

**Implementation Regulations for the master's degree in  
Transport, Infrastructure and Logistics (TIL)  
2011-2012**

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# Implementation Regulations for the master's degree in Transport, Infrastructure and Logistics (TIL)

## 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 study 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 5

Projects and seminars, 40 credits

- d. Seminars, 3 credits as laid down in Article 6
- e. Interdisciplinary design project, 7 credits as laid down in Article 7
- f. Interdisciplinary graduation work, 30 credits as laid down in Article 8

2. Students who have been admitted to the programme on the basis of a bachelor's degree gained from a Dutch higher vocational institute must also, apart from of the study programme mentioned in paragraph 1 and preferably within a year of embarking on the programme, follow a subsidiary programme amounting to 28 credits in total and consisting of the following subjects:

<u>code</u>	<u>subject</u>	<u>credits</u>
WI1708TH1	analyse 1	3
WI1708TH2	analyse 2	3
WI1708TH3	analyse 3	3
WI1807TH1	lineaire algebra 1	3
SPM1311	wiskundige modellering en differentiaalvergelijkingen	4
SPM1330	onderzoeksmethoden en dataverwerking 1	4
WB2104	introductie modelvorming en regeltechniek	3
CT2710	transport & planning	5

## Article 3 – Fundamentals

The student is obliged to complete the following basic components, the so-called fundamentals, amounting to 27 credits in total:

<u>code</u>	<u>subject</u>	<u>credits</u>
TIL4030	interdisciplinary fundamentals	6
CIE4801	transportation and spatial modelling	6
SPM9444	TIL systems & policy engineering: a TIP perspective	6
WB3420-11	introduction transport engineering and logistics	6
ME1410	quantitative methods for logistics	3

## Article 4 – Specialisations

From the subject specialisations given below the student is required to select one, amounting to 26 or 27 credits in total:

Specialisation P – Policy: infrastructure, planning and environment, 26 credits

<u>code</u>	<u>subject</u>	<u>credits</u>
SPM4630	transport policy	5
SPM5610	planning and design of multi-modal infrastructure networks	5
CIE4760	infrastructure projects: assessment and planning	6
CIE5750	spatial planning for the metropolis	4
ME1400	sustainability in the transportation engineering	3
AE4230	safety of transportation	3

Specialisation D – Design: transport systems and networks, 27 credits

<u>code</u>	<u>subject</u>	<u>credits</u>
CIE4751*	urban planning and transport networks	4
CIE5802-09	advanced transportation modelling	4
CIE4811-09	design and control of public transport systems	6
CIE5803-09	rail traffic management	4
AE4414-11	airline operations and management	4
SPM5610	planning and design of multi-modal infrastructure networks	5
* if already taken in minor CT-Mi-127 as CT4751 or CIE4751MI, subject must be replaced by: CIE4330	ports and waterways 1	4

Specialisation O – Operations: traffic, technology and control, 26 credits

<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	4
WB3417-04	discrete systems: modelling, prototyping, simulation & control	5
SC4026	control system design	3
SPM9325	simulation master class	4

Specialisation E – Engineering: transport, logistics and supply chains, 27 credits

<u>code</u>	<u>subject</u>	<u>credits</u>
WB3421-04	automation and control of transport and production systems	6
WB3419-03	characterisation & handling of bulk solid materials	6
SPM4620	supply chain analysis	3
SPM4640	supply chain engineering	4
SPM5620	design and control of multi-modal logistic chains	4
CIE4840	freight transportation systems: analysis and modelling	4

**Article 5 – Electives**

1. The credits awarded for the elective subjects chosen by the student have to add up to a total of 26 or 27 credits.
2. The amount of credits mentioned in paragraph 1 depends on the size of the chosen specialisation as indicated in Article 4: the total amount of credits of the fundamentals as indicated in Article 3, the specialisations as indicated in Article 4 and electives should add up to a total of 80 credits.
3. The student is required to select at least one subject, not already taken as part of the chosen specialisation as stipulated in Article 4, from each of the four elective lists as given below:

Electives T&P – Transport and Planning, at least 1 subject

<u>code</u>	<u>subject</u>	<u>credits</u>
CIE4751*	urban planning and transport networks	4
CIE4760	infrastructure projects: assessment and planning	6
CIE4811-09	design and control of public transport systems	6
CIE4820	sociology and psychology in transport	4
CIE4821-09	traffic flow theory and simulation	6
CIE4822-09	traffic management and control	6
CIE4831-09	empirical analysis for transport and planning	4
CIE4840	freight transportation systems: analysis and modelling	4
CIE5720	environmental impact assessment	4
CIE5730**	spatial and transport economics	4
CIE5750	spatial planning for the metropolis	4
CIE5802-09	advanced transportation modelling	4
CIE5803-09	rail traffic management	4
CIE5804-09	innovations in dynamic traffic management	4
CIE5805	intelligent vehicles	4
CIE5810-09	traffic safety	4

\* cannot be chosen if already taken in minor CT-Mi-127 as CT4751 or CIE4751MI

\*\* cannot be chosen if already taken in minor CT-Mi-127 as CT5730 or CIE5730MI

Electives T&L – Transport and Logistics, at least 1 subject

<u>code</u>	<u>subject</u>	<u>credits</u>
SPM4610	transport and logistics systems engineering	6
SPM4620	supply chain analysis	3
SPM4630	transport policy	5
SPM4640	supply chain engineering	4
SPM5610	planning and design of multi-modal infrastructure networks	5
SPM5620	design and control of multi-modal logistic chains	4

Electives TEL & PEL – Transportation Engineering, at least 1 subject

<u>code</u>	<u>subject</u>	<u>credits</u>
ME1400	sustainability in the transportation engineering	3
WB3417-04	discrete systems: modelling, prototyping, simulation & control	5
WB3419-03	characterisation & handling of bulk solid materials	6
WB3421-04	automation and the control of transport and production systems	6
WB3422-11	design of transport equipment	6
WB3423-04	the delft systems approach	3
WB3424-08	production organisation principles	3

Electives TIL – Other TIL fields, at least 1 subject

<u>code</u>	<u>subject</u>	<u>credits</u>
CIE4010	economics	4
CIE4780	underground space technology: special topics	4
CIE4330	ports and waterways 1	4
CIE5306	ports and waterways 2	4
SPM4416	strategic management of large engineering projects	6
SPM9431	public private partnership	6
SPM9325	simulation master class	4
SPM9155	advanced system dynamics	4
SC4026	control system design	3
SC4040	filtering and identification	6
SC4081-10	knowledge based control systems	4
MT725	inland shipping	2
AE4414-11	airline operations and management	4
AE4415-11	airport design and operation	4
AE4420-11	network and fleet management	3
AE4428-11	air traffic management	3
AE4230	safety of transportation	3
WI4062TU	transport, routing and scheduling	3
WM0320TU	ethics and engineering	3

4. If the subjects selected according to paragraph 3 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, within the restrictions given below.
- As additional elective subjects the student may choose:
    - elective projects as mentioned in Article 9, paragraph 1
    - all subjects offered at master level at Delft University of Technology
    - all subjects offered at master level at another Dutch university.
  - For these additional elective subjects the student needs prior approval from the programme coordinator. If parties fail to reach agreement, the board of examiners decides.

**Article 6 – Seminars**

The student is required to participate in and organise seminars. Thus he is expected to complete:

<u>code</u>	<u>subject</u>	<u>credits</u>
TIL4010-11	TIL seminars	3

**Article 7 – Interdisciplinary design project**

1. The student is expected to complete an interdisciplinary design project:

<u>code</u>	<u>subject</u>	<u>credits</u>
TIL5050-12	interdisciplinary design project	7

2. The student is allowed to start the project mentioned in paragraph 1, once:
  - a. the obligations stipulated in Article 2, paragraph 2 have been met, or the Bachelor of Science studies mentioned in Article 5, paragraph 1 Teaching and Examination Regulations have been successfully rounded off;
  - b. a total of at least 60 credits has been gained;
  - c. the obligations stipulated in Article 3, the so-called fundamentals, have been met, under the understanding that subjects with a total value of 3 credits may not have yet been completed;
  - d. he has completed at least one subject from each of the four elective lists mentioned in Article 5, paragraph 4. Please note that in this particular case, unlike Article 5 paragraph 3, the chosen subjects may be part of the chosen specialisation as stipulated in Article 4.
3. Further stipulations relating to the project are given in the Rules and Guidelines laid down by the board of examiners.

### **Article 8 – Graduation project**

1. The student is expected to complete a graduation project:

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

2. The content of the graduation work has a relationship to 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 Master Thesis Project. That committee will consist of at least three examiners. The members of the assessment committee will in any event come from two different of the above mentioned faculties.
3. The graduation work consists of a graduation project, a thesis report and a graduation presentation. The thesis report includes a summary.
4. The project is subject to a strict planning and time table; specific dates and deadlines need to be set for the evaluation(s) and the final presentation of the project. The planning and the project process will be monitored by the graduation coordinator.
5. The student is allowed to start the graduation work mentioned in paragraph 1, once:
  - a. the obligations stipulated in Article 2, paragraph 2 have been met, or the Bachelor of Science studies mentioned in Article 5, paragraph 1 Teaching and Examination Regulations have been successfully rounded off;
  - b. all the obligations mentioned in Articles 3 to 7 have been met, under the understanding that of the optional subjects, mentioned as electives in Article 5, those with a total value of 6 credits may not have yet been completed.
6. Further stipulations regarding the graduation work are included in the Rules and Guidelines laid down by the board of examiners.

### **Article 9 – Elective projects: interdisciplinary research project and external project (internship)**

1. The student is expected to complete projects and seminars as mentioned in the Articles 6, 7 and 8. Apart from these obligatory subjects, there are elective projects. The elective projects are:

<u>code</u>	<u>subject</u>	<u>credits</u>
TIL4020-11	interdisciplinary research project	7
TIL4090-11	external project: internship	10

2. The student is allowed to start an interdisciplinary research project or an external project (internship) as mentioned in paragraph 1, once:
  - a. the obligations stipulated in Article 2, paragraph 2 have been met, or the Bachelor of Science studies mentioned in Article 5, paragraph 1 Teaching and Examination Regulations have been successfully rounded off;
  - b. a total of at least 45 credits has been gained;
  - c. the obligations stipulated in Article 3, the so-called fundamentals, have been met, under the understanding that subjects with a total value of 3 credits may not have yet been completed
3. Further stipulations pertaining to the internship are included in the Rules and Guidelines laid down by the board of examiners.

### Article 10 – Drawing up the exam programme

1. Before embarking on graduation work as mentioned in Article 8 the student must compile his entire examination programme, then present it to the board of examiners, together with the examination committee's composition.
2. Any changes made to the approved examination programme or to the approved examination committee should be presented to the board of examiners.

### Article 11 – 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 programme coordinator and the board of examiners, and must consist entirely or mainly of subjects given in conjunction with the 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 12 – The Technology in Sustainable Development annotation

1. Within the programme the student is free to choose the graduation profile Technology in Sustainable Development.
2. The examination programme for students who have opted for the annotation known as Technology in Sustainable Development must at least include the following:
  - a. A sustainable development colloquium totalling 5 credits:

<u>code</u>	<u>subject</u>	<u>credits</u>
WM0939TU	engineering for sustainable development	5

- b. Subjects within or outside the realm of the 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. Graduation work carrying 30 credits in line with what is stipulated in Article 8. The graduation work must focus on the topic of sustainable development. The referent will test the hypothesis of the graduation project and the way in which it has been tackled against the extent to which sustainable development issues have been integrated into the project.
  - d. The components mentioned under a and b can be chosen as part of the optional subjects, mentioned as additional electives in Article 5, paragraph 4.
  - e. If the amount of credits available in the category of additional electives in Article 5, paragraph 4 as mentioned under d is not sufficient to accommodate the components mentioned under a and b, these components may substitute optional choice subjects referred to as electives in Article 5, paragraph 3. In this case prior approval by the programme coordinator is required.
3. Students who complete the annotation successfully, receive an annotation Technology in Sustainable Development with their degree certificate.

### Article 13 – The Entrepreneurship annotation

1. The examination programme for students who have opted for the annotation Entrepreneurship must at least include the following:
  - a. Electives related to entrepreneurship adding up to a total of 15 credits of which:
    - at least 10 credits are extracurricular and
    - the remaining credits belong to the optional subjects, mentioned as additional electives in Article 5, paragraph 4.
  - b. Graduation work carrying 30 credits in line with what is stipulated in Article 8, partly focusing on the topic of entrepreneurship.
2. The examination programme for the Entrepreneurship annotation needs the prior approval by the Director of Education and a coordinator of Delft Centre for Entrepreneurship.

- Students who complete the annotation successfully, receive an annotation Entrepreneurship with their degree certificate.

#### **Article 14 – Honours Class programme**

- Motivated students who have finished their Bachelor's degree course with a weighed averaged mark of 7.5 or higher, and students who have excelled during the first semester (no fails and a weighed average of 7.5 or higher) are eligible for a special individual programme of 30 credits on top of the Master's degree course: an Honours Class programme
- The Honours Class programme has to be completed during the student's Master's degree programme.
- One subject is compulsory for all Honours Class programme students:

<u>code</u>	<u>subject</u>	<u>credits</u>
WM0355HT	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.

- Students who have successfully completed the Honours Class programme will receive a separate Honours Class certificate from the university with their degree certificate.
- Students who fulfill, or will fulfill, the requirements laid down in paragraph 1, and are interested in an Honours Class programme can send their application to the programme coordinator for approval together with an essay in English language, containing their motivation and a proposal for the Honours Class programme. The content of the Honours Class programme should be thematically consistent.

#### **Article 15 – Practicals and/or exercises**

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

#### **Article 16 – The types of examinations**

- The examinations linked to the various subjects are to be completed in the way laid down in the study guide pertaining to the subject in question.
- Examinations pertaining to subjects provided by programmes other than the MSc programme Transport, Infrastructure and Logistics 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 17 – The frequencies, times and sequences of the exams**

- Any written or oral examinations are to be completed in the period immediately following the block when the relevant instruction and lectures were given.
- The written examinations referred to in paragraph 1 may be reseat during the period indicated in the examination timetable.
- Practicals and/or exercises may be completed in the way laid down in the relevant timetables.

#### **Article 18 – Deviate from the examination programme**

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

#### **Article 19 – Transitional rules**

- A number of subjects that are scheduled in the second year of the programme are available from the academic year 2012-2013 only. They are not yet available in the academic year 2011-2012.

2. In the exceptional event that the student wants to take one or more of these subjects in the academic year 2011-2012, he can take replacement subjects. This needs prior approval by the programme coordinator.
3. Subjects that are not yet available in the academic year 2011-2012 and their replacement courses are:

<u>Subjects available from 2012-2013</u>			<u>Replacement subjects in 2011-2012</u>		
<u>code</u>	<u>subject</u>	<u>credits</u>	<u>code</u>	<u>subject</u>	<u>credits</u>
TIL5050-12	interdisciplinary design project	7	TIL5050	interdisciplinary project	10
SPM5610	planning and design of multi-modal infrastructure networks	5	SPM9401	planning and design of transport systems	6
SPM5620	design and control of multi-modal logistic chains	4	SPM9400	design and control of multi-modal logistic chains	6
SPM9155	advanced system dynamics	4	SPM9154	advanced system dynamics	5
SPM9325	simulation master class	4	SPM9322	simulation master class	5

4. If replacement takes place in the academic year 2011-2012, there will be consequences for the composition of the programme.
  - a. If TIL5050-12 is replaced by TIL5050, the total amount of credits that have to be gained for electives as stipulated in Article 5, paragraph 2 will be deducted by 3 credits.
  - b. If SPM5610 is replaced by SPM9401 as part of a specialisation as mentioned in Article 4, the total amount of credits that have to be gained for electives as stipulated in Article 5, paragraph 2 will be deducted by 1 credit.
  - c. If SPM5620 is replaced by SPM9400 as part of a specialisation as mentioned in Article 4, the total amount of credits that have to be gained for electives as stipulated in Article 5, paragraph 2 will be deducted by 2 credits.
  - d. If SPM9325 is replaced by SPM9322 as part of a specialisation as mentioned in Article 4, the total amount of credits that have to be gained for electives as stipulated in Article 5, paragraph 2 will be deducted by 1 credit.

#### ***The pass and fail ruling (the Rules and Guidelines of the board of examiners)***

1. *Students may be said to have gained their Master's degree when they have met the following requirements:*
  - *if the student in question has been admitted to the programme,*
  - *once the marks list is complete, that is to say, when a mark has been given for each subject, the work has been graded as a pass or when the student has been exempted,*
  - *once the project and graduation work and, if relevant, the internship, have been completed with a mark no lower than 6.0,*
  - *when none of the marks are below 6.*
2. *It must be clear to the student how the examiners arrived at the examination result.*
3. *In special cases the board of examiners may accept deviations from the points mentioned in paragraph 1. If necessary, alternative arrangements may even be laid down.*

#### ***The Inflow programme pass and fail ruling for students from higher vocational colleges (the Rules and Guidelines of the board of examiners).***

1. *Students may be said to have gained their Master's degree when they have met the following requirements:*
  - *if the student in question has been admitted to the programme,*
  - *once the marks list is complete, that is to say, when a mark has been given for each subject, the work has been graded as a pass or when the student has been exempted,*
  - *once the project and graduation work and, if relevant, the internship, have been completed with a mark no lower than 6.0,*
  - *when none of the marks are below 6.*
2. *It must be clear to the student how the examiners arrived at the examination result.*
3. *In special cases the board of examiners may accept deviations from the points mentioned in paragraph 1. If necessary, alternative arrangements may even be laid down.*