	5

- The student may request the board of examiners to be exempted from the obligation to include in his examination programme a subject mentioned in paragraph 4 when he has successfully completed an equivalent subject in his Bachelor's degree programme.

Chapter 4 – Deviate from examination programme

Article 17 – The free study programme

1. Students are free to compile examination programmes that are rounded off with a final degree audit. Such a programme needs prior approval by the board of examiners and must consist entirely or mainly of subjects given in conjunction with the degree programme but it can be complemented with other subjects.
2. The preliminary approval referred to in paragraph 1 must be presented to the board of examiners by the student in the form of a justified request.

Article 18 – Deviate from the examination programme

The board of examiners may allow students to deviate from the examination programme.

Chapter 5 – Examinations and practicals

Article 19 – Practicals

1. The subject's teaching takes the form of lectures and/or practicals.
2. Practicals must be completed before students participate in the examination unless otherwise is indicated in the study guide pertaining to that particular subject.

Article 20 – The types of examinations

1. The examinations linked to the different subjects are to be completed in the way laid down in the study guide pertaining to the subject in question.
2. Examinations pertaining to subjects provided by other programmes are to be completed in the way stipulated by or on behalf of the Teaching and Examination Regulations laid down by the relevant programme.

Article 21 – The frequencies, times and sequences of the exams

1. Written or oral examinations are to be completed at the of the teaching period in which the subject was taught.
2. The resit periods for any of the written examinations referred to in paragraph 1 are indicated in the examination timetable.
3. Practicals may be completed in the way laid down in the relevant timetables.

Chapter 6 – Transitional rules

Article 22 – Transitional rules as of 1 September 2016

1. A number of subjects belonging to the programme 2015-2016 are no longer available in their original form from the academic year 2016-2017.
2. Students in the degree programme as given in the Implementation Regulations 2015-2016 and earlier degree programmes may replace subjects in their examination programme with replacement subjects as mentioned in paragraphs 3 to 6 according to what is stipulated the Implementation Regulations 2015-2016, Article 25, paragraphs 1, 2 and 3 as "a list of replacement subjects will be published in the Implementation Rules 2016-2017".

3. Subjects from the programme 2015-2016 that are no longer available in the academic year 2016-2017 and that are replaced by other subjects are:

<u>Subject in programme 2015-2016</u>			<u>Replacement subject in programme 2016-2017</u>		
<u>code</u>	<u>subject</u>	<u>credits</u>	<u>code</u>	<u>subject</u>	<u>credits</u>
AE4454	life cycle analysis and production	6	AE4454-16	life cycle analysis & production	3
ME1405	automation of transport systems	3	ME44200	intelligent control for transport technology	3
ME1406	control of intelligent transport infrastructures	3	ME44300	coordination for real-time logistics	3
ME1410-13	quantitative methods for logistics	6	ME44205	quantitative methods for logistics	5
SPM4612	statistical methods for behavioural analysis	6	SEN1221	statistical methods of choice behaviour	5
SPM4631	transport policy	6	SEN9715*	designing transport policies	5
TIL4030-14	interdisciplinary fundamentals	9	TIL4030-16	TIL research and design methods	7
WB3416-03	design with the finite element method	3	ME44105	structural design with FEM	4
WB3417-04	discrete systems: modelling, prototyping, simulation & control	5	ME44305	delft systems and simulation approach	5
WB3419-15	characterisation & handling of bulk solid materials	6	ME44100	dynamics of material and equipment interaction	3
WB3420-11	introduction transport and logistic engineering	6	ME44000	introduction transport engineering and logistics	3
WB3422-11	design of transport equipment	6	ME44110	design of transport equipment	5

* available from the academic year 2017-2018 only

4. Subjects from the programme 2015-2016 that are unchanged, but recoded and renamed, are:

<u>Subject in programme 2015-2016</u>			<u>Recoded and renamed subject in 2016-2017</u>		
<u>code</u>	<u>subject</u>	<u>credits</u>	<u>code</u>	<u>subject</u>	<u>credits</u>
ME1403-13	advanced operations and entrepreneuring	6	ME44310	advanced operations and production management	6
TIL4020-11	interdisciplinary research project	7	TIL6020	TIL scientific assignment	7

5. Subjects from the programme 2015-2016 that are unchanged, but recoded only, are:

<u>Subject in programme 2015-2016</u>			<u>Recoded subject in 2016-2017</u>		
<u>code</u>	<u>subject</u>	<u>credits</u>	<u>code</u>	<u>subject</u>	<u>credits</u>
ME1100	automated driving, automotive human factors & safety	3	ME41000	automated driving, automotive human factors & safety	3
ME1412	discrete element method (DEM) simulation	4	ME44115	discrete element method (DEM) simulation	4
ME1430	advanced design of baggage handling systems	3	ME44120	advanced design of baggage handling systems	3
ME1431	structural integrity assessment for transport equipment	3	ME44125	structural integrity assessment for transport equipment	3
MTM313-15	shipping management	5	MT44070	shipping management	5

6. Subjects from the programme 2015-2016 that are renamed only, are:

<u>Subject in programme 2015-2016</u>			<u>Renamed subject in 2016-2017</u>		
<u>code</u>	<u>subject</u>	<u>credits</u>	<u>code</u>	<u>subject</u>	<u>credits</u>
CIE4811-09	design and control of public transport systems	6	CIE4811-09	planning and operations of public transport systems	6
CIE5805	intelligent vehicles	4	CIE5805	intelligent vehicles for safe and efficient traffic: design and assessment	4
TIL5050-12	interdisciplinary design project	7	TIL5050-12	TIL design project	7
TIL5060	thesis	30	TIL5060	TIL thesis	30
TIL6010	matlab / programming	2	TIL6010	TIL programming / matlab	2

7. Subjects from the programme 2015-2016 that are replaced by other subjects from 1 September 2017 are listed in Article 23, paragraph 1.

8. Subjects from the programme 2015-2016 that are not replaced in the degree programme are:

<u>code</u>	<u>subject</u>	<u>credits</u>
AE4441*	operations optimisation	6
AR0027	smart infrastructure and mobility	6
SPM4416	strategic management of large engineering projects	6
SPM4423	legal aspects of MAS design	5
SPM5610**	planning and design of multi-modal infrastructure networks	5
SPM9155***	advanced systems dynamics	4
SPM9716**	cost-benefit analysis: theory and applications	4
WI4062TU****	transport, routing and scheduling	3
WM0320TU*****	ethics and engineering	3
*	<i>still available as AE4441-16 in other degree programmes; not allowed in examination programme</i>	
**	<i>available until the academic year 2016-2017; allowed in examination programme</i>	
***	<i>still available as EPA1341 in other degree programmes; allowed in examination programme</i>	
****	<i>still available in other degree programmes; not allowed in examination programme</i>	
*****	<i>still available in other degree programmes; allowed in examination programme</i>	

9. Subjects, new in the academic year 2016-2017, that have no equivalent in earlier programmes are:

<u>code</u>	<u>subject</u>	<u>credits</u>
AR0093	infrastructure and environment method module	3
ME41105	intelligent vehicles	4
SEN1311	institutional economics for designing in socio-technical systems	3
SEN1711	advanced evaluation methods for transport decision-making	5
SEN1721	travel behaviour research	5
SEN1741	innovations in transport and logistics	5
TIL4020-16	TIL research project	3

10. As an alternative to what stated in paragraph 2 students in the degree programme as given in the Implementation Regulations 2015-2016 and earlier degree programmes may request the board of examiners to make a transfer to the degree programme as given in these Implementation Regulations 2016-2017. Subjects in their original examination programme will replace subjects in the degree programme as given in these Implementation Regulations 2016-2017 according to the equivalence rules as given in paragraphs 3 to 7.

11. In the case of a transfer between degree programmes as mentioned in paragraph 10, by way of derogation from paragraph 8, at least one of the following subjects:

<u>code</u>	<u>subject</u>	<u>credits</u>
AE4441	operations optimisation	6
WI4062TU	transport, routing and scheduling	3

will be considered as an equivalent subject for:

<u>code</u>	<u>subject</u>	<u>credits</u>
ME44205	quantitative methods for logistics	5

12. A number of subjects that are scheduled in the second year of the programme are available from the academic year 2017-2018 only. They are not yet available in the academic year 2016-2017. In the exceptional event that the student wants to take one or more of these subjects in the academic year 2016-2017, he can take replacement subjects. Subjects that are not yet available in the academic year 2016-2017 and their replacement courses are:

<u>Subjects available from 2017-2018</u>			<u>Replacement subjects in 2016-2017</u>		
<u>code</u>	<u>subject</u>	<u>credits</u>	<u>code</u>	<u>subject</u>	<u>credits</u>
SEN9110	simulation master class	5	SPM9325	simulation master class	4
SEN9710	multi-modal freight transport policy	5	SPM5620	design and control of multi-modal logistic chains	4
SEN9720	logistics and supply chain innovations	5	SPM4621	supply chain analysis and engineering	6

13. The examination programme must in any case encompass at least 120 credits. Any inconsistencies arising as a result of transitional measures will be compensated for with free elective subjects as mentioned in Article 5, paragraph 8 under a.

Article 23 – Transitional rules as of 1 September 2017

1. Subjects from the programme 2015-2016 that are no longer available in the academic year 2017-2018 and that are replaced by other subjects from 1 September 2017 are:

<u>Subject in programme 2015-2016</u>			<u>Replacement subjects in 2017-2018</u>		
<u>code</u>	<u>subject</u>	<u>credits</u>	<u>code</u>	<u>subject</u>	<u>credits</u>
SPM4621*	supply chain analysis and engineering	6	SEN9720	logistics and supply chain innovations	5
SPM4631	transport policy	6	SEN9715	designing transport policies	5
SPM5610*	planning and design of multi-modal infrastructure networks	5	SEN1711**	advanced evaluation methods for transport decision-making	5
SPM5620*	design and control of multi-modal logistic chains	4	SEN9710	multi-modal freight transport policy	5
SPM9325*	simulation master class	4	SEN9110	simulation master class	5

* *still available in the academic year 2016-2017*
** *already available in the academic year 2016-2017, but not as equivalent for SPM5610*

2. From 1 September 2017 there may be significant changes in the MSc programme Civil Engineering, track Transport & Planning. This may affect the availability of the 'Electives T&P – Transport and Planning' in 2017-2018, as listed in Article 5, paragraph 4. A list of replacement subjects will be published in the Implementation Rules 2017-2018. However, a subject that will be available in 2017-2018 since it is also a second year subject in one of the specialisations, as mentioned in Article 4, is:

<u>code</u>	<u>subject</u>	<u>credits</u>
CIE4811-09	planning and operations of public transport systems	6

3. The examination programme must in any case encompass at least 120 credits. Any inconsistencies arising as a result of transitional measures will be compensated for with free elective subjects as mentioned in Article 5, paragraph 8.

Chapter 7 – Final provision

Article 24 – When the rules do not provide

Insofar as these Implementations Regulations do not provide for specific circumstances, the board of examiners will make a decision that is in line with the Implementation Regulations to every extent possible and the board of examiners will also take article 6 of the Rules & Guidelines into account.