

3TU.



IMPLEMENTATION REGULATIONS

2017-2018

**3TU MASTER OF SCIENCE PROGRAMME
CONSTRUCTION MANAGEMENT AND ENGINEERING (CME)**

DELFT UNIVERSITY OF TECHNOLOGY

Section 1 – Compiling the study programme

Article 1 - Study load of the degree programme and of each of the study components it comprises:

The study load of the master programme is 120 credits. Of these 120 EC no EC may be part of what belongs to a previously passed bachelor's examination.

Article 2 - Composition of the study programme

1. The study programme is composed as follows:
 - a. Obligatory courses as described in article 3.
 - b. Electives courses related to the specializations or the free study programme, as described in article 4.
 - c. Graduation work, as described in section 2 and 3 of this article.
2. Students undertake graduation work of 36 EC which relates to the specialisation (or track) they have chosen at Delft University of Technology.¹
3. The graduation work consists of a component 'Preparation for Thesis' of 4 EC and a graduation project + report and presentation of 32 EC. The total of Graduation Work is 36 EC.
The component 'Preparation for Thesis' consists of a more in-depth study of the graduation course and the production of a set-up for and planning of the graduation project, called Proposal.
4. Students who come under consideration for admission on the basis of a bachelor's degree awarded by a Dutch university of professional education (HBO) can only be admitted to the programme after rounding off the preparatory programmes (CME bridging programme) as mentioned in article 10.

Students who have passed the preparatory programme have the right to join the programme in any of the three locations of the Universities of Technology in Delft, Enschede as well as Eindhoven.

5. Students can put together their own study programme associated with an examination. The study programme must have the approval of the Board of Examiners beforehand.

Approval is granted when, in the judgment of the Board of Examiners, it is plausible that the proposed programme leads to the achievement of the objectives of the programme as formulated in article 4 of the Teaching and Examination Regulations.

Article 3 – Obligatory courses

1. Students must complete all of the following 'cornerstone' courses:

| <u>code</u> | <u>course</u> | <u>credits</u> |
|-------------|----------------------|----------------|
| AR8002 | Legal and Governance | 7 |
| SPM8000 | Project Management | 7 |
| SPM8002 | Process Management | 7 |
| CME1200 | Collaborative Design | 7 |

2. Students must complete all of the following 'obligatory specialism' courses:

| <u>code</u> | <u>course</u> | <u>credits</u> |
|-------------|---------------------------------|----------------|
| CME1210-14 | Infrastructure Asset Management | 7 |
| CME2200 | Dynamic Control of Projects | 4 |
| CIE4130 | Probabilistic Design | 4 |
| CME2300 | Financial Engineering | 4 |

¹ See article 18

| | | |
|-----------|---|---|
| CIE4030 | Methodology for Scientific Research | 3 |
| EPA1433 | Intercultural relations and project management* | 5 |
| WM0312CIE | Philosophy, Technology Assessment and Ethics | 4 |

* From the academic year 2017-2018, this course will be offered by the University of Leiden at the The Hague-campus.

Article 4 – Elective courses

1. The agreement of the Board of Examiners and the education management on beforehand is required for all elective Courses, except for the courses which are mentioned below in this article. For approval, the student must draw up his entire examination programme and present it to the Board of Examiners. The Board of Examiners will take the student's entire elective programme into account when assessing the requested electives from the student.
2. An elective course might be any Master's level course at a Dutch university or at an international university which TU Delft has an exchange-contract with, provided that the course is in conjunction with the degree programme CME.
3. Where the previous education of a student admitted to the programme does not completely match the programme, the admissions committee can specify additional courses with a total of at most 10 EC (deficiency courses) which replace one or more elective courses.
4. The CME degree programme has four specialisations and a free study programme*
 - a. Asset Management
 - b. Infrastructure and Environment
 - c. Project Management
 - d. Legal and Finance
 - e. Free study programme

*See the CME study guide for more information about the courses you can choose

a. Specialisation Asset Management (AM)

Students who have opted for the specialisation Asset Management might choose elective from the following list of courses:

| <u>code</u> | <u>course</u> | <u>credits</u> |
|-------------|---|----------------|
| CIE3380 | Infrastructure Management | 4 |
| CIE4120 | Information Systems for the Construction Industry | 4 |
| CIE4480 | Integral System Design | 4 |
| IN4086 | Data Visualization | 6 |
| IN4152 | 3D Computer Graphics and Animation | 5 |
| WI4050 | Uncertainty and Sensitivity Analysis | 6 |
| WI4138 | Decision Theory/Expert Judgement | 6 |

MSc courses in conjunction with the specialisation, conform the rules laid down in section 1.

Students may choose 1 out of:

| | | |
|------------|----------------------------|----|
| CIE4061 | Multidisciplinary Project | 10 |
| CIE5050-09 | Additional Graduation Work | 10 |
| CME2100 | Internship | 10 |

b. Specialisation Infrastructure and Environment (IE)

Students who have opted for the specialisation Infrastructure and Environment might choose elective from the following list of courses:

| <u>code</u> | <u>course</u> | <u>credits</u> |
|-------------|---|----------------|
| CIE4760 | Assessment of Transport Infrastructure and Systems | 6 |
| SPM9750 | Environmental Sustainability in the Built Environment | 4 |

MSc courses in conjunction with the specialisation, conform the rules laid down in section 1.

Students may choose 1 out of:

| | | |
|------------|----------------------------|----|
| CIE4061 | Multidisciplinary Project | 10 |
| CIE5050-09 | Additional Graduation Work | 10 |
| CME2100 | Internship | 10 |

c. Specialisation Project Management (PM)

Students who have opted for the specialisation Project Management might choose elective from the following list of courses:

| <u>code</u> | <u>course</u> | <u>credits</u> |
|-------------|---|----------------|
| CIE5981 | Forms of Collaboration in Civil Engineering | 4 |
| EPA1144 | Actor and Strategy Models | 5 |
| SPM9537 | Integrated Plant Management | 5 |
| CME5000 | Procurement of Large Infrastructural Projects | 4 |

MSc courses in conjunction with the specialisation, conform the rules laid down in section 1.

Students may choose 1 out of:

| | | |
|------------|----------------------------|----|
| CIE4061 | Multidisciplinary Project | 10 |
| CIE5050-09 | Additional Graduation Work | 10 |
| CME2100 | Internship | 10 |

d. Specialisation Legal and Finance (LF)

Students who have opted for the specialisation Legal and Finance might choose elective from the following list of courses:

| <u>code</u> | <u>course</u> | <u>credits</u> |
|-------------|--|----------------|
| AR0880 | Real Estate Valuation | 7 |
| CIE4760 | Assessment of Transport Infrastructure and Systems | 6 |
| SPM9715 | Intermediate Economics | 5 |
| SPM9716 | Cost-Benefit-Analysis: Theory and Applications | 4 |
| WI3421 | Risk Management | 3 |
| CME5000 | Procurement of Large Infrastructural Projects | 4 |

MSc courses in conjunction with the specialisation, conform the rules laid down in section 1.

Students may choose 1 out of:

| | | |
|------------|----------------------------|----|
| CIE4061 | Multidisciplinary Project | 10 |
| CIE5050-09 | Additional Graduation Work | 10 |
| CME2100 | Internship | 10 |

e. Free specialisation

Students who have opted for the free specialisation might choose elective courses in conjunction with the CME degree programme.

Students may choose 1 out of:

| | | |
|------------|----------------------------|----|
| CIE4061 | Multidisciplinary Project | 10 |
| CIE5050-09 | Additional Graduation Work | 10 |
| CME2100 | Internship | 10 |

Section 2 –Honours Programme

Article 5 – Honours 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 20 credits on top of the Master's degree course: the Honours Programme Master.
- The content of the Honours Programme Master should be thematically consistent. The course UD2010 , Critical Reflection on Technology, 5 credits, is compulsory to the Honours Programme Master.
- Students who fulfil, or will fulfil, the requirements laid down in subsection 1, and are interested in the Honours Programme Master can send their application to the programme coordinator together with an essay in English, containing their motivation and a proposal for the programme. The programme has to be approved by a scientific staff member, the programme coordinator and the Board of Examiners.
- The Honours Programme Master has to be completed during the course of the student's Master's programme. None of the results may be lower than 6,0.
- The various parts of the programme will be assessed by the respective examiner(s). The fulfilment of all criteria to the Honours Programme Master will be assessed by the board of examiners.
- Students who have successfully completed the Honours Programme Master will receive a special certificate from the university with their degree certificate.

Article 6 – Annotations

After prior approval by the Board of Examiners, students can opt for the annotations mentioned in the Implementation Regulations of Civil Engineering among which **Integral Design and Management**

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

- a. subjects within or outside the compulsory or elective subjects of the chosen track and/or specialisation adding up to a total of 8 credits (4 credits if CTB3380 has been completed in the Bachelor's phase):

| code | subject | ECs |
|---------|---------------------------|-----|
| CIE3380 | Infrastructure Management | 4 |
| CIE4480 | Integral Systems Design | 4 |

- b. subjects from the list below within or outside the compulsory or elective subjects of the chosen track and/or specialisation adding up to a total of at least 6 credits (10 credits if CTB3380 has been completed in the Bachelor's phase):

| code | subject | ECs |
|----------|---|-----|
| CIE41202 | Information Systems for the Construction Industry | 4 |
| CIE4130 | Probabilistic Design and Risk Management | 4 |
| SPM8000 | Project Management | 7 |
| AR8002TU | Legal and Governance | 7 |
| IN4170 | Databases and Data Mining | 6 |
| IN4325 | Information Retrieval | 5 |
| WI4051TU | Introduction to Operation Research | 6 |
| WI4138 | Decision Theory/Expert Judgement | 6 |

- c. a Multidisciplinary Project (CIE4061-09) carrying 10 credits as mentioned in Article 3 subsection 1 clause c. The Multidisciplinary Project must focus on the topic of integral design and management. The coordinator will test the hypothesis of the project and the way in which it has been tackled against the extent to which integral design and management issues have been integrated into the project.

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

1. 2. Students who complete the annotation successfully, receive an annotation Integral Design and Management with their degree certificate.
2. The Board of Examiners will decide if and which part of the chosen annotation programme can be obtained within the examination programme.

Section 3 – Transitional programme

Article 7 - Admission requirements for issuing proof of admission

The admission requirements for the Master's degree programme correspond to the qualities regarding the knowledge, insight and skills that students obtained at the time of finishing their Bachelor's degree programme.

² as of 1 September 2015

Admission of international students:

1. Command of English: following the introduction of teaching in English, students must have an IELTS or comparable total score of at least 6.5, in which all parts should be assessed with a 6.0. Comparable scores are:
 - TOEFL internet-based: 90
 - Cambridge certificate: CPE-C or CAE-C
2. The level of education in the country in which the student has completed his/her pre-university education: this must be more or less comparable with that in the Netherlands.
3. Level of knowledge: the student must also have accumulated sufficient knowledge on the basis of the courses he/she has studied abroad. It must be at a level comparable to that of Dutch students who are admitted to the Master's programme.

Article 8 - Bachelor's degree certificates that provide direct access to the Master's programme

The following Bachelor's degree certificates from the institutions for higher education indicated below provide direct access to the Master's programme:

- bachelor programmes Architecture (TUD, TU/e)
- bachelor programmes Civil Engineering (TUD, UT)
- bachelor programmes Technische Bedrijfskunde (TU/e, UT)
- bachelor programme Systems Engineering, Policy Analysis & Management (TUD)
- bachelor programme Technical Innovation Sciences (TU/e)

In this, following deficiency courses can be mandatory according to article 4 section 3 jo. article 9.

Article 9 – deficiency programme

In accordance with article 4 section 3, the following additional courses are obligatory for students with a bachelor or equivalent study³:

1. BSc Architecture, Urbanism & Building Sciences, Delft

| <u>Code</u> | <u>Course</u> | <u>credits</u> |
|-------------|----------------------------|----------------|
| WI1708TH1 | Analyse 1 | 3 |
| WBMT2049-T1 | Kansrekening en statistiek | 3 |
| WI1808TH1 | Lineaire Algebra | 3 |

2. BSc Technische Bestuurskunde, Delft

| <u>Code</u> | <u>Course</u> | <u>credits</u> |
|-------------|---------------|----------------|
| CTB2410 | Waterbouw | 5 |

3. BSc Civil Engineering, Delft

| <u>Code</u> | <u>Course</u> | <u>credits</u> |
|--------------|-------------------|----------------|
| WM0201TU-Eng | Technical writing | 2 |

4. Other BSc programmes from TU Delft faculties: TNW, LR, 3ME, EWI

| <u>Code</u> | <u>Course</u> | <u>credits</u> |
|-------------|--|----------------|
| CT-MI-174 | Project Management: from Nano to Mega (minor)* | 30 |

* or the student can request the Board of Examiners for an alternative program that is tailored individually.

5. BSc from TU Delft faculty IO

Students with BSc from the TU Delft faculty IO must follow the CME HBO bridging programme as described in article 10.

6. Bridgingprogramme CME (premaster) at TU Eindhoven or University Twente

| <u>Code</u> | <u>Course</u> | <u>credits</u> |
|-------------|----------------------------|----------------|
| WI1708TH1 | Analyse 1 | 3 |
| WBMT2049-T1 | Kansrekening en statistiek | 3 |
| WI1808TH1 | Lineaire Algebra | 3 |

³ See article 12 for a list of approved equivalent mathematics courses.

7. Students with a BSc from TU Eindhoven or University Twente
The necessity and the content of a deficiency programme will be assessed by the Board of Examiners before the student will be admitted to the degree programme.

Article 10 – Bridging programme CME (Premaster)

Students of the CME bridging programme must complete all of the following courses at TU Delft adding up to 36 credits:

| <u>Code</u> | <u>Course</u> | <u>credits</u> |
|--------------|--|----------------|
| CT1730HBO | Introduction to Geotechnical Engineering | 3 |
| WI1708TH | Analyse, part 1, 2 and 3 | 9 |
| WI1807TH | Lineaire Algebra | 3 |
| WM0201TU-Eng | Technical Writing | 2 |
| WI1909TH | Differentiaalvergelijkingen | 3 |
| CTB2410 | Waterbouw | 5 |
| CTB3420 | Integraal ontwerp infrastructuur | 4 |
| WBMT2049-T1 | Kansrekening en statistiek | 3 |
| CTB3380 | Infrastructuur Management | 4 |

Article 11 – Special requirements bridging programme

For the courses Analysis 1, 2 and 3, the weighted average must be at minimum a 6.0., in which for each part at least a 5.0 must be obtained. The parts as well as the weighted average are not rounded off.

Article 12 – Special requirements equivalent mathematics courses

Students admitted to the deficiency programme mentioned in article 9 or to the bridging programme mentioned in article 10, before or from September 1 2016, can choose equivalent math courses from the lists below.

1. Analyse

| <u>code</u> | <u>course</u> | <u>credits</u> |
|---------------|--------------------------------|----------------|
| WI1708TH1 | Analyse 1 | 3 |
| CTB1001-15 T1 | Analyse, module 1 | 3 |
| WI1030WBMT-T3 | Wiskunde 1, analyse 1, toets 3 | 3 |

2. Kansrekening en Statistiek

| <u>code</u> | <u>course</u> | <u>credits</u> |
|-------------|--|----------------|
| WI2031TH | Kansrekening en Statistiek voor HBO instromers | 3 |
| WBMT2049-T1 | Kansrekening en Statistiek | 3 |
| CTB2200 | Kansrekening en Statistiek | 3 |

3. Lineaire Algebra

| <u>code</u> | <u>course</u> | <u>credits</u> |
|---------------|--|----------------|
| WI1807TH1 | Lineaire algebra 1 | 3 |
| CTB1002-T1 | Lineaire algebra (toets 1) | 3 |
| WI1030WBMT-T5 | Wiskunde 1, lineaire algebra 1, deeltentamen - toets 5 | 3 |
| WI1808TH1 | Lineaire Algebra | 3 |

Section 4 – Deviate from examination programme

Article 13 – Deviate from the examination programme

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

Article 14 – When the rules do not provide

Insofar as these Implementations Regulations do not provide for specific circumstances, for example when a course from an approved examination programme is no longer offered, 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.

Section 5 – Examinations and practicals

Article 15 - Number and frequency of the examinations and practical exercises

1. Written and oral (interim) examinations are taken immediately following the teaching period in which the education is provided.
2. At least one repeat opportunity is offered for each written (interim) examination. A timetable of these repeat examinations is published at the beginning of the study year.
3. Practical can be done in agreement with the relevant timetables.

Article 16 - Format of examinations

1. The (interim) examinations are taken in the manner prescribed for the relevant course in the study guide.
2. (Interim) examinations of courses, which are given by another programme to the CME programme are taken in the manner determined in or in accordance with the Education and Examination Regulations for CME.

Article 17 - Participation in practical exercises:

1. The educational programme Construction Management & Engineering consists a number of practical exercises in the form of design projects. Practical exercises can also be a part of a course, which is completed with a written exam. More information about these practical exercises can be found in the course descriptions. For the accomplishment of the master thesis, there is a digital and hardcopy guide available.⁴
2. Usually the opportunity to participate in a project or practical is offered only once per year. If – for reasons beyond his control – a student has not been able to participate in a project or practical in accordance with the regular schedule, the Examination Board will try – to the best of its ability – to enable the student still to carry out the project or practical.

Section 6 – Access to Master Thesis Project

Article 18 - Conditions for admission to the examinations

Students may only take part in the examinations listed below after they have passed the corresponding examinations listed under respectively article 3 (obligatory courses), article 4 (elective courses) and article 9 (deficiency programme when applicable):⁵

- CME2001 Preparation, 4 EC;
- CME2000 Thesis, 32 EC.

Section 7 – Transition Regulations

Article 19– Transitional ruling

Not applicable.

⁴ You can contact the CME secretary's office for the guide.

⁵ Students may begin their final thesis when they have passed all their courses.