Building Engineering
2018-2019
information booklet master track
TUDelft
NB The official course and examination regulations are always decisive. These can be found at Legal Position/Regulations/TER/Civil Engineering and Geosciences on www.studenten.tudelft.nl.
Preface

This booklet is published by the MSc Building Engineering track of the faculty of Civil Engineering of the Delft University of Technology. The booklet is meant as a guiding document for (future) Master students Building Engineering at this faculty.

With this guiding document an overview is given of the possibilities within the Master variant. At the same time it helps the student to choose courses and make a planning for the Master’s phase.

In addition to this information booklet it is advised to visit the website of Building Engineering: www.be.citg.tudelft.nl This website publishes an overview of the courses and MSc thesis projects and, when applicable, adjustments in the curriculum. For actual information you are advised to enrol for the Master Building Engineering community on Brightspace. On www.studyguide.tudelft.nl you can find more detailed information on courses.

July 2018
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*World Expo, Shanghai, China*
Buildings are an important part of human society. From the moment that humans changed their lifestyle from nomadic to settling, buildings have become a necessity; a necessity that has been growing in complexity ever since. Where the first human beings simply needed a roof over their head and relied on farm animals and fire to keep them warm, there the modern human requires light, space, climate control. Furthermore, modern man requires a greater variety of buildings, churches to football temples, offices to train stations, etc. Buildings with ever increasing complexity and ever increasing scale.

This is where the Building Engineer comes into play. The Building Engineer plays a vital role in making a building work. The complexity of all the different functions that a building fulfills needs to be analyzed and controlled. With a broad background followed by a specialisation, the Building Engineer can assume different roles such as structural engineer, façade engineer, building manager, building services engineer, etc. This way the complexity of the project is brought back to the essential human needs: comfort and protection.

This booklet is a guide for students interested or participating in the Building Engineering Master variant.

Chapter 1 gives a short introduction into Building Engineering backgrounds and an overview of future possibilities. Chapter 2 is a practical chapter with information on the curriculum of the Building Engineering Master variant. The two specialisations within the Building Engineering track are discussed in Chapter 3, including curricular demands. The practicalities surrounding the Master’s thesis, which concludes the Master’s education, are found in Chapter 4. In Chapter 5 an important institution related to the Building Engineering track at this faculty is introduced: the student’s association U-base. Chapter 6 concludes with useful addresses and telephone numbers.
1.1 The Dutch building industry

With 63 billion euros in 2017, approximately 10% of the gross national product, the turnover of the building industry is clearly an important part of the Dutch economy.

Yearly turnover of the Dutch building industry in 2017:
(source: Verwachtingen bouwproductie en werkgelegenheid 2018, EIB)

<table>
<thead>
<tr>
<th>Category</th>
<th>Value (billion)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing</td>
<td>€ 20</td>
</tr>
<tr>
<td>Utility buildings</td>
<td>€ 15</td>
</tr>
<tr>
<td>Maintenance building</td>
<td>€ 11</td>
</tr>
<tr>
<td>Civil structures and external contracting</td>
<td>€ 17</td>
</tr>
<tr>
<td>Total</td>
<td>€ 63</td>
</tr>
</tbody>
</table>

Building Engineering students will usually work in the field of utility buildings. The domain of (utility) buildings can be subdivided into the following categories:

Relation with people:
- Offices
- Hospitals
- Schools
- Sports stadiums
- Shopping centres
- etc.

Relation with infrastructure:
- Stations
- Parking garages
- Airports
- Seaports
- Communication towers
- etc.

Relation with processes:
- Industrial buildings
- Clean room facilities
- Power plants
- Waste processing plants
- Aircraft hangars
- etc.

Left: Train station, Lisbon Portugal  
Right: Muziekpaleis, Utrecht
1.2 Roles

Building projects are becoming increasingly complex both in functions as in technology and process. The result is that an integral approach is desired more and more. The role of the Building Engineer in this process is focused on technology and process, while the architect is mostly focused on function and aesthetics. However, to create a successful building it is necessary to continuously use an integral approach and consideration.

1.3 Working field

Many of the Building Engineering graduates will start working in the construction industry. There are different roles that can be assumed by building engineers in different parts of the building process as well as in different types of companies. After graduation both national and international career opportunities are available. Possible working fields:

- Building contractors
- Real estate developers
- Institutional investors
- Architectural/ Engineering firms
- Consultancies
  - Building Services firms
  - Façade consultancies
- Construction firms of large companies and institutions
- Engineering services government
- Research institutes (e.g. TNO)
- Educational institutes (e.g. TU Delft)
1.4 The Building Engineering Track: preparation for the working field

The Master of Science programme of Civil Engineering comprises the following eight tracks:

- Structural Engineering
- Building Engineering
- Hydraulic Engineering
- Water Management
- Transport and Planning
- Geo-Engineering
- Geoscience and remote sensing
- Environmental engineering

The MSc track ‘Building Engineering’ provides a broad curriculum. This includes all important aspects throughout the entire building cycle, from initial planning through the phase of use and onwards to redevelopment and demolition. The focus is on the technical and structural functions of buildings. However, the principles of architectural design are also examined. After all, in practice civil engineers will often work together with architects. It is therefore important for you to be familiar with each other’s fields of expertise. If for instance a building’s supporting structure is visible then together with an architect a solution needs to be found which is attractive in both structural and architectural terms.

The main difference with the Master track Structural Engineering lies in this integral focus on structures, where Structural Engineering focuses more on materials and mechanics.

In order to make a useful contribution to the design of buildings, a building engineer must have knowledge that includes the following fields:

- Structural solutions
- Structural and building services engineering
- Materials
- Building physics
- Finishing techniques
- Building organisation and management
- Building costs

This knowledge is acquired in a two-year programme which is designed to help you graduate as a highly expert engineer with a practical perspective. Following graduation your knowledge and experience will make you suited for a wide range of professions.
2.1 General programme Civil Engineering Master

The official documents on regulations for exams and graduation give a general scheme applicable for all Master tracks. This scheme is given in Figure 2.1. This is presented in a convenient arrangement in Figure 2.2.

In the scheme it is visible that all tracks of the Civil Engineering Master programme have one course in common. This is the course on ethics (WM0312CT), or its equivalent CIE4510. Then there is an obligatory part for all Building Engineering specialisations, part b1. For Building Engineering it has been tried to compose a mix between a decent common basis with room for specialisation. Therefore 5 courses are obligatory for all BE students. These courses can be found in Figure 2.2.

Then there is an obligatory part dependent on which specialisation is chosen (part b2). Within the Building Engineering Master Track two different specialisations can be followed:
- Building Technology & Physics
- Structural Design

The reason for using specialisations in the Building Engineering track is to improve the transparency within all possibilities to choose from. Furthermore it gives an identity in relation with graduation and future possibilities within the study programme which aids both students and external professionals. The layout of the specialisations can be found in Chapter 3.

In addition to the general program of Building Engineering and its specialisation it is possible to acquire an annotation on Dynamics (contact: dr. Tsouvalas), Integral Design & Management (contact: dr. van Nederveen), Technology in Sustainable Development (tudelft.nl/tido) or Entrepreneurship (dce.tudelft.nl). Furthermore, annotations on Urban Planning & Engineering and The Infrastructure Planning and Environmental Engineering are available.

N.B. The program overview can also be obtained from www.studyguide.tudelft.nl

It is strongly advised to make a study-planning at the start of your master studies, and to discuss it with fellow MSc students (for instance from U-base).
Article 3 – The composition
1. The study programme tracks are compiled in the following way:
   a. **4 credits**: the subject Philosophy, Technology Assessment and Ethics for CT (WM0312CIE) or the subject Clim. Change: Sc. & Ethics (CIE4510)...
   b. **56 credits**: track-linked subjects belonging to the chosen track. The track-linked subjects may be subdivided into those that are general track-linked subjects (the common compulsory block) and those that belong to a specialisation as stipulated in Articles 5 to 12 or a free specialisation. Track-linked credits, exceeding 56 credits, will be considered as credits achieved for electives mentioned under c.
   c. **20 credits** as follows:
      - **part 1**: 10 credits
        - all subjects from the Civil Engineering MSc programme which may include only one of the following subjects:
          - CIE5050-09 Additional graduation project
          - CIE4040-09 Internship,
          - CIE4061-09 Multidisciplinary project ((Building Engineering) students who take “AR0026:MEGA” in part 2 are not allowed to combine this with “CIE4061-09: Multidisciplinary project”.
      - **part 2**: 10 credits electives from:
        - other subjects from the Civil Engineering MSc programme with the exception of the three mentioned subjects above under part 1,
        - all subjects offered in conjunction with other MSc degree courses at a Dutch University or at an international university with an exchange contract with TUD.
        - the specialisation subjects included in the table ‘Track linked BSc electives’ (‘keuzelijst specialisatievakken’) as intended in Article 3 of the annex for the Bachelor’s degree course in Civil Engineering at Delft University of Technology, as far as they are considered to be convergence subjects (CIE course codes, see list at end of annex),
        - interfaculty Master’s-level electives at Delft University of Technology with a “WM-code” to a maximum of 6 credits, however language, skills subjects and MOOCs are not allowed within the examination programme. Language, skills subjects and MOOCs can only be part of the extracurricular paragraph of the diploma supplement,
        - deficiency subjects referred to in article 3, section 4.
      Any deviations to this composition requires the approval of the Board of Examiners on forehand. For this a motivated request is needed.
      If applicable: also subjects from annotations can be selected.
   d. **40 credits**: a track-linked Master Thesis Project (CIE5060-09). The Master Thesis Project consists of a final project, a thesis, a summary of the thesis, a summary of the thesis and a final presentation. 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 will be monitored by the graduation coordinator.
<table>
<thead>
<tr>
<th>credits</th>
<th>course [credits]</th>
<th>period</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. 4 ECTS</td>
<td>Compulsary for all students</td>
<td>p1 p2 p3 p4</td>
</tr>
<tr>
<td>WM0312CIE Ethics [4]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b1. 20 ECTS</td>
<td>Compulsary for all BE areas:</td>
<td></td>
</tr>
<tr>
<td>CIE5981 Forms of Collaboration in Civil Engineering [4]</td>
<td></td>
<td>S</td>
</tr>
<tr>
<td>CIE4240 Forensic Structural Engineering [3]</td>
<td></td>
<td>S</td>
</tr>
<tr>
<td>CIE4210 Parametric design and modelling [3]</td>
<td></td>
<td>S</td>
</tr>
<tr>
<td>CIE4220 Introduction to Building Physics and Façades [6]</td>
<td></td>
<td>S</td>
</tr>
<tr>
<td>b2. 36 ECTS</td>
<td>Specialisation linked courses, see Chapter 3</td>
<td></td>
</tr>
<tr>
<td>c. 20 ECTS</td>
<td>Recommended for Building Engineering (for alternatives: see p.12)</td>
<td></td>
</tr>
<tr>
<td>p1. CIE4040-09 Internship [10] or</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CIE5050-09 Additional graduation project [10] or</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Additional electives [10]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>p2. AR0026 MEGA [12]</td>
<td></td>
<td>S</td>
</tr>
<tr>
<td>d. 40 ECTS</td>
<td>MSc Thesis (specialisation linked)</td>
<td></td>
</tr>
<tr>
<td>Σ 120 ECTS</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Figure 2.2: The layout of the Building Engineering Master’s Track**

Delft University of Technology 2018-2019
2.2 Traineeship (c1)

One of the optional subjects in the MSc programme is the internship. The internship lasts for at least 8 weeks and is awarded 10 ECTS as standard. The aim is that in the course of your internship you become familiar with the technical, social and organisational aspects of civil engineering as a practical profession. All information can be found at the internship office at room 2.73 of Civil Engineering or at their website.

2.3 Enrollment courses at Faculty of Architecture

For courses at the faculty of Architecture (AR-code) students should register at http://bis.bk.tudelft.nl. Deadlines are:
- beginning of June for period 1 and 2
- beginning of December for period 3 and 4

2.4 The multi-disciplinary project

In the Building Engineering programme it is highly recommended to follow the interfacultary project AR0026 - MEGA [12], see page 15. If you choose AR0026 you can not opt for the fourth year Master’s project (CIE4061-09).
2.5 AR0026 - MEGA (c2)

This course runs already over 25 years, and is regarded as one of the most demanding and exciting experiences during the master study. MEGA is organized in close cooperation between the faculties of Architecture and Civil Engineering, deals with the specific management, architectural, economic and technical aspects accumulated in a MEGA Building. Therefore students join small multidisciplinary groups and design a complex building, for instance a high rise structure. By investigating the several disciplines and by integrating them in a collective design, students learn to work together in a group and learn to take and evaluate decisions to reach an optimized an integrated design. The target is to produce a collective concept acting as a professional multidisciplinary design team. A realistic program, situated on a plot will determine the design target.

During the course, consultants of each discipline support the groups. Furthermore, usually a well-known designer is invited to give a lecture about his or her own work in practice.

In 2018-2019 MEGA is given in period 4.
Chapter 3: Specialisations

Introduction

As mentioned in Chapter 2, the Building Engineering Track has 2 different specialisations:

- Building Technology & Physics
- Structural Design

These specialisations will be discussed in this chapter. Each specialisation will be dealt with in three pages. The first page discusses the goals of the specialisation and the second page gives the course schedule. In the course schedule the specialisation-linked courses are stated.
3.1 Building Technology & Physics

Even more than the load-bearing structure, the appearance and the interior climate define the way users enjoy the building. In the specialisation Building Technology & Physics you will gain insight in all techniques that contribute to this.

Building Technology allows an engineer to translate the wishes of the architect into reality. This means determining which materials will be used for the finishing of the building and also ensuring that a sustainable building is constructed. You need to know about building components, material properties, building physics, maintenance properties and the repairability of materials and of technical installations in buildings. Since the façade is one of the most technically demanding and challenging components of a building, the emphasis for a building technologist lies on façade design and construction.

Building Physics is the science of designing high performance buildings that are durable, comfortable, energy efficient, affordable and healthy. To avoid or solve many building problems, a unique mix of heat and mass transfer physics, acoustics, material science, construction technology, human physiology, and engineering analysis and design must be applied.
<table>
<thead>
<tr>
<th>credits</th>
<th>course [credits]</th>
<th>period</th>
</tr>
</thead>
<tbody>
<tr>
<td>b2. 25 ECTS</td>
<td>specialisation linked courses.</td>
<td>p1 p2 p3 p4</td>
</tr>
<tr>
<td>AR0531</td>
<td>Innovation and Sustainability [6]</td>
<td>s s s s</td>
</tr>
<tr>
<td>AR0115</td>
<td>Technoledge Façade Design [6]</td>
<td>s s s s</td>
</tr>
<tr>
<td>CIE4225</td>
<td>Advanced and Applied Building Physics [6]</td>
<td>s s s s</td>
</tr>
<tr>
<td>CIE5100</td>
<td>Repair and Maintenance of Construction Materials [4]</td>
<td>s s s s</td>
</tr>
<tr>
<td>CIE5131</td>
<td>Fire Safety Design [3]</td>
<td>s s s s</td>
</tr>
</tbody>
</table>

11 ECTS | free electives |
### Program Building Technology & Physics

<table>
<thead>
<tr>
<th>Sem.</th>
<th>1st period</th>
<th>2nd period</th>
</tr>
</thead>
</table>
| 1    | Semester 1.1  
   CIE4202 Architectural History of Buildings [4 ECTS]  
   CIE4240 Forensic Structural Engineering [3 ECTS]  
   AR0531 Innovation and sustainability [3 ECTS]  
   CIE5981 Forms of Collaboration [4 ECTS] | Semester 1.2  
   CIE4220 Intr. Building Ph. and Façades [6 ECTS]  
   CIE5100 Repair & Maintenance [4 ECTS]  
   CIE4120 Parametric Design & Eng. [3 ECTS]  
   AR0531 Innovation and sustainability [3 ECTS] |
| 2    | Semester 2.1  
   AR0115 Technoleedge Façade Design [6 ECTS]  
   CIE4225 Adv & Applied Building Physics [6 ECTS]  
   Free electives [2 ECTS] | Semester 2.2  
   WM0312CT Ethics [4 ECTS]*  
   AR0026 MEGA [12 ECTS] |
| 3    | Semester 3.1  
   Electives [15 ECTS] | Semester 3.2  
   Start Final Thesis [10 ECTS]  
   CIE5131 Fire Safety Design [3 ECTS]  
   Electives [2 ECTS] |
| 4    | Semester 4.1  
   Final Thesis [15 ECTS] | Semester 4.2  
   Final Thesis [15 ECTS] |

* or CIE4510 Climate change: science and ethics in p2 [4 ECTS]
3.2 Structural Design

The design phase of buildings involves not only structural experts and architects but, increasingly, structural designers as well. These ‘designing engineers’ act as a bridge between architects and the structural experts who focus on verification of standards, dimensioning and detailing. The Structural Design specialisation has been created in response to this development.

The main difference with the master track Structural Engineering lies in this integral focus on structures, where Structural Engineering focuses more on materials and mechanics. Building Engineering has a broader approach, integrating different disciplines such as building services, architecture, etc. For Structural Engineering the approach is more elementary on the principle of mechanics and knowledge of materials.
<table>
<thead>
<tr>
<th>credits</th>
<th>course [credits]</th>
<th>period</th>
</tr>
</thead>
<tbody>
<tr>
<td>b2.</td>
<td>32 ECTS</td>
<td></td>
</tr>
<tr>
<td></td>
<td>specialisation linked courses.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CIE4115 Steel Structures 2 [4]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CIE4190 Analysis of Slender Structures [4]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CIE3109-09 Structural Mechanics 4 [4]</td>
<td>s</td>
</tr>
<tr>
<td></td>
<td>CIE3150 Concrete Structures 2 [4]</td>
<td>s</td>
</tr>
<tr>
<td></td>
<td>CIE5251-09 Structural Design, Special Structures [5]</td>
<td>s</td>
</tr>
<tr>
<td></td>
<td>CIE4281 Building Structures 2 [4]</td>
<td>s</td>
</tr>
<tr>
<td></td>
<td>CIE4110 Timber and Timber Structures 1 [4]</td>
<td>s</td>
</tr>
<tr>
<td></td>
<td>CIE4285 Structural Glass [3]</td>
<td>s</td>
</tr>
</tbody>
</table>

*if one or more of the courses above has been done in BSc, they can be replaced by:*

|         | CIE4120 Information Systems for the construction industry [4] | s      |
|         | CIE4121 Steel Structures 3 [4]                              | s      |
|         | CIE4125 Structural Design - Case Steel, Timber or FRP [3]    | s      |
|         | CIE4140 Structural Dynamics [4]                             | s      |
|         | CIE4160 Prestressed Concrete [4]                            | s      |
|         | CIE4170 Construction Technology for CE Structures [4]        | s      |
|         | CIE5124 Timber and Timber Structures 2 [4]                  | s      |
|         | CIE5131 Fire Safety Design [3]                              | s      |
|         | CIE4362 Soil Structure Interaction [3]                      | s      |
|         | CIE5125 Steel Bridges [4]                                   | s      |
|         | CIE5127 Concrete Bridges [4]                                | s      |
|         | CIE5148 Computational modelling of structures [4]           | s      |
|         | CIE5260 Structural Response to earthquakes                 | s      |

<p>| 4 ECTS  | free electives from the above courses.                   |        |</p>
<table>
<thead>
<tr>
<th>Sem.</th>
<th>1st period</th>
<th>2nd period</th>
</tr>
</thead>
</table>
| 1    | Semester 1.1  
CIE4202 Architectural History of Buildings [4 ECTS]  
CIE4240 Forensic Structural Engineering [3 ECTS]  
CIE4190 Analysis of Slender Structures [4 ECTS]  
CIE5981 Forms of Collaboration [4 ECTS] | Semester 1.2  
CIE4220 Intr. Building Ph. and Façades [6 ECTS]  
CIE4281 Building structures 2 [4 ECTS]  
CIE4120 Parametric Design & Eng. [3 ECTS] |
| 2    | Semester 2.1  
CIE3109-09 Structural Mechanics 4 [4 ECTS]  
CIE3150 Concrete Structures 2 [4 ECTS]  
CIE5151-09 Structural Design, Special Structures [5 ECTS]  
CIE4285 Structural glass [3 ECTS] | Semester 2.2  
WM0312CT Ethics [4 ECTS]*  
AR0026 MEGA [12 ECTS] |
| 3    | Semester 3.1  
Timber structures [4 ECTS]  
CIE4115 Steel Structures 2 [4 ECTS]  
Free electives [7 ECTS] | Semester 3.2  
Start Final Thesis [10 ECTS]  
Electives [5 ECTS] |
| 4    | Semester 4.2  
Final Thesis [15 ECTS] | Semester 4.2  
Final Thesis [15 ECTS] |

* or CIE4510 Climate change: science and ethics in p2 [4 ECTS]
Chapter 4: Graduation at Building Engineering

Introduction

The Master’s thesis finalises the Master’s study at the university. During the graduation period not only the graduation work itself is important, but also the organisation of the graduation as a whole. The organisation of the Master’s thesis is considered an important part of the graduation and is the sole responsibility of the student.

This chapter tries to give an overview of all the steps that need to be taken within the graduation period. The build-up of the chapter is related to the graduation scheme shown in Figure 4.1. In addition, students are advised to consult the CIE-0 form, which provides information on the graduation procedure (studenten.tudelft.nl).

Chairman Graduation Committee

Chair of Building Engineering is prof. Nijsse. In many cases he acts as chair of the graduation committee, although this is not mandatory. For students Building Technology and Physics, prof. van de Dobbelsteen, Bluyssen and Luscuere (Faculty of Architecture) are allowed to be chairman of students in the specialisation Building technology and physics.
Figure 4.1: Flow chart for graduation at Building Engineering (see also form: CIE-0)
4.1 Start of the Master’s thesis project

The first step in starting on the final project is to visit the graduation coordinator. For Building Engineering this is H.R. Schipper, r. 1.55 Stevin II. Together the official part of the graduation will be set-up, this is the left hand column in Figure 4.1. One can start the MSc thesis as soon as the BSc and 65 ECTS in the MSc. are completed.

Finding a subject
At the same time a graduation subject needs to be found. Some inspiration can be found in the building engineering community at Brightspace. It is a good idea to discuss this with a number of teachers and professors, where own input is very much appreciated. The graduation subject needs to be approved in concordance with the graduation committee chairman.

A graduation subject at Building Engineering can be:
- Research focussed
- Design focussed
In practice a combination of the two is most common.

To help the student to find a graduation subject it is also advised to look at previous subjects at repository.tudelft.nl. Other important resources are PhD. students, fellow students. When searching for a subject take into account your interests, strengths and weaknesses and ideas about a future career.

Graduation project at company
Companies also often have interesting challenges for graduating students. In these cases it is common to have a person from the company to take place in the graduation committee.

Graduation committee
The chairman of the graduation committee is the graduation professor or a member from scientific staff (Assistant or asociate professor) from CiTG. The committee itself depends completely on the subject, but must consist of at least three persons from the Delft University. One of these three persons has to be from outside the Building Engineering section. Furthermore, one or two members from outside the university can be added. The composition of the committee is a combined task of the graduation committee chair and the student.
Cooperation
It may be interesting to cooperate in one of the research fields (of the PhD students) of Building Engineering:

SAFE
- Structural design and safety/ Forensic Engineering

SMART
- Structural glass
- Free form concrete and High rise in prefab concrete
- Computational design (BEMnext)

SUSTAINABLE
- Reuse of existing buildings

Forms
All forms mentioned in Figure 4.1 can be found on the faculty website (studenten.tudelft.nl, go to CiTG, Forms) and at the Service Point of the faculty.
The following forms are available:
- CIE-0: 'Procedure Graduation'
- CIE-1: 'Application Start MSc. Thesis'
- CIE-2: 'Master Examination Programme'
- CIE-2a: 'Master Examination Programme-assessment committee' (use only to inform about changes in CIE-2)
- CIE-3: 'Application Form MSc Degree'
- CIE-4: 'Withdraw Form' (if applicable)

4.2 Course of the graduation project
The Start Meeting is the first official meeting of the complete graduation committee. At this meeting the student presents a detailed work plan for the entire project. The work plan is a result of preliminary research by the student into the chosen subject and is put down in concordance with the graduation professor.

Typically, the Start Meeting is followed by two Interim Meetings to monitor the progress of the project. The time between the meetings is approximately 2/3 months. Additional meetings can be set up when necessary. Obviously there is regular contact with individual committee members between meetings, for instance once per 2 weeks.

At the Final Meeting a green light is given to proceed to finishing the project. The date for the Final Presentation is set here as well. The Judgement Meeting takes place directly before the Final Presentation. At this meeting the student is absent and the committee will judge the project as a whole. After the following Final Presentation the final mark is established.

A graduation project usually takes 9 months. Make a clear planning in advance and keep track of your progress!
4.3 Finalizing the Master’s Thesis

In order to graduate a number of aspects needs to be taken into account. First, there is a number of deliverables and second, the official judgement criteria that are used by the graduation committee.

**Deliverables**
The following deliverables are obligatory:

- Hard copy of the final report for each committee member
- A4 announcement/ invitation for presentation
- Upload full report to repository* in .doc or .pdf format

**Judgement criteria**
The Master’s Thesis is judged on the following 5 aspects:

1. **Scientific Approach (25%)**
   - Theoretical profundity
   - State of the art description and literature study
   - Scientific argumentation (hypothesis testing)
   - Quality of experimental work or design
   - Creativity: new ideas

2. **Quality of result/product (25%)**
   - Scientific reflection and judgement
   - Utilisation of result/product
   - Extension/generation of methods
   - Quality of abstract
   - Amount of work

3. **Behavioral competencies (20%)**
   - Initiative and/or own contribution
   - Responsibility
   - Communicative skills
   - Independency

4. **Quality of written presentation (15%)**
   - Structure and consistency
   - Acknowledgement of sources/quotations
   - English proficiency

5. **Quality of oral presentation and defence (15%)**
   - Speaker quality
   - Clarity and structure of presentation
   - Quality of presentation material
   - Answering of questions

U-base will announce various thesis presentations. It is strongly advised to visit some of these.

*) For more information on this, see the building engineering website
Chapter 5: Related institutions

U-BASE Association

U-BASE association is the student association of Building Engineering and Structural Engineering.

The main objective of the U-BASE is to introduce students to the business environment of civil engineering and the building and structural engineering practice in particular. To achieve this, we create and stimulate relations between students, the university and the building industry by organizing several activities:

- Excursions to companies and interesting building projects several times a year;
- Study tours abroad once a year: the last few years the U-dispuut visited Moscow & St Peters burg, Shang Hai, New York, Hong Kong, Chicago, Tokyo and Singapore;
- Symposia, workshops and guest lectures;
- By publishing a magazine the ‘U-profiel’.

For more information on the U-BASE visit us for a cup of coffee at room 1.35 Stevin II or go to:

www.u-base.org
# Chapter 6: Useful addresses and telephone numbers

<table>
<thead>
<tr>
<th>Contacts Building Engineering</th>
<th>Telephone</th>
<th>E-mail</th>
<th>Room</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professor (only on Fridays)</td>
<td>Prof. Ir. R. Nijssse</td>
<td>+31 (0)152789933</td>
<td><a href="mailto:R.Nijssse@tudelft.nl">R.Nijssse@tudelft.nl</a></td>
</tr>
<tr>
<td>Graduation coordinator Structural Design and Building Technology &amp; Physics</td>
<td>dr. ir. H.R. Schipper</td>
<td>+31 (0)15 27 84917</td>
<td><a href="mailto:H.R.Schipper@tudelft.nl">H.R.Schipper@tudelft.nl</a></td>
</tr>
<tr>
<td>Internship coordinator BE and SE</td>
<td>ir. L.J.M. Houben</td>
<td>+31 (0)15 27 81174</td>
<td><a href="mailto:L.J.M.Houben@tudelft.nl">L.J.M.Houben@tudelft.nl</a></td>
</tr>
<tr>
<td>Internship office</td>
<td></td>
<td>+31 (0)15 27 83042</td>
<td><a href="mailto:stagebureau-citg@tudelft.nl">stagebureau-citg@tudelft.nl</a></td>
</tr>
<tr>
<td>U-BASE</td>
<td></td>
<td></td>
<td><a href="mailto:info@u-base.org">info@u-base.org</a></td>
</tr>
</tbody>
</table>

General website: be.citg.tudelft.nl