

MSc Thesis Project

Civil Engineering and Management / Construction Management and Engineering

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Preface

This brochure contains information about the graduation process. Although an effort is made to present the information as accurately as possible, it is not meant as a regulation: you cannot derive rights from this brochure. You can derive rights from the Students' Charter, which is available for inspection at BOZ-CE and on the website.

This brochure is applicable to MSc students in the programmes Civil Engineering and Management and Construction Management and Engineering who plan to start their MSc Thesis Project.

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1. Before the start of the graduating process

1.1. *What is graduating about?*

Graduating implies that you will:

- Have finished the course Preparation Master Thesis of 7.5 EC (CEM: 195489000 or CME: 95889000);
- do a final project;
- write a MSc Thesis of which you will be the only author;
- give a public, oral presentation of the final project: the colloquium.

These activities are rated at a total of 37.5 EC, or a little more than half a year of fulltime work. The final project is executed individually.

A student that starts the graduation is expected to:

- be motivated to learn, not to know everything;
- be able to plan activities in consultation with his/her supervisor;
- be able to apply knowledge in practice;
- be able to design a project in consultation with his/her supervisor;
- be able to do research, to measure, to collect data, to arrange these data and to
- generate conclusions based on those data;
- take initiative.

1.2. *What should you expect from a final project?*

In the Student Charter, the only content specific demand related to the final project is that it lies within the field of Civil Engineering. Thus, it can either be a research or a systematic design (of a model, object, or procedure). The assignment can be executed at one of the departments of civil engineering, for example a research project that contributes to a PhD dissertation. The assignment can also be executed externally at a company or an institution. It is not allowed to execute the assignment in the form of paid work. However, it is allowed to receive an expense allowance, but only if it lies within an acceptable range. Usually a company or institution will only give an expense allowance when you sign a contract (see paragraph 1.7 for more information about contracts). You can search for a subject by yourself, or you can choose one of the assignments that are available at the UT or elsewhere. If you choose for the second option, you still have to specify the problem definition and plan the activities to come to a five or six month extending assignment. You are free to choose your final project, but your choice has to be approved by your supervising staff member (see further on).

1.3. *Learning Goal*

The main objective of the MSc-thesis project is to – independently - carry out a large individual research or design project in one of the sub-fields of Civil Engineering and Management, applying state-of-the-art scientific knowledge of the sub-field. Appendix 1 shows the learning goals in detail.

1.4. *What are the entry requirements?*

You can start with the graduation process when you have passed (almost) all courses of the Civil Engineering and Management or Construction Management and Engineering programme. The most important reason for that is that you can fully dedicate yourself to the final project without being interrupted by other course work. Moreover, in case of an external assignment, it is physically impossible to attend any courses. Make sure you plan your course schedule long before you start your final project (at least two months), especially when you choose for an external assignment, which might cause

problems in combining assignment and education. Be aware of the fact that logistic issues on itself are not sufficient to be considered for extra (oral) exam possibilities. If you wish to start your graduation (or the preparatory course) while having a gap of more than 7.5 EC, you will need an explicit approval from the examination committee. In order to get this approval, a thorough planning has to be handed in at the student advisor that points out how and when those last courses are to be attended. Your colloquium can only be held when all course exams have been passed!

1.4.1 Preparation assignment

In order to start, you have to do an preparation assignment which is 7,5 ECs. You do not have to enroll for this course, nor do you have to follow any classes. You start this preparation in consultation with you supervisor, so at the very beginning of the project. You actually need to have an idea of what your project is going to be, to thoroughly execute the preparation assignment. In general, a preparation assignment is internal, and in some cases you visit the company a couple of times to gather all the information you need. If you actually have to be at the company in order to do your preparation assignment, please make sure to request enough time for it with your supervisor.

1.5. What other preparations does it take?

At the beginning of the final year of the CEM/CME programme, it is time to think about your final project. At that moment you need to determine *when* you will start with the assignment. A study planning is needed as well to avoid interruption by project work, practicals, lectures and exams. The departments provide general information on the Internet about specific regulations concerning graduation at that department (<http://www.utwente.nl/cem> or www.utwente.nl/cme). Study this information carefully.

In general, the graduation process starts with an intake with the department's graduation coordinator. He or she will ask for your interests and refers you, if your ideas are concrete enough, to a possible supervising staff member (UT supervisor). Contact the applicable secretary for appointments with the graduation coordinator:

- CME or Construction Process Management, phone +31 53 4894254 / +31 53 4892670
- Transportation Engineering and Management, phone +31 53 4894322 / +31 534892670
- Water Engineering and Management, phone +31 53 4893546 / +31 53 4894320
- Integrated Civil Engineering systems: one of the above.

To orientate yourself, you can participate in business days, study the department's research website, study Master's theses of former students (which can be found in the library), attend colloquia, talk to fellow-students who also write their MSc Thesis. You can discuss the possibilities of an external assignment with the graduation coordinator or your UT supervisor. He or she may have contacts which lead to such an assignment, or maybe you are asked to look for an assignment yourself. It is not allowed to search for an assignment outside the field of Civil Engineering without discussing it with the graduation coordinator or the UT supervisor. The programme is not responsible for finding an external assignment. The preparation for an external assignment is more time consuming than for an internal assignment. Make sure you start your orientation on time; at least two months in advance!

When you have found an assignment, it is important to ask yourself some questions that can help you judge the quality of the assignment:

- Is the problem mentioned really a problem?
- Is the problem mentioned really the problem, or does it have a deeper/broader problem that causes it?
- What is the importance of the assignment for the host organisation: do you really make a valuable contribution by performing the assignment?
- Are there any personal or financial issues that might drive the host organization and might cause trouble? (see also paragraph 1.7 about contracts)
- Do you really get the time and space to do your research? (see also paragraph 1.7. about contracts)
- Can the assignment be executed within the set time span?
- Do you feel like executing the assignment with great enthusiasm and commitment?
- Is it an assignment that fits the profile and you study-programme?
- Is it an actual research assignment or will you just be working for a company?

Your UT supervisor has to approve the formulation of the assignment before you will start.

1.6. Where can you do your MSc Thesis Project?

As mentioned before: it is possible to graduate either inside or outside the departments of Civil Engineering, inside the UT or outside the UT. The exam committee formally appoints a MSc Thesis committee for each student. This MSc Thesis committee includes at least two staff members from the UT, one of whom is the UT supervisor who also is the chairman of the committee. In general, the UT supervisor is a professor or associate professor and has to be part of one of the departments of civil engineering. The second committee member may be from outside these departments. The one who is concerned with the day to day supervision is sometimes a PhD student and is called the daily supervisor. In case of an external assignment, someone from the company is added to the graduation committee and is called the external supervisor. It is recommended to have an external supervisor

The UT supervisor is responsible for:

- the formation of the MSc Thesis committee that meets with the above requirements;
- making arrangements with you about the formulation of the assignment and the phasing of research and reporting;
- making arrangements concerning the contents of the preparatory course;
- the assignment of a daily supervisor (if necessary);
- Signing relevant documents
- ...

The UT supervisor is chosen in consultation with the graduation coordinator. Other members of the graduation committee are usually chosen in consultation with the UT supervisor.

1.7. Language

The graduation report will be written in English. Beforehand permission must be obtained from the Examination Board. The language to be used is determined at the beginning of the thesis project. If the report is written in the English language, a summary in Dutch is required. If the report is written in Dutch, a summary in English is required.

1.8. Contracts

If you sign a contract, please hand over a copy of your contract to your supervising staff member if it is a two-way contract. If it is a 3-way contract also your supervising staff member should sign a copy. There are a few points you need to be aware of when signing a contract (especially a two way contract):

- Are there any arrangements with respect to confidentiality in the contract? (check implications before signing!)
- Are there proper arrangements with respect to supervision from the company? (if not, don't sign!)
- Are there proper arrangements with respect to e.g. data collection (if not, don't sign!)
- Are you covered with insurance?

Non-EU students should consult International Office and/or coordinator internationalization before signing any contract. This is to avoid problems with respect to working permits

1.9. Check on address and tuition fee

If you go abroad for your thesis project, please notice that it's wise to keep your verified address. If you don't have a verified address in the Netherlands, this may mean that you need to pay a higher tuition fee.

- *You have a verified address (the address where you are official registered at the municipal personal records database and CSA has been able to verify your registration) in the Netherlands:*
If you have a verified address in the Netherlands and your period abroad is no longer than 8 months, you do not have to deregister from the municipal personal records database. Otherwise you do not meet the residency requirements which will mean that you have to pay the institutional tuition fee (higher)
- *If your internship abroad is longer than 8 months please contact Student Services (studentservices@utwente.nl).*

More information:

<http://www.utwente.nl/so/studentervices/en/address/>

1.10. Formal start of the graduation process

After you have had your intake with the graduation coordinator, you sign in to Mobility Online and register yourself. Once your registration was approved, you print the proposal form. This form has to be handed over to the UT supervisor to sign.

During the first sessions with the UT supervisor, various issues will be discussed. An important subject is the content of the preparatory course. This course enables the student to dive into the research area and will finally lead to a definitively description of the MSc Thesis project, together with a plan of action.

Other issues to be discussed are:

- the phasing of the activities;
- the structure of the MSc Thesis committee;
- potential arrangements regarding confidentiality of the results;
- the way in which the supervision will be organized;
- potential planning issues regarding courses that have to be attended.

All the above points are stated on the MSc Thesis form. The form will be signed by the UT supervisor and yourself and you can upload it in Mobility Online. In the meantime (this is an automatic process) BOZ will check if you have a sufficient amount of ECs to start (no more than a shortage of 7.5 ECs) In case of problems concerning the approval, BOZ-CE contacts you within two weeks. Sometimes, the UT supervisor chooses not to do the intake c.q. other meetings, but to let one of his coworkers replace him as a daily supervisor. However, he/she will remain responsible for the proper course of the graduation process and can be held responsible for it in case of problems.

It is in your own interest to keep your MSc Thesis form up-to-date: if something goes wrong, it provides evidence of the arrangements made.

1.11 Process steps in Mobility Online.

From study year 2017-2018 onwards, the registration for all Mobility-related topics will be registered in Mobility Online. That applies to the registration of the MSc thesis also. You can access Mobility Online via the Student Portal – UT Applications. The moment you know you are starting your MSc-thesis, it is important to register in Mobility Online. If this is not done, you CANNOT start with your graduation. You have to register for ‘Graduation – Extended’.

Below you find the process steps that are obligatory for you to take to start with your master thesis:

1. Fill out the application form in Mobility Online
2. You will receive an automatic e-mail of your online application, after the programme coordinator approves.
3. Fill out the proposal form (NOT OPTIONAL, has to be done), and have it signed by the chairman of your assignment committee (your UT-supervisor). Upload it to Mobility Online. Once you have uploaded your proposal form BOZ will check if you have enough ECs to start with your thesis. If so, the program coordinator will approve your proposal form, which is your green light to start your graduation.
4. The proposal form will be approved, if it is complete, by the programme coordinator. If anything is missing, it will say so in an e-mail as a response to the uploading of de the signed document. This step will then repeat itself until you provide all the necessary information.
5. You fill out if you want to apply for a scholarship
 - a. If yes, wait for the response by the International Office. (continue your further steps at the point below with the )
 - b. If no, your application in Mobility Online is registered properly.
6. You can now start your Master Thesis; you are responsible of making sure all the steps are taken, please check again.
7. During your Mobility, you have to make sure you fill out the notification on whether you started your mobility by filling out an address, and filling out an expected returndate.
8. If there are any changes (i.e.: change of supervisors/change of dates or any other relevant changes) OR if there are NO relevant changes: fill out ‘Notification of changes’; it has to be filled out either way.
9. Once you have finished your Master Thesis you print the attachments as described below (a,b,c) and visit BOZ-CE, to hand them in:
 - a. Bring by your filled out colloquium request (no longer than 3 weeks before the planned date): [attachment Colloquium arrangements](#), at BOZ-CE in building de Buitenhorst.
 - b. Bring by your filled out ‘Application Form IR/MSc-exam’, signed by you UT-supervisor: attachment [Application Form IR/MSc-exam](#)

- c. Bring by the 'Guidance form MSc Thesis report' and indicate whether or not the thesis is confidential, and have your UT-supervisor sign it as well: attachment ['Guidance form MSc Thesis report'](#).
 - d. E-mail the PDF-file of your Master-thesis at least one week before the colloquium to BOZ-CiT-CES@utwente.nl.
10. Check the box in Mobility Online: 'I handed in all the deliverables'. DO NOT FORGET, OTHERWISE YOUR COLLOQUIUM CANNOT TAKE PLACE.
 11. BOZ-CE will check if you delivered all the required deliverables. If not, they will notify you. If so, they will register your graduation and arrange the colloquium. PLEASE MAKE SURE YOU ONLY CHECK THE BOX ONCE YOU HANDED IN THE DELIVERABLES MENTIONED AT POINT EIGHT.
 12. BOZ-CE checks off the box for activity finished, which you can see in Mobility Online, your graduation procedure has reached its end.
- **Students that apply for a scholarship (so answered 'yes' to question 6), please build in these extra steps:**
1. Once you have applied for your scholarship, the scholarship office will take over and you have to answer some additional questions.
 2. You have to fill out your home address and bank details
 3. The scholarship office checks the box for 'scholarship application received'. Once that box has been checked by the office you receive 75% of the provisional scholarship amount within 2 weeks.
 4. 'During the mobility' you have to make sure to register your address and your return date, and you have the option to check a box if you want to change anything in your application.
 5. The steps 'after the mobility' differ slightly from a Master student that stays in the Netherlands. First you have to let your external supervisor fill out the letter of appointment which indicated that you were actually there.
 6. Scholarship Office will approve the letter of appointment.

You can follow the regular student's process plan from step 8 on the previous page onwards.

General remarks:

Everytime you hand something in or check off a box, you will get an e-mail from Mobility Online on what you have to do next. It is your own responsibility to check the application regularly, deliver everything you need to and make sure you hand in everything on time. If you are experiencing difficulties with Mobility Online, or with certain deliverables make sure you get in contact with someone from the programme, preferably your UT-supervisor or the programme coordinator (Eva Blokhuis, e.m.blokhuis@utwente.nl / 053-4897563).

2. The graduation period

2.1. Graduation rooms

Students who graduate within the University of Twente are usually provided with a standard workplace, which means: office space, some office equipment and your own desk, PC and network connection, access to telephone etc. if necessary to conduct the research. If you wish to use these facilities, you can contact the departmental secretary. A workplace is never guaranteed. Make sure that you bring your MSc Thesis form to be able to show the secretary your approval for starting your graduation process.

2.2. Supervision

The supervision by the UT supervisor (or his/her stand-in) is fairly limited. It consists of doing the intake, attending progress meetings, making probable adjustments to the planning, and discussing the final thesis and probable concept versions of the thesis. It is not his job to encourage you to move on and make progress: that is your own responsibility. On the other hand, do not hesitate to ask for his help when you get stuck, because it is his job to help you out in such circumstances.

Besides the formal supervision, you will have a daily supervisor with whom you can discuss everyday issues. It is someone who is very familiar with the field of action of your thesis and usually has direct interest in your results. Usually, this daily supervisor is a teacher, or a PhD student that can use your results in his own PhD Thesis. In case of an external project, an employee of the company will supervise you as well. You can contact your daily supervisor for literature tips, for introducing you to experts in the field, for testing your ideas or for discussing concept versions of your thesis. Keep in mind, however, that also your daily supervisor is limited in his/her time. The supervision style differs greatly among supervisors. The following overview shows these differences. The styles are stated in extreme form and the list is far from complete:



Supervisor structures contents in advance
 + Well organized
 - boring

CONTENTS

Supervisor leaves structuring to student
 + Lively
 - not organized

Guiding:
 + result achieved on a short term
 - Little learning effect

ACTIVITIES

Supporting:
 + enlarges learning effect
 - Result achieved on a long term

Supervisor sets rules:
 + ambiguousness
 - Tense atmosphere

MANNERS

Interaction with student determines rules:
 + relaxes atmosphere
 - Confusing

2.3. Expectations with respect to supervision

Students expect supervisors	Supervisors expect students:
to fulfill arrangements	to fulfill arrangements
to read concept reports in time	to hand in concept reports in time
not to be too guiding	get in touch in case of problems
not to approve everything	not to approve everything
to be open to other points of view	to be open to other points of view
to discuss with other supervisors	to discuss with fellow students or PhDs
not to give negative feedback only	not to think too soon that they have made an amazing discovery
To respond timely	Schedule appointments
	Manage administrative procedures

When the supervision does not meet your expectations, you should discuss this explicitly with your (external) supervisor. Your expectations may be unrealistically high, your supervisor may not have noticed the problem, or your supervisor may be too demanding. When you are unable to reach a solution, you can contact your UT supervisor. In case of an external project, your external supervisor might be transferred or might leave the company, which endangers the continuation of your project. In this case you should definitely contact your UT supervisor so that he/she can come to a solution in consultation with the company. Even if everyone does one's best and everyone is in good faith: sometimes, things can go badly wrong because of various reasons. If you think that this is the case and you do not come to a solution after discussions with your supervisors, you should contact the student

advisor in order to get out. When you think your UT supervisor is not functioning the way one could expect, you can contact the programme coordinator or the programme director.

2.4. Keeping track

The graduation process is known for the study delay it often causes. Appendix 2 shows a flow chart for the assessment during the master thesis. Sometimes, delay is not a problem at all. If you decide to extend the project because you are enthusiastic about the subject, and you don't get into financial problems, nothing is wrong. Actually, in this case, study delay is not the right word. But the delay (of many months in some cases) is often unwanted and unplanned. This is usually caused by:

- *The student works properly, but the project is not executable in five to six months.*

This cannot always be avoided. Despite the planning skills and expertise of the supervisor, it is not always possible to say where things can go wrong, especially with open-end problems. Therefore it is wise to split the project into different phases with strict deadlines for each phase. This way, you are able to either deliberately choose to extend your project, or adjust the next phases or narrow the problem definition to stay within the 30 EC time span.

- *The supervisor fails to set unambiguous criteria to the final thesis and keeps on demanding new adjustments and additions.*

Usually, it is hard or even impossible what to expect from the final project and the MSc Thesis in advance. But you can prepare yourself to avoid problems. While performing the course Preparation Master Thesis, expectations can be sharpened. After this course you should have formulated a concrete research question and narrowed your scope. This is clarifying for both your supervisor and you. With respect to the report, it is wise to put up a report outline of one or two pages and to discuss this outline with your supervisor: is it acceptable and which parts should be worked out in great detail and which parts shouldn't? Make short reports of the progress meetings on the MSc Thesis form and ask the supervisor his opinion about the adequacy of its content. In sum, make clear arrangements if possible and write them down. It is wise to come to a hand-in date for the MSc Thesis in an early stage of the project, although it can be adjusted if necessary. The committee will criticize the report and is obliged to – if it does not meet their demands – point out explicitly what has to be adjusted or extended. It is not allowed for the committee to keep on making new demands.

- *The student does not work hard enough.*

The final project is rated at 21 working weeks of 40 hours. If you spend less than this amount of time, your project will be delayed. As stated before: do not expect your supervisors to check if you are still on schedule. They will only intervene in case of severe delay. With the system of the MSc Thesis form, that ensures you to plan your next progress meeting, we try to avoid this.

- *The student doesn't make headway.*

This is typically a problem at the beginning and at the end of the process. At the beginning, because you are not succeeding in narrowing the problem into something concrete to work on. Some students want to turn their final project into a life's work and approach the problem from every perspective they can think of. That won't speed up the process. At the end, the writing of the report often forms an obstacle. If you get stuck in such a way, do not hesitate to contact your supervisor. Most supervisors have been in a similar situation before and can provide you with useful advice.

2.5. Extra facilities

- Student Counselling Service University of Twente (see <http://www.utwente.nl/so/studentenbegeleiding/en/>)

- Study and Career (see <http://www.utwente.nl/so/studyandcareer/>, site in Dutch, but courses partly in English esp. http://www.utwente.nl/so/studyandcareer/schrijven_en_taal/)
- Non-confidential finished Master Thesis reports CEM/CME available in library

3. Finishing the graduation period

3.1. The completion

On the agreed date mentioned on the MSc Thesis form, you hand in your definitive version of the report to your supervisor. Moreover, you make an appointment for a meeting in which the MSc thesis committee will approve your report: the so-called 'green light meeting'. Please inform your supervisor with it is a confidential report. The report should contain a one or two page summary in Dutch or English. If the report has not yet met all requirements, your UT supervisor should explicitly tell you what to adjust or elaborate in order to get the approval. Ask for clarification if needed! There may be arranged a second 'green light meeting' (see Appendix 2). If you get your 'green light' and you have finished all your exams, you can arrange your colloquium. Together with your MSc Thesis committee and BOZ-CiT you set a date and a time for your presentation. There should be a period of at least 3 weeks between the day of the arrangements and the colloquium itself. These three weeks are used by BOZ-CiT to check your list of courses, and by the Central Student Administration (CSA) to check if you meet all legal requirements the final exam, to prepare your diploma et cetera.

The process then continues as follows:

- You fill in the 'request for colloquium' section on the MSc Thesis form: date, time, and title of your colloquium, as well as some general information and a short description of the final project. After that, you let your UT supervisor sign the form for approval and you hand it over to BOZ-CE at least three weeks before the colloquium date;
- BOZ CE checks your programme. If everything is in order, BOZ-CE arranges a room and the announcement of your colloquium. Together with the announcement of your colloquium, you receive an overview of your grades;
- You check your grade overview. Until a week before the planned graduation date, you have time to correct the overview c.q. deliver missing grades. Corrections and additions to the grade overview are processed based on written evidence (exam forms or the official grade lists from the BOZ CiT archive);
- Contact the reception desk if you need any special equipment (laptop, beamer) during your colloquium. Ask BOZ-CE for his/her name and telephone number. We advise you to check the equipment timely!
- At least a week before the colloquium, you hand in a digital version of your MSc Thesis report (in PDF format) at BOZ-CE. So you can arrange the final exam before your MSc Thesis report is entirely finished, but possible adjustments should not take more than a week time!
- After the colloquium, the MSc Thesis committee determines the final grade and you will receive your diploma. Moreover, you will receive a preliminary grade overview, on which the grade for the final project is not yet included. Several days later, you will be sent your definitive grade overview, including the grade for the final project.
- If you wish have a drink with family and friends afterwards, you will have to arrange that by yourself.

One final remark:

At the end of August, a lot of people do their colloquium. This means that some of the graduation candidates have to wait until September, while their MSc Thesis was already approved in August. If your colloquium is planned in September, you will have to sign up for the new academic year (and pay the tuition fee), because the date of your colloquium is the date of graduation, not the date of the approval.

Most of the fee will be returned though. Especially when your graduation date is planned in August, you have to make sure to make solid arrangements with your UT supervisor about handing in your final report and planning your colloquium. Do not forget to include possible holidays of your supervisors in your planning and the possibility that your report will not be approved right away. To make sure your colloquium can be held before the first of September, start arranging your graduation in May. If you start arranging later, or if it takes you too long to finish your report, you can not blame Civil Engineering for the fact that your colloquium can not be planned before the first of September.

3.2. Marking

The exact marking of your activities varies, but the following general aspects will definitely be taken into account:

1. Content:
 - a. Research method
 - b. Use of theories, tools and techniques practice
 - c. Quality of the solution and discussion
2. Working process:
 - a. Independently, systematically and methodically
 - b. Learning abilities and reflection
 - c. Time
3. Written and oral communicating skills:
 - a. Report
 - b. Defence in public

3.3. Terminating your registration at Student Services

Directly after your graduation terminate your registration. Check <http://www.utwente.nl/so/studentservices/uitschrijven/> for the detailed information about terminating your registration and restitution of tuition fee. Restitution of tuition fee will only take place after Student Services has received the official graduation date from the faculty.

3.4. Studiefinanciering (Dutch students only)

Signing out also means losing the right to receive 'studiefinanciering' and the OV card (Public Transport). The communication with the DUO is your own responsibility, so do not forget to inform them about the fact that you have been signed out!

3.5. ConcepT/ConcreeT/KIVI-Niria

The membership of ConcepT doesn't end if you graduate so don't forget to inform them about the fact that you have been signed out and want to be signed out by ConcepT too. As an alumnus you can become member of the alumni-association ConcreeT (see <http://www.concreet.utwente.nl/>) and KIVI NIRIA (<http://www.kiviniria.net/>)

3.6. More information

There are several books for writing theses and reports (examples of books in Dutch: Verschuren & Doorewaard: Het ontwerpen van een onderzoek, Uitgeverij Lemma BV, ISBN 905189886 of Steehouder e.a.: Leren Communiceren, Wolters Noordhoff, ISBN 9001808263 and in English: the study material of the course Research Methodology and Academic Skills (195800100)).

Appendix 1: Learning outcomes MSc-thesis project

The main objective of the MSc-thesis project is to – independently¹⁾ - carry out a large²⁾ individual research or design project in one of the sub-fields of Civil Engineering and Management, at a level that is representative for an MSc-program, i.e. by applying state-of-the-art scientific knowledge of the sub-field.

- 1) *With 'independently' we mean: the student acts as the project leader for this individual project with guidance from his/her supervisors. The amount of guidance needed will be reflected in the grading of the project.*
- 2) *With 'large' we mean one coherent project of 30 EC that requires about 21 full-time working weeks, i.e. about half a year of work. (The 30 EC includes finalizing the thesis and defending it in public, but not setting up a research or project plan, based on a scientific literature study, and acquiring additional required knowledge, since this is subject of the separate course 'preparation MSc-thesis'.)*

Learning outcomes with respect to content

By carrying out the MSc-thesis project the student has to show that:

- he/she has expert knowledge on at least one of the sub-areas of Civil Engineering and Management, and is able to expand his/her expertise in the field of Civil Engineering and Management
- he/she is able to position the (scientific research of the) own sub-field in the scientific and societal context
- he/she is able to identify gaps in scientific knowledge within a subfield of Civil Engineering and Management, is able to assess research within a sub-field of Civil Engineering and Management on its scientific value and is able to understand and incorporate the results of research into his/her own work
- he/she is able to judge the value of information, makes effective use of this information for decisions and is able to evaluate these decisions
- he/she is able to carry out his/her research or design plan, by applying an appropriate research or design methodology
- he/she is able to judge if available concepts, tools and techniques are adequate for the problem at hand, able to apply adequate tools and techniques and able to generate his/her own assumptions, tools, theories, techniques or novel ideas if these are not available
- is able to analyze and discuss the results, to draw conclusions from the results and to reflect on the results in the wider societal and scientific context

Learning outcomes with respect to working process

By carrying out the MSc-thesis project the student has to show that:

- he/she can reflect upon his/her own work and uses relevant information to improve his/her capabilities
- he/she has the attitude to strengthen his/her personal development and enhance his/her expertise
- he/she is able to work independently
- he/she is able to work systematically and methodically
- he/she is able to manage his/her own project as a project leader including proper communication with supervisors
- he/she is able to finish the project in the time available

Learning outcomes with respect to written and oral communication skills

By writing the MSc-thesis report and presenting and defending the project in public the student has to show that:

- he/she is skilled in properly documenting and presenting results of scientific and design work, including the underlying knowledge, choices and considerations, to colleagues and to a broader public
- he/she is competent in scientific reasoning
- he/she adheres to existing academic conventions, such as giving proper credit and referencing

Learning outcomes of the course 'Preparation MSc-thesis'

The main objective of the course Preparation MSc-thesis project is to – independently¹⁾ – produce a research or design plan for his/her MSc-thesis project, based on state-of-the-art scientific knowledge of the sub-field and acquire additional knowledge to prepare for the MSc-thesis project. The MSc-thesis project is a large²⁾ individual research or design project in one of the sub-fields of Civil Engineering and Management.

- 1) *With 'independently' we mean: the student acts as the project leader for producing this research or design plan with guidance from his/her supervisor(s). The amount of guidance needed will be reflected in the grading of the course.*
- 2) *With 'large' we mean one coherent project of 30 EC that requires about 21 full-time working weeks, i.e. about half a year of work.*

Learning outcomes with respect to content

By producing the research or design plan the student has to show that;

- he/she is able to identify gaps in scientific knowledge within a subfield of Civil Engineering and Management, is able to assess research within a sub-field of Civil Engineering and Management on its scientific value and is able to understand and incorporate the results of research into his/her own work
- he/she is able to formulate a research or design problem and is able to produce a research or design plan, with enough focus and such that it can be realized in the time available
- he/she is able to acquire additional scientific knowledge independently

Learning outcomes with respect to working process

By producing the research or design plan the student has to show that:

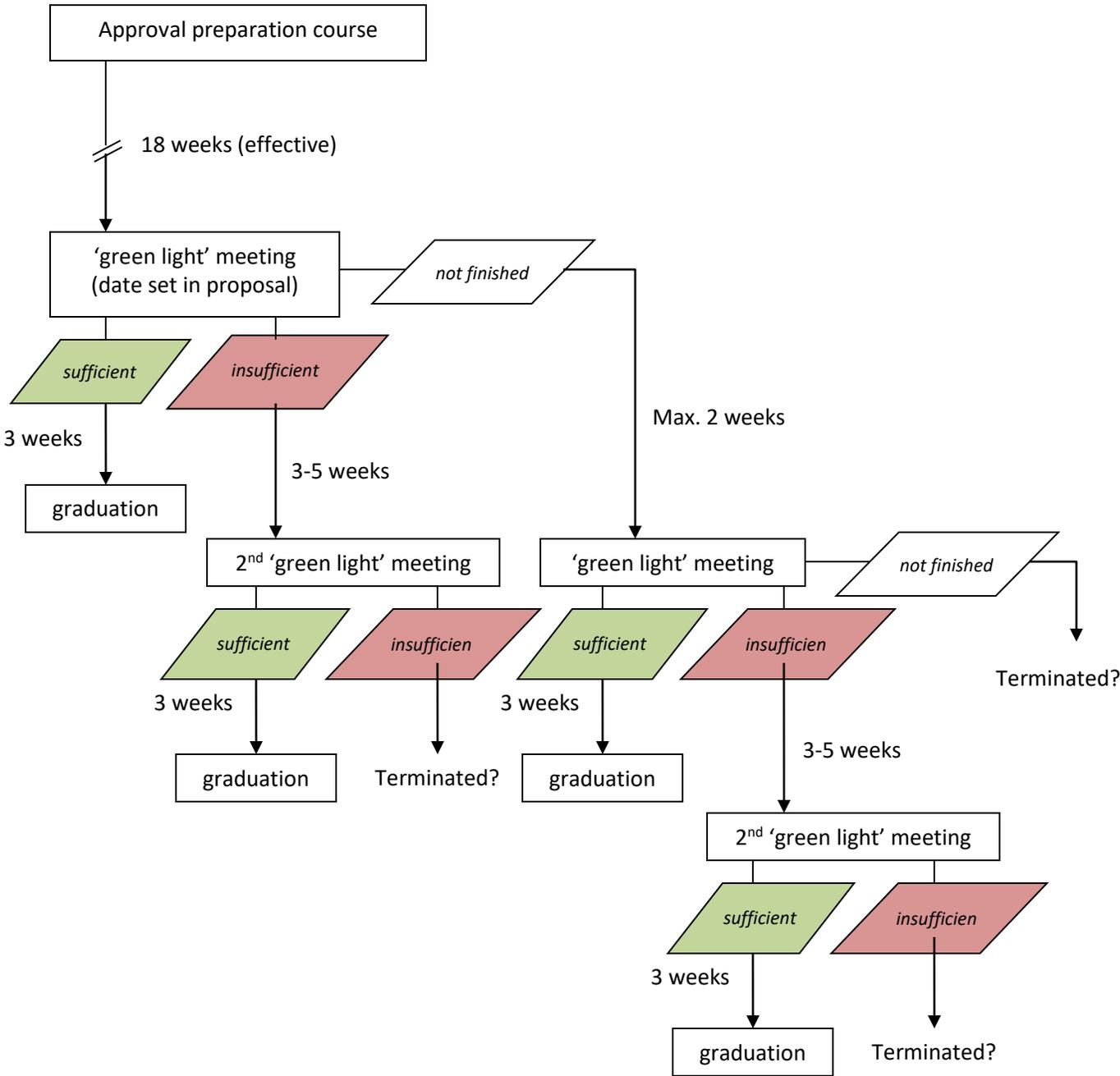
- he/she reflects upon his/her own work and uses relevant information to improve his/her capabilities
- he/she has the attitude to strengthen his/her personal development and enhance his/her expertise
- he/she is able to work independently
- he/she is able to work systematically and methodically
- he/she is able to finish the project in the time available

Learning outcomes with respect to communication skills

By writing up the research or design plan the student has to show that:

- he/she is skilled in properly documenting results of a scientific literature study
- he/she is skilled in presenting a research or design plan in writing, including the underlying knowledge, choices and considerations
- he/she is competent in scientific reasoning
- he/she adheres to existing academic conventions, such as giving proper credit and referencing

Appendix 2: Flow chart MSc assessment



Attachment 3: COLLOQUIUM ARRANGEMENTS

Explanation colloquium arrangements

The colloquium arrangements consist of the following:

1. Colloquium Announcement:

After you have arranged a date and time with your MSc Thesis committee (preferably in line with course hours), please fill in the 'Colloquium Announcement'-part. Mind the following: the location of the colloquium will always be booked by BOZ-CE/CEM/CME! The Colloquium Announcement should be handed in at BOZ-CE/CEM/CME no later than 3 weeks before the planned date. Before you can do the Colloquium Announcement all courses need to be finished.

2. Application form Ir/MSc-exam:

In the part 'Application form Ir/MSc-exam', you fill in your personal data. The UT supervisor has to sign this form so BOZ-CE/CEM/CME can make sure he / she agrees with your application. Also the UT supervisor has to indicate how the supervision time is divided among the committee members.

3. Guidance form MSc Thesis report:

By means of this form you indicate whether your report is confidential. If the report is not confidential it will be send to the library (accessible via the internet).

A MSc Thesis report should be handed in as a pdf-file by means of an email to BOZ-CE/CEM/CME at least one week before the planned colloquium date.

<h3><i>1. Colloquium Announcement</i></h3>

TO BE FILLED BY STUDENT

Within the framework of his / her MSc Thesis project

..... (name student)

will give a presentation about (title colloquium):

.....

.....

.....

Date: Time:

Location preference: Expected number of attendees:

Be aware:

- ***Check with the location manager or the reception of the building whether the equipment you need is available.***
- ***Check whether the names, initials and titles of all committee members have been entered fully and correctly at page 3!***

2. Application form Ir/MSc-exam

Attachment 4: Application form Ir/MSc-exam

To be filled in by the student.

Undersigned,

..... (last name, first name(s))

..... (student number)

..... (address)

..... (postal code) (place)

..... (telephone)

requests to be graduated immediately after his / her colloquium which takes place on

..... (date colloquium)

Signature student date:

3. Guidance form MSc Thesis report

Attachment 5: Guidance form MSc Thesis report

To be filled in by student.

Title MSc Thesis report (be aware: the final definitive title!):

.....
.....
.....
.....

Optional: subtitle

.....
.....

Confidentiality

Please fill in whether the MSc Thesis report is confidential or not:

- The MSc Thesis report contains confidential information. Attach the declaration of confidentiality form to this document (see <https://www.utwente.nl/ctw/student-mobility/documents/>)
- The MSc Thesis report is not confidential

Additional remarks:

.....
.....
.....

TO BE FILLED IN BY UT SUPERVISOR

Undersigned UT supervisor agrees to the before-mentioned description of the MSc Thesis project and has checked it for any mistakes. Also the composition of the MSc Thesis committee as mentioned on the previous page is correct

The UT supervisor has given the student 'green light' and approved of the MSc Thesis report.

The breakup of the supervision hours in percentage terms among the UT committee members is:

name	percentage
1. %
2. %
3. %

Total	100 %

Date:

Signature UT supervisor: