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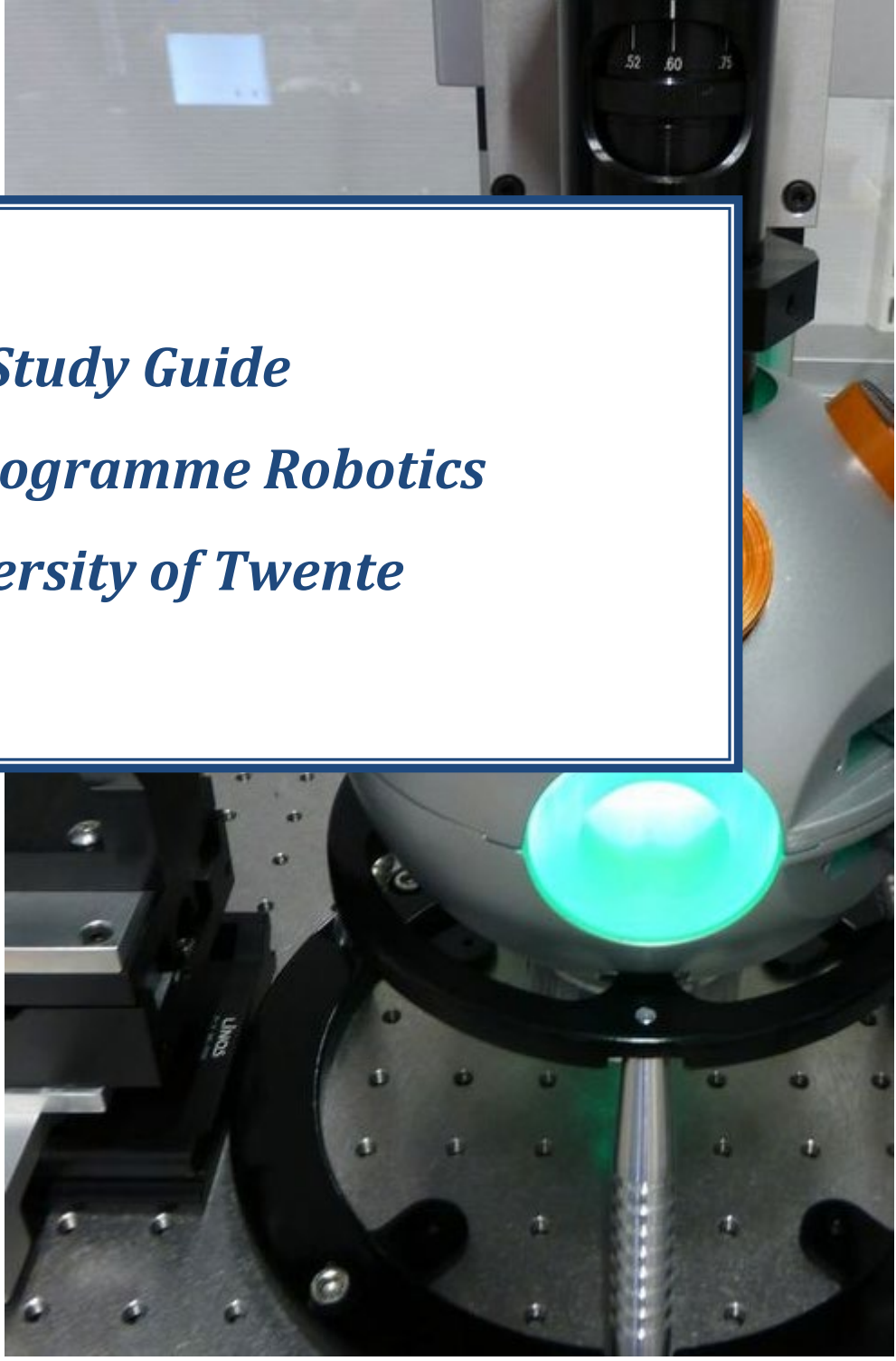

Study Guide

EngD programme Robotics

University of Twente

PREFACE

Welcome to the two-year technological designers programme Robotics at the University of Twente. This study guide provides information about your programme, including start-up information, a to do list, the training and supervision plan (T&SP), Hora Finita information, the Qualifier, courses to be chosen, the final design project and the assessment criteria. This guide also gives information about the relevant contacts for the EngD programme Robotics.

Your supervisors, this study guide, the EngD charter, Osiris and Hora Finita help you through your EngD programme, but note that you are responsible for your own process in the two years the programme lasts. Applications such as Hora Finita and Osiris only supports you in making this process work!

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11-2020

INTRODUCTION

TWO-YEAR PROGRAMMES AT THE STAN ACKERMANS INSTITUTE

Together the four Dutch universities of technology – Delft University of Technology, University of Twente, Eindhoven University of Technology and the Wageningen University – offer two-year programmes with a focus on technological designs. In addition to broadening your technological expertise, you will also learn more professional skills that will enhance your career opportunities. Industry offers engineers from our programmes excellent jobs, because of the strong reputation of our graduates.

4TU TECHNOLOGICAL DESIGNER PROGRAMMES

The 4TU technological designer programme in Robotics offers you an opportunity to enhance your expertise and project management skills with an extensive hands-on assignment, supervised by experienced professionals. The EngD programme Robotics focuses on solving designer issues within the main themes in the robotics sector: industrial robots (e.g. welding robots), robots for maintenance and inspection (e.g. sewer inspection) and robots for medical use (e.g. rehabilitation robots).
For more information, visit the website: www.utwente.nl/engd

ENGD DIPLOMA AND DEGREE

When you successfully complete the EngD programme, you will receive a certified diploma. You will be entitled to use the academic degree Engineering Doctorate (EngD) and will be registered as a Technological Designer in the Dutch register kept by the Royal Institution of Engineers in the Netherlands (KIVI). The quality of the programmes is guaranteed by an assessment and certification procedure on behalf of the Dutch Certification Committee for Technological Design Programs (CCTO, Nederlandse Certificatie Commissie voor Opleidingen tot Technologisch Ontwerper).

THE ORGANISATION OF THE ENGD PROGRAMME IN ROBOTICS

TWENTE GRADUATE SCHOOL (TGS)

The Post-Master EngD programmes at the University of Twente are part of the Twente Graduate School. TGS is the University section that registers PhD's and EngD trainees. Its mission is to train and educate excellent researchers and designers, usually at the start of their career, and to present and promote excellent research and design via clustered or separate (professional) doctoral programmes. The Director of the Twente Graduate School is responsible for the quality assurance of the EngD educational programme.

Coordination and organisation of the EngD programme in Robotics is accommodated at the Faculty of Engineering Technology. The persons and committees mentioned in this section are the relevant committees for EngD trainees in Robotics.

Director EngD programme in Robotics

Dr.ir. T.H.J. (Tom) Vaneker is responsible for the implementation, realisation and quality of the programme. If you have content related questions, please contact him at t.vaneker@utwente.nl or 053 489 2472.

Office manager EngD programmes at the University of Twente

Brenda Kroeze is responsible for the daily operational activities. Please contact her at engd@utwente.nl or 053 489 3780.

PROGRAMME COMMITTEE

The programme committee of the EngD programme Robotics is responsible for the programme structure and research directives within the EngD degree.

Chairman:	Dr.ir. T.H.J. Vaneker
Members:	Dr.ir. J.F. Broenink
	Dr.ir. R.G.K.M. Aarts
Secretary:	B. Kroeze

SUPERVISORY COMMITTEE

Each trainee is matched with a supervisory committee that consists of at least (1) a thesis supervisor, who is a professor in one of the departments of Robotics at the University of Twente, (2) a daily supervisor who is member of the scientific staff of the university (i.e. Assistant professor or higher), and (3) a company supervisor. Most likely, the members of the supervisory committee are also member of the graduation committee, where the thesis supervisor must assure that your thesis meets the accepted requirements (see article 14 of the EngD charter[1]).

You have to plan meetings with your supervisors on a regular basis. The frequency must be determined in consultation with your thesis supervisor and daily supervisor(s). This frequency must be entered in the supervision agreements in the Training & Supervision Plan (T&SP) that needs to be uploaded in Hora Finita.

ENGD BOARD OF EXAMINERS

The University of Twente established an EngD Board of Examiners (BoE). This board functions under the mandate of the Doctorate Board (final responsibility remains with the Doctorate Board). It is an independent authority regarding anything that has to do with course examinations and EngD projects. The BoE establishes rules set in the EngD Charter regarding, for instance, the qualifier, graduation, and cum laude-requirements.

Other tasks of the EngD BoE:

- Is the independent body in case of complaints (in courses, cooperation with supervisor or company)
- Judges the completeness of the dossier per EngD trainee at the end of the programme
- Provides the EngD trainee formal access to the EngD defence, to be assessed by the TEC

[1] The EngD charter can be found at www.utwente.nl/engd/intranet

- Grants exemptions for the Master degree requirement for admission to the EngD programme
- Approves educational framework and approves changes to the predetermined curriculum of the programmes
- Sets the entrance and exit qualifications for EngD in general
- Guards the entrance and exit qualifications per EngD programme
- Monitors the internal quality assurance of each EngD programme
- Responsible for the self-assessment and site-visit of the Institutes accreditation
- Commissions the self-assessment report for the EngD programmes
- Reports annually to the Doctorate Board and the programs

Composition of the EngD BoE

- Chairman: director TGS: prof. Ariana Need
- Vice chairman: dr. Hans Voordijk
- Programme directors: dr. Tom Vaneker (ROB), Dr. Artur Pozarlik (EPT), dr. Seirgei Miller (CE), prof. Matthijn de Rooij (MT), Dr. Luís Ferreira Pires (BIT)
- Secretary: Brenda Kroeze

In case an issue or complaint of a trainee or anyone involved in a certain EngD programme is discussed, the involved programme director has no vote. He can only advise the member of the EngD BoE.

See www.utwente.nl/engd/intranet for the Regulations of the EngD BoE at the University of Twente

ENGD COUNSELLOR

If you face obstacles during your EngD that you can't discuss with your supervisors, or feel you need some external coaching, you can contact the EngD Counsellor. There you will find individual easy accessible coaching with the focus on staying on track. The EngD Counsellor is independent and will maintain the strictest confidentiality.

Possible subjects:

- Productivity
- Motivation
- Cultural differences (for instance in your group)
- Combining personal life with the heavy workload
- Self-confidence
- Advice regarding difficult situations with your supervisor and the organization you do your project for
- Stress

For appointments you can contact the secretariat of SACC at +31 53 489 2035 or by email: sacc@utwente.nl

USEFUL LINKS AND CONTACT AT THE UNIVERSITY

See Appendix VIII for an overview of useful links and contacts.

REGULATIONS

ENGD CHARTER

All rules and regulations for the EngD programmes at the University of Twente are laid down in the EngD Charter. The EngD Charter describes the duties and responsibilities of EngD trainees and their supervisors and is adopted by the Doctorate Board of the University of Twente. By reading the document, you know what is expected from you as an EngD trainee and what you can expect from your supervisors and the University. This Charter is the key for a productive and well-organized EngD programme. It is highly recommended to read the EngD Charter so that you are aware of what to expect from your supervisors and the University. Some of the information of the Charter may also be included in this study guide. If the study guide and the Charter contradict each other, the charter will prevail.

HORA FINITA

Hora Finita is the online registration and monitoring system for EngD trainees and PhD candidates at the University of Twente. All EngD trainees are registered in Hora Finita after being accepted by the faculty. Hora Finita is aimed to facilitate, formalise and archive the most essential interaction between you, the thesis supervisor and a mandated member of the EngD Board of Examiners. The monitoring system is designed in such a way that you will be alerted for upcoming actions, like reporting to be done. The thesis supervisor and EngD Board of Examiners will be prompted to review and accept the reporting in the monitoring system. After several reminders, overdue actions will be reported to the dean of the faculty.
Hora Finita is only concerned with the formal steps and approval as mentioned in the EngD charter[2]. It is assumed that informal exchange of drafts and discussions occur outside Hora Finita between you, your thesis supervisor and your daily supervisor(s).

Hora Finita and the EngD Charter can be found at www.utwente.nl/engd/intranet

SCIENTIFIC INTEGRITY

The UT subscribes to the guidelines for scientific integrity, as specified in the Netherlands Code of Conduct for Academic Practice, see Appendix X.
These guidelines hold for all staff and students from the University of Twente and is applicable to all design, research and educational activities. For EngD students this implies that the guidelines are valid for both the educational programme as well as the technological design project.

The Executive Board established the Scientific Integrity Complaints Procedure in order to protect and guarantee scientific integrity. This procedure provides a system for reporting and dealing with possible violations of scientific integrity. This procedure is consistent with the national LOWI regulations (in Dutch). The first point of contact is the university's confidential adviser for scientific integrity (for the complainant). Possible violations of scientific integrity as well as any follow-up steps can be discussed with him in all confidence.
Actual reports about (possible) violations of scientific integrity are dealt with by the UT scientific integrity committee. Staff members of the UT who have faced a complaint with regards to their integrity can, if they so desire, be assisted by the independent university's confidential adviser for the accused. The confidential adviser for the accused knows the rules and procedures and can support the accused. The accused can share his or her doubts and concerns with this confidential adviser and this confidential advisor can also provide aftercare services.

For you as EngD trainee you need to agree with the Scientific Integrity code of the University. You can do this by clicking Academic Integrity Code tab in Hora Finita.

[2] Hora Finita is accompanied by the EngD Charter which forms the basis for the monitoring system.

ATTAINMENT LEVEL

TECHNOLOGICAL DESIGN

The EngD programme Robotics is a programme that fits in the third cycle of the Bologna declaration. This means that the trainees are expected to deliver a scientific or technological contribution to society. In case of engineering programmes, it is important to determine what a 'contribution' should be. In order to do so, we cite the following definition of 'engineering" according to the American Engineering Council of Professional Development (ECPD/ABET):

*"The creative application of scientific principles to **design** or **develop** structures, machines, apparatus, manufacturing processes or works…"*

In other words, the solution of an engineering problem is an *artefact*. Technological artefacts are:

- Products and structures
- Processes
- Systems for transport of humans, information and goods
- Control systems for production and transport
- Instruments, safeguarding integration and synthesis

Artefacts serve an economical or societal purpose, which means they have a *value*. Artefacts considered are designed according to *scientific principles*, which means that there should be a systematic method for *synthesising* the design and that a design is evaluated using scientifically based *analysis* methods.

In the EngD programme Robotics, the technological design of an artefact is the outcome of the project. The technological design can be dedicated to a complete artefact, a component of a larger artefact or a redesign of an existing artefact. In each project, the emphasis can be on different phases of a design. Therefore, the focus can be on the requirements, on the modelling or on the analysis of the artefact.

FINAL ATTAINMENT LEVEL

The EngD programme Robotics educates people who are able to make high quality, creative and innovative designs for complex technological issues with a multidisciplinary character. This means that after completion of the programme, you must be able to:

- Make a design on a multidisciplinary technological artefact in the field of Robotics ;
- Contribute to a more comprehensive design (independently or in cooperation with colleagues);
- Give direction in a project team to accomplish a design.

The final qualifications specify the knowledge, attitude and skills that EngD trainees should have mastered upon completion of the programme. The general EngD final qualifications are mentioned in article 4 of the EngD Charter. Additional qualifications specific for the EngD Robotics are listed on the next page. These are formulated along ten clear competence areas in three domains:

Knowledge
After finishing an EngD degree in Robotics, the graduate… 1. …has an overview of all disciplines within the field of Robotics, and has mastered state-of-the-art knowledge in specific areas of Robotics. 2. …has an overview of related disciplines such as economics, environment and safety, and is aware of the relevance of these sub-areas in order to apply them within a project. 3. … has an overview of and insight into the possibilities of new emerging technologies in the field of robotics and is able to develop a roadmap for their implementation in the field.
Design skills
After finishing an EngD degree in Robotics, the graduate… 4. …is able to analyse complex problems, is able to determine connections between multidisciplinary aspects of the design problem and is able to maintain an overview of the entire design problem. 5. …is capable of out-of-the-box thinking and able to apply creative thinking to design and realise innovative solutions. 6. …has knowledge of design methods and is able to determine which method is best suited to a particular design problem and is able to apply the correct design method. 7. …is able to analyse actors' constraints and demands (giving attention to the full lifecycle of the design) in order to generate or select solutions that fit within the constraints, is able to make choices that lead to a feasible design, and is able to validate the design on the basis of the defined constraints.
Professional skills
After finishing an EngD degree in Robotics, the graduate… 8. …is able to actively participate in, or give direction to, constructive informal team meetings in order to arrive at innovative solutions (through discussion). 9. …is able to work in a project-based setting and within a team, and is able to analyse the causes when a team is not functioning properly. 10. … has a critical attitude towards their short- and long-term professional development and takes active control of steps to secure this development.

An important difference in the final attainment level between a MSc graduate and an EngD graduate is that the EngD graduate is educated to create technological designs and masters the competencies at a higher level. This means that an EngD graduate is able to apply his/her knowledge and skills to design problems with a higher complexity and a stronger multi-disciplinary character. In addition, an EngD-graduate has a wider range of skills, for example in the field of creative thinking, out-of-the-box thinking, applying design methodologies and communication skills.
The graduation assessment form that will be used to verify if all qualification are met can be found in Appendix VI.

COURSE PROGRAMME ENGD ROBOTICS

ENGD PROGRAMME

The programme[3] consists of three blocks: (1) professional development, (2) in-depth and broadening courses and (3) the technological design project. These blocks with a total of 120 EC can run parallel to each other. The block with in-depth and broadening courses can partly be tailored to the technological design project. Gained skills in professional development and gained knowledge from in-depth and broadening courses are implemented in the design project.

PROFESSIONAL DEVELOPMENT

The professional development courses are intended to improve professional skills and advance career opportunities. Therefore, the courses in Professional Effectiveness and the TGS Introductory Workshop are compulsory. Other courses are elective and can be choses in consultation with your supervisors, with a maximum of 1 language course. The total study load of the professional development courses is 6-10 EC. These courses cover the professional skills learning goals mentioned at page 8. See www.utwente.nl/ctd for an overview of professional development courses.

IN-DEPTH AND BROADENING COURSES

The in-depth and broadening courses carry a total study load of at least 42 EC and comprises a compulsory block and an elective block. This block is set up to cover the design skills learning goals mentioned at page 8. The compulsory block includes:

EngD Robotics Compulsory block				
Course	**Code**	**EC's**		
		Total	**Basic part**	**EngD part**
Systems Design and Engineering for EngD	202000251	15		
Modern Robotics for EngD	201600347	**6**	3.5	2.5
Besides, you have to choose at least one of the courses mentioned below:				
Modeling and Simulation for EngD	201600348	**6**	3.5	2.5
Design Principles for Precision Mechanics for EngD	201600355	**6**	3.5	2.5
System Identification and Parameter Estimation for EngD	201600356	**6**	3.5	2.5
Example: A trainee follows the course Modeling and Simulation for EngD. After passing the examination, he/she earns 6 EC. Another trainee skips the basic part (decision in agreement with the lecturer) because he/she already followed the course in his/her UT-Master. He/she will get 2.5 EC.				

[3] See also Appendix II for a timeline of the 2 years the programme lasts

The chosen course out of the set of four must be accompanied with upgrade-assignments specific for the EngD trainees. In case you have already followed one of the courses in your master education, you will get exemption for the lecturing part, but you still have to do the additional upgrade-assignment. In the latter case, the EngD part is awarded with 2.5 EC. **Exemption is only possible if a specific course is already followed at the University of Twente.** So the compulsory courses must always be on a post-master level.

Upgrade assignments

As mentioned it the previous section, the chosen course out of the set of 4 must be upgraded to a Post-Master level by means of an additional assignment. Therefore, a project (related to the main design project) has to be defined and carried out, in which the course content is applied. You can define the additional assignment as follows:

1. After the first course, contact the lecturer of the course and indicate that you are an EngD trainee who needs to upgrade the course to a Post-Master level, and discuss how to define the additional assignment.
2. Make sure that the assignment meets the following requirements:
   - In the assignment you should apply the content of the courses concentrated on your Design Project
   - It should have a design focus and on a Post-MSc level
   - It should have a workload of at least 2.5 EC
3. Fill in the approval form for upgrade assignments (see Appendix V) and demand your lecturer and programme director for a signature for approval. After approval, upload this document in the T&SP element as a proof of attendance in Hora Finita.
4. Examination of the upgrade assignment is possible by means of a presentation or report.

The elective block of at least 15 EC allow you to extend your competences in a specific direction as a further preparation for the design project. This block covers the (technological) knowledge learning goals mentioned at page 8.

For the composition of the elective block, together with your (daily) supervisors you can select courses that are of interest for the technological design project. Elective courses can either be master courses or post-master courses at the University of Twente, national research schools, Capita Selecta courses (see below), conference visits (incl. paper and/or poster, see next page), summer schools, in-company courses, or courses at another 4TU location. Note that any additional costs related to following courses at this either university or elsewhere, are on the account of the research chair. So you have to contact your Thesis Supervisor for approval (for regular UT courses as mentioned in Osiris and the CTD-website[4] no costs are charged).

CAPITA SELECTA

Capita Selecta courses can be used for educational activities that are not covered by the regular courses at the University. The content, amount of work, and the form of the Capita Selecta must be set up in agreement with your supervisors.

In case you want to set up a Capita Selecta, you have to follow the next six steps:

1) When you choose to make a capita selecta, first start to write learning goals.
2) Communicate with your supervisor who is the teacher or content expert who can evaluate your capita selecta.
3) Describe the execution, make clear why and how you will do it, make a planning and depending on the content decided by your supervisor and programme director make sure the capita selecta is on (Post-)Master level.
4) Use the codes for the capita selecta:
   - CS1 EngD Robotics 201300176
   - CS2 EngD Robotics 201300177
   - CS3 EngD Robotics 201300178
5) Describe this whole idea/plan in the T&SP element in Hora Finita.
6) If you pass let the teacher fill in the mark sheet that is needed for Osiris with the corresponding coding and EC's agreed upon (see point 3).

[4] www.utwente.nl/en/ctd/

For courses at research schools or in-company courses, write the description and the learning goals of the course in Hora Finita, and let your supervisor register the course in Osiris with the number of credits and the capita selecta course codes mentioned above.

CONFERENCE VISITS

It is possible to earn EC's for conference visits. Just visiting is not enough for receiving credits, you must also hand in at least a report of the conference. The number of to be provided EC's is as follows:

- Conference visit including conference report 1 EC
- Conference visit including conference report and poster 2 EC
- Conference visit including conference report and paper 3 EC

The course code for conference visits is 201600191. Note that the responsible lecturer or supervisor should write the corresponding amount of credits on the mark sheet.
After approval, upload the conference report, poster and/or paper in the course element in Hora Finita.

EUROPEAN CREDITS

The University of Twente uses the European Credit Transfer System (ECTS) to register the study load. All EngD programmes have a two-year (24 months) duration, and are worth 120 credits. Since this system is used throughout Europe, your academic record will be easily recognised if you want to continue your education at another university or if you apply for a job abroad. As a trainee at the UT, you can check your own credits via the Osiris website (http://osiris.utwente.nl/).
The average study load per EC is 28 hours. The number of credits of each course and general information about each course can be found at the course descriptions at the Osiris website. Each course will be finalised with an examination. The final mark of each course has to be 6 or higher (on a scale of 1-10). Agreements made- and rules established concerning exams, including the determination and publication of the results, the duration of the validity of the exams, the right to inspect the results, appeal and objection and fraud are provided in the EngD Charter and the Education and examination regulations (OER) of the educational programmes which provides the courses.

TRAINING AND SUPERVISION PLAN (T&SP)

You need to set up a T&SP including an education plan in Hora Finita within the first three months of your appointment. This should be done in consultation with your daily supervisor at the University of Twente and the company. You can find the template for your T&SP at www.utwente.nl/engd/intranet. Your T&SP contains the names of your thesis supervisor and daily supervisor, supervision arrangements, the chosen set of courses including course descriptions, and what knowledge and skills must be acquired. After completion, it must be approved by both your thesis supervisor and the EngD Board of Examiners in Hora Finita. In order to do so, in the home-screen of Hora Finita you must go to the T&SP tab, upload the document, and click the button *"Submit T&SP for review"*.
Your T&SP is a working document so in consultation with your supervisors, based on advancing insights, it is possible to adjust your T&SP during your EngD programme. **Note that after each change in your T&SP new approval in Hora Finita is needed by both your thesis supervisor, as well the EngD Board of Examiners.**

When setting up your education plan, make sure that your personal educational programme is conform the following requirements:

- Professional Development ≥6 EC
- In-depth and broadening courses ≥42 EC
  - At least 50% of the in-depth and broadening block is on post-master level
  - At least 33% of the in-depth and broadening block has a strong design focus
- The number of in-depth and broadening courses in balance.

Besides, please keep in mind that most of the following aspects should be present in your educational programme as well:

- The function of the designer in the industry
- Technical creativity
- Modern design methods

- The quality of a product, process or system
- Risk analysis of possible failures during the design period
- Specifying the requirements which the artefact should meet
- Attention to the aspects of designing (energy consumption, environmental impact, safety, raw material consumption, residues processing etc.)
- Attention to laws and regulations of the government
- Knowledge of patent literature
- The choice of production techniques and industrial feasibility (in terms of investments, location, available production instruments, the environment, noise- and energy regulations and vulnerability)
- Meaning of lifespan, maintenance and reliability
- Project-based approach, including planning and completion time, and the relation with the development on the market

Supplement specific for a process designer:

- Specification of the process; setting up a parameter set with limits and tolerances

Supplement specific for a product designer:

- Functional demands for the design project; translation to product specifications (including quality, manufacturability and price)
- Preparation for manufacturing
- Methodological designing (distinct between designing consumer products and industrial products)

These aspects are covered by the final qualifications mentioned at page 7. Appendix I provides an overview of how these final qualifications can be covered by the design project, compulsory courses and elective courses.

TECHNOLOGICAL DESIGN PROJECT

The design project is defined in close consultation with the organisation or institution you will be working for. The programme ensures that the design project is innovative and complex, contains sufficient design aspects and is sufficiently multidisciplinary.
Due to the complex and multidisciplinary character of the project, in most projects you will work together with colleagues. The workload of the design project is at least 60 EC.

Design process
The design project covers at least 50% of the EngD programme and leads to a solution of an engineering problem in the field of robotics. An additional goal is to evaluate skills and knowledge by carrying out a relatively large design project within an industrial or governmental environment. The design project is related to a technological problem and is constrained by time planning, project management, industrial and/or governmental context, and project deliverables. The assessment criteria for the design process are divided into four main groups:

1. Organisation and planning
2. Problem analysis and solution
3. Communication and social skills
4. Structure and attitude

The subdivision of these assessment criteria for the design process is documented in Appendix III.

During the design project, you have at least 50 contact hours with experienced designers. The designers:

- are employed within the company or University of Twente and have sufficient practical experience;
- have relevant technological and methodological knowledge ;
- are familiar with the stages of a design process.

Technological Design
The assessment criteria of the technological design itself are documented in Appendix IV. These criteria are based on five basic aspects of a design and measured by 12 indicators.

The five basic aspects or views to evaluate a technological design we distinguish are:

1. **Functionality**, answering the question “What is the artefact doing in its environment?”
2. **Construction**, answering the question “How will the artefact do this?”
3. **Realisability**, answering the question “How can the artefact be realised?”
4. **Impact**, answering the question “What are the risks and benefits of the artefact for its environment?”
5. **Presentation**, answering the question “What does the artefact look like in all its details?”

ENGD THESIS
In order to assess your Design Project, you individually have to write an EngD Thesis. In this thesis you report the aspects mentioned above. These are covered by the points mentioned in the EngD Thesis format in Appendix IX. You can download the title page for your EngD thesis at www.utwente.nl/engd/intranet

QUALIFIER AND GRADUATION

QUALIFIER

The (public) qualifier is held between 6 and no more than 9 months after the start of the EngD programme. It is a meeting which serves to determine whether the technological design proposal is of a sufficient level and whether it is likely that you will complete your EngD programme within the remaining period. During this meeting, in front of the Qualifier Committee[5] you present the first results of your project and the technological design proposal for the remaining period. The presentation is followed by a discussion.
As input for this qualifier, you have to draw up a progress report of no more than two pages, containing the results in the design project, results in the educational programme, and future ideas. This document must be submitted at least one week before the Qualifier date to the committee members, and it must be uploaded in the "Progress Interviews" tab in Hora Finita. The Training and Supervision Plan and a project planning of your EngD project must be added to the progress report as appendices.
See Article 15 of the EngD Charter for more information about the EngD Qualifier[6].

In case the advice of the Qualifier Committee is sufficient, an evaluation interview (for EngD-trainees who are employed at the UT) or Progress Interview (for EngD- trainees who are employed at the company) follows. The result of the qualifier serves as input for the evaluation/progress interview between the thesis supervisor and the professional doctoral candidate following the qualifier.
In case the advice of the Qualifier Committee is insufficient, an assessment interview follows. The result of the qualifier serves as the input for the assessment interview. You have the opportunity to meet the specific point mentioned in the interview within an improvement period of no more than 3 months. At the end of this period, a second qualifier follows.
See Article 16 of the EngD Charter for more information about the evaluation/progress interview.

You can download the appropriate forms for the Qualifier and evaluation/progress interview from www.utwente.nl/engd/intranet.

GRADUATION[7]

To obtain the academic degree EngD, you have to complete the course programme successfully and write an EngD thesis covering your Design Project. The total design programme is examined by the Graduation Committee[8].
In order to assess the total project, you have to provide a report with the complete documentation of the design and a report (in Dutch or English) of the design process and present the results in front of the Graduation Committee. This ceremony is public. After the presentation (~45 minutes including public discussion/questions from the audience), an interrogation session behind closed doors (~45 minutes) will take place with the Graduation Committee.
The decision on the awarding will be taken by the Graduation Committee in a closed session after the adjournment of the interrogation session. For the assessment[9], the Graduation Committee makes use of the assessment form, see Appendix VI. If you demonstrate exceptional competence in the practice of your technological design, you can be awarded 'with distinction' (cum laude)[10].

Note that prior to your graduation some administrative actions should be taken (see page 16). It is important that all documents are correct and completed on time in order to guarantee that you can graduate on the intended graduation date.

[5] The Qualifier Committee exists of the programme director, thesis supervisor, daily supervisor(s), and at least one (associate) professor from outside the chair.
[6] The EngD charter can be found at www.utwente.nl/engd/intranet
[7] See article 17 of the EngD Charter
[8] The Graduation Committee exists of the programme director, thesis supervisor, and an associate professor from outside the chair of the thesis supervisor. Company supervisors can act as an additional committee member.
[9] An overview of the criteria for the design process and design project are provided in Appendix III and IV
[10] See article 17a of the EngD Charter

TO DO LIST

INTAKE ENGD

First admission to the faculty is done by the faculty HR through appointment. Secondly, an appointment with the EngD office and the candidate is planned. During the intake you will be registered and introduced to Hora Finita, you will be informed about your programme for the next two years, and the EngD office (Horst tower T413) takes care for registration as a student. This registration is needed to get access to Canvas and Osiris in order to make sure that you can follow courses and that your marks are stored.
If you are employed by a company/institute, you ALSO have to fill in a PNUT (person not employed by the University of Twente) form. The secretary of the research chair you are linked to should take care of this form.

REGISTRATION FOR COURSES AND EXAMINATIONS

Registration for courses takes place through the internet on https://canvas.utwente.nl[11] and https://osiris.utwente.nl[12]. Note: you have to register for the examinations separately.

TRAINING & SUPERVISION PLAN

You will set up a draft T&SP within the first three months of your appointment; see Section 'Course programme EngD Robotics'. Your T&SP should be approved in Hora Finita by your Thesis Supervisor and a mandated member of the EngD Board of Examiners. When setting up your T&SP, make sure that your personal educational programme is conform the requirements specified at page 11.

The draft T&SP contains:

- The names of your thesis supervisor and daily supervisor;
- Supervision agreements with your thesis supervisor and daily supervisor;
- The chosen set of courses;
- Course information of the chosen courses. This contains the course information including a description of the courses, design focus (yes or no), level of the course (master or post-master), the scope of the courses (in-depth or broadening), the number of credits, lecturer, course code and university or institute that provides the course (if a course is provided by the University of Twente, then a copy of the course content from OSIRIS is sufficient);
- Covering letters: In case you follow a master course that needs to be upgraded to a post-master level, you need a covering letter from the lecturer, stating that you have completed the course at post-master level (see page 10 and Appendix V). In most cases, it is not possible to upload this document within the first two months of your programme, so you have to upload a scan of this (signed) document as soon as the additional assignment is determined.
- Certificates: Make sure that you receive certificates for professional development courses, and upload them as a proof of attendance in the specific T&SP element in Hora Finita. It is not possible to upload the certificates within the first two months of your programme, so you have to upload a scan them as soon as you have received them.

Your T&SP is a working document, so in consultation with your supervisors, based on advancing insights, it is possible to adjust your T&SP during your EngD programme.

REGULAR MEETINGS

Plan regular meetings with your daily supervisor and your thesis supervisor. A frequency of at least once per two weeks with your daily supervisor is strongly recommended. **Note that you have to write your supervision frequency in your T&SP.**

[11] See www.utwente.nl/en/educational-systems/about_the_applications/canvas/ for more information about Canvas
[12] See www.utwente.nl/en/educational-systems/about_the_applications/osiris/ for more information about OSIRIS

GRADUATION[13]

At least 8 weeks before the expected graduation, and after you got approval (green light) from your thesis supervisor regarding your draft thesis, you have to arrange the following:

1) Make sure that all courses mentioned in your T&SP - including the capita selecta courses (see page 9) - are listed in Osiris. This requires you to ask your daily supervisor to make a mark sheet of your attended professional development EC's (course code: 201300295) and send it to BOZ;
2) Together with your thesis supervisor, programme director and company supervisor, plan a date for your EngD thesis defense.
3) Make sure that your T&SP is complete and approved in Hora Finita. This includes the copies of professional development certificates, signed approval forms for additional assignments (for upgrading to Post-MSc level), and all the programme requirements (Post-MSc level, design focus, scope, etc.) tabulated and summed;

Only after a positive portfolio assessment in Hora Finita, you can continue with the following steps.

4) At least 5 weeks before the expected graduation, send a filled approval form for graduation (see Appendix VII), signed by your thesis supervisor and the programme director to engd@utwente.nl to request approval by the Dean of TGS. This form must include a list of the graduation committee, including their affiliations and roles in your committee. Make sure that your thesis supervisor has invited an external expert from another research chair or university, as member of the examination committee. **Only after receipt of the form, the diploma procedure can start** (in some occasions this can take about a month).
5) Ask the secretary of your department to book a room at your graduation date for the presentation (max. 45 minutes), a separate room for the interrogation session (for 1,5 hour, this could be the professor's office), and a room where the diploma can be presented publicly (for 0,5 hour).
   Note: the interrogation session itself takes about 45 minutes (and 45 minutes for grading). Make sure that that your public (friends, family, company) is aware of this. You can ask the secretary of the department for a separate room.
6) Make arrangements with the graduation committee on how and when they will receive the final report (at least two weeks before the graduation date) and on how many hard copies are required.
7) Send a PDF of the final thesis to engd@utwente.nl
8) Provide the University Library the electronic version of your EngD thesis[14].

Directly after graduation:

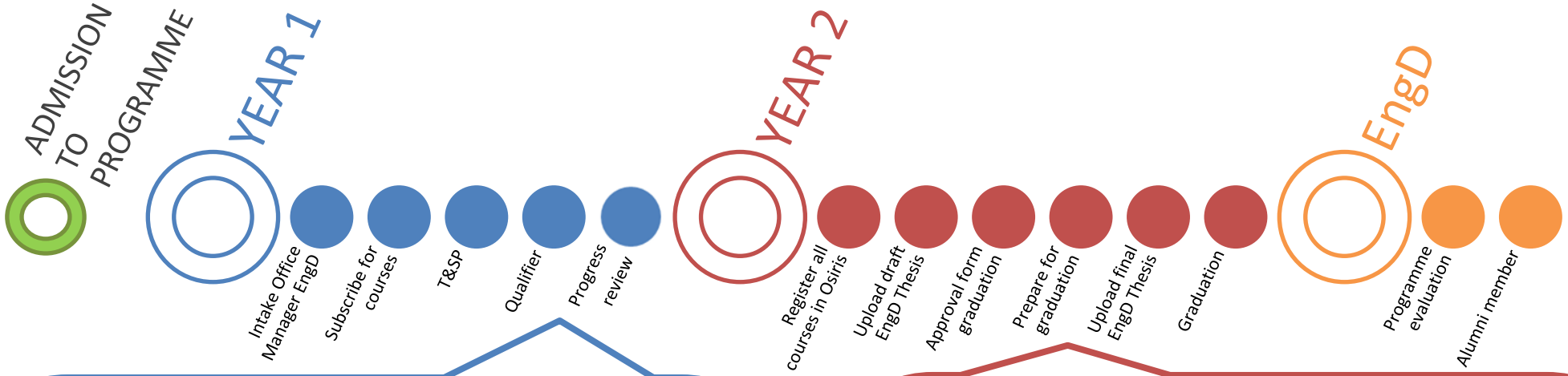
9) Fill in the evaluation form that will be provided by the EngD secretariat and send it back to engd@utwente.nl).

[13] Also see article 17 of the EngD Charter for the formal regulations of the graduation
[14] See https://www.utwente.nl/en/cfm/services-abc/!/product/p885010/theses

Appendix I - Relationship between the final qualifications and separate courses

	Final Qualification: After finishing an EngD degree Robotics, the graduate…									
	1)… h as an overview of all disciplines within the field of Robotics, and masters state-of-the-art knowledge in specific areas of Robotics.	2)… has an overview of related disciplines like economics, environment and safety, and is aware of the relevance of these sub-areas of Robotics in order to apply them within a project.	3) …has an overview of and insight into the possibilities of new emerging technologies in the field of Robotics and construction and is able to develop a roadmap for their implementation in the field.	4)…is able to analyse complex problems, is able to determine connections between multidisciplinary aspects of the design problem and is able to keep an overview of the entire design problem.	5)… is capable to think out-of-the-box and is able to apply creative thinking to design and realise innovative solutions.	6)… has knowledge of design methods, is able to determine which method is best suitable for a certain design problem and is able to apply the correct design method.	7)… is able to analyse constraints and demands of actors (with attention to the complete lifecycle of the design) in order to generate or select solutions that fit within the constraints, is able to make choices that lead to feasible designs and is able to validate the designs	8)… is able to actively participate/give direction to constructive informal team meetings in order to come to innovative solutions (by means of a discussion).	9)… is able to work in a project based setting and within a team, and is able to analyse the causes when a team is not functioning properly.	10)… has a critical attitude towards his short and long term professional development and takes active control of steps to secure this development.
Compulsory Design Project	x	x	x	x	x	x	x	x	x	x
Knowledge – elective courses										
Capita Selecta's	x	x	x	x	x					
Conference visits	x	x	x							
(Post-)Master courses	x	x	x							
Design – compulsory courses										
Systems Design and Engineering for EngD				x	x	x	x	x	x	
Modern Robotics for EngD	x	x	x	x	x	X				
Professional development										
TGS Introductory Workshop										x
Professional Effectiveness								x	x	
Elective professional development courses								x	x	x

Appendix II - Timeline EngD programme



Intake Office Manager EngD
First admission to the faculty is done by the faculty HR through appointment. Secondly, an appointment with the EngD Office Manager and the candidate is planned. This should be within two weeks after admission for the EngD. The Hora Finita system will be introduced to the EngD trainee, and the EngD Office Manager will inform the trainee about his/her programme for the next two years.

Subscribe for courses
In order to prevent for study delay, you can already start subscribing for (compulsory) courses before the T&SP is approved. Registration for courses takes place through the internet on https://canvas.utwente.nl and https://osiris.utwente.nl.

Training & Supervision Plan (T&SP)
The T&SP in Hora Finita contains names of (daily) supervisors, supervision arrangements, the chosen set of courses and what knowledge and skills must be acquired and how this should be done. It should be accepted in Hora Finita within three months after start of the EngD by both the Thesis Supervisor and the EngD BoE. See the EngD study guide for the requirements of your T&SP.

Qualifier and Progress/assessment review
Judgment of work so far and prospect of success finishing the EngD in time; update of T&SP. Between 6-9 months after start, with optional 3 months improvement period (with specified targets). Directly after the Qualifier, the progress/assessment review is held. See the EngD Charter for more information.

At least 8 weeks before the expected graduation, and after you have got approval (green light) from your Thesis Supervisor regarding the draft EngD thesis, you have to arrange the following:

1) **Make sure that all courses, including the professional development and capita selecta courses, are listed in Osiris.** (This requires you to ask your daily supervisor to make a mark sheet of your attended courses and send it to BOZ before you can download your grades from Osiris).
2) Make sure that your **T&SP is complete and approved in Hora Finita**. This includes the copies of professional development certificates, and it should meet all the programme requirements (Post-MSc level, design focus, scope etc.)
3) At least 5 weeks before graduation, **send a copy of the approval form for graduation**, signed by your Thesis Supervisor and the programme director to engd@utwente.nl for the signature of the Dean of TGS.
4) **Prepare for graduation**
5) Make arrangements with the graduation committee on how and when they will receive the final report (at least two weeks before the graduation date) and **send your final thesis to engd@utwente.nl.**
6) **Graduation**
   See the EngD Charter and your study guide for more information about graduation.
7) Fill in the evaluation form that will be provided by the EngD office.

Appendix III - Criteria for assessing the design process of a technological design

1. Organization and planning

Includes: project planning, time management, organizing meetings, reaching milestones

Indicator	Excellent	Good	Fair	Poor	Fail
Project planning	Planning contains milestones, specifications of activities and updates during the project	Planning contains milestones and specifications of activities	Planning contains phases and milestones	Only phasing	No planning
Plan realization	Reaches 90% of the updated milestones, even if there were disturbances during the course of the project	Reaches at least 70% of the updated milestones, even if there were great disturbances during the course of the project	Reaches at least 50% of the updated milestones, even if there were great disturbances during the course of the project	Reaches no more than 40% of the updated milestones	Reaches less than 30% of the updated milestones
Conducting meetings	Prepares a detailed agenda, takes care of supporting documentation, reserves a room and invites stakeholders, prepares detailed minutes of the meeting, follows up the actions agreed during the meeting	Prepares a detailed agenda, takes care of supporting documentation, reserves a room and invites stakeholders, prepares detailed minutes of the meeting	Prepares a detailed agenda, takes care of supporting documentation, reserves a room and invites stakeholders	Prepares a basic agenda, reserves a room and invites stakeholders, but fails in preparing supporting documentation	Is not reliable in preparing meetings: no agenda, room reservations and no invitations to stakeholders

2. Problem analysis and solution

Includes: problem statement, analysis of the context, conducting a literature study, showing creative thinking in searching for a solution.

Indicator	Excellent	Good	Fair	Poor	Fail
Analysis	Problem formulation with motivation and validated assumptions	Problem formulation with motivation and non validated assumptions	Problem formulation with motivation	Only problem formulation	No clear problem formulation
Understanding of impact	Demonstrates understanding of the impact of reaching the project goal on the project environment and beyond	Demonstrates understanding of the impact of reaching the project goal on the project environment	Has tried to understand the impact of reaching the project goal on the project environment	Realises that reaching the project goal may have impact on the project environment	Does not understand the impact of reaching the project goal on the project environment
Creativity	Dares to abandon the well-understood standard methods and creates and applies better ones resulting from exploring several alternatives	Considers abandoning the well-understood standard methods and proposes plausible alternatives	Is familiar with the standard methods, but also explores alternatives	Is somewhat familiar with the standard method and realizes that there may be alternatives	Has difficulties with understanding and applying the standard method
Genericity	The solution is applicable in the entire problem domain and other well-described domains	The solution is applicable for the entire problem domain and beyond	The solution is adequate for the entire problem domain	The solution is only adequate for a subset of the problem domain	The solution is not even adequate for a subset of the problem domain

3. Communication and social skills

Includes: communication with stakeholders, knowledge mobilization, working in teams, giving presentations, keeping a logbook, preparing agenda's for meetings and writing minutes, formulating meeting goals and summarizing the results of the meeting, looking for and using expert knowledge.

Indicator	Excellent	Good	Fair	Poor	Fail
*Reporting (orally and written)**	There is a clear purpose and structure and the reporting is adequate for various audiences	There is a clear purpose and structure and the reporting is adequate for the intended audience	There is a clear purpose and structure	There is a clear purpose	No clear purpose, no structure and no audience awareness
Knowledge management	Actively looks for information sources and proactively shares knowledge	Actively looks for information sources and shares knowledge when asked	Actively looks for information sources, but does not share knowledge	Does not share knowledge, but uses some external knowledge	Is not aware of external knowledge and is not sharing own knowledge
Stakeholder motivation	Shows adequate persuasion and negotiation in communication and is able to manage expectations	Shows adequate persuasion in communication	Shows little persuasion in communication	Has a passive role in the communication	Does not initiate any kind of communication with stakeholders
Atmosphere	Knows how to manage and mitigate conflicts, makes others feel comfortable working with her/him, and actively creates a good atmosphere	Knows how to prevent (potential) conflicts from escalating and makes others feel comfortable working with her/him	Capable of detecting (potential) conflicts and is aware of the level of comfort	Incapable of increasing or improving a feeling of comfort for his/her peers and of detecting (potential) conflicts	Lacks basic social skills and unnecessarily causes conflicts

** Presentations skills is assumed to be covered by 'orally reporting'.*

4. Structure and attitude

Includes: giving stakeholders feedback and receiving feedback from stakeholders, self reflection using a strengths and weaknesses analysis, having a constructive, systematic, creative and critical attitude.

Indicator	Excellent	Good	Fair	Poor	Fail
Structure and consistency	Has conciously chosen among various methods of structuring and consistency in his/her working and reporting	His/her work and reports show explicit and adequate structure and consistency	His/her work and reports show some structure and consistency	Realizes that coherence and consistency are necessary, but is incapable of achieving them	Is not aware of the need of coherence and consistency in his/her working and reporting
Reflection and critical attitude	Consistently demonstrates reflective thinking throughout the design process and the knowledge involved; tends to find and call attention to errors and flaws	Demonstrates reflective thinking in the major part of the design process and the knowledge involved; tends to seek errors and flaws	Occasionally demonstrates reflective thinking in parts of the design process and the knowledge involved; sees errors and flaws when pointed at, and reacts adequately	Lacks reflective thinking on the own design process and the knowledge involved; sees errors and flaws only when pointed at	Takes everything for granted
Independency	Consistently formulates and substantiates a personal opinion and defends it, when necessary going against commonly shared	Consistently formulates and substantiates a personal opinion	Incidently formulates and substantiates a personal opinion	Reluctantly formulates and incompletely substantiates a personal opinion	Has no well-formulated own opinion

Appendix IV - Criteria for assessing the outcome of the design project

The criteria are grouped per aspect. They all have a 5-point scale.

1. Functionality

a. *Satisfaction.* This concerns the extent to which the designed artefact satisfies the requirements. Often the formal requirements develop during the project, based on mere informal initial requirements. In case the requirements are relatively easy to meet, the evaluation team will be stricter in weighing the discrepancies than in case the requirements are very difficult. So in a way the judgment of the evaluation team will evaluate the satisfaction relatively to the difficulty of the problem.

1	2	3	4	5
Poor fit to the requirements	Insufficient fit to the requirements	More or less meets requirements	Meets requirements	Exceeds requirements

b. *Ease of use.* This concerns the ease of use for the stakeholders. The stakeholders are e.g.: end users, operators, engineers is responsible for installation and maintenance of the artefact.

1	2	3	4	5
Very difficult	Difficult	Acceptable	Easy	Very easy

c. *Reusability.* The extent to which the artefact can be used in other situations.

1	2	3	4	5
No reuse	In same context, same scale	In same context, different scale	In different context, same domain	In different domains

Distinguished are the notions of 'scale', 'context' and '(application) domain'. In different disciplines, these notions may have different meanings.

2. Construction

a. *Structuring.* This concerns the partitioning of the artefact in logical or physical *components*. Structuring may use *hierarchy*, which means that subsystems can be considered as components themselves. The 'structuring' is often called the 'architecture' of an artefact. Structuring is important to understand the construction of an artefact and it is used for instance for manufacturing and maintenance. The structuring has four elements: (1) overview, with or without hierarchy, (2) low degree of coupling between components, (3) high cohesion within components, (4) clear interfaces.

1	2	3	4	5
None	1 out of 4	2 out of 4	3 out of 4	All 4

b. *Inventivity.* The measure for originality. One way to express this is by the surprise factor.

1	2	3	4	5
No surprise at all	Surprise for laymen	Surprise for peers	Surprise for professionals	Surprise for supervisors

c. *Convincingness.* This concerns the evidence that the construction will work and has the defined functionality. Distinguished here are several forms of proof. An empirical proof is a statistical argument based either of simulations or on experimentation with a prototype.

1	2	3	4	5
No proof	Informal proof	Empirical proof based on simulation	Empirical proof based on a prototype	Formal and empirical proof

3. Realisability

a. *Technical realisability.* This concerns certainty that it is technically possible to produce the artefact.

1	2	3	4	5
Unknown if it can be produced	Informal arguments	Model-based analysis	Prototype is realised	0-series is produced

b. *Economical realisability.* This concerns the *business case* for the artefact. A business case can be scored in two ways: the analysis is convincing or the outcome such that it is easy to convince stakeholder to invest in it. The next scale combines the two.

1	2	3	4	5
No business case	Accurate estimate of costs	Accurate estimates of costs and revenues	A well-substantiated financing plan	Business case committed by stakeholders

4. Impact

a. *Societal impact.* This concern the influence the artefact will have on societal values such as sustainability or health and well-being.

1	2	3	4	5
Negative impact	No impact	Low positive impact	Moderate positive impact	High positive impact

b. *Risks.* This either may concern the risks of the artefact during development of the artefact or the risks related to the use of the artefact. The analyses of the risks as well as the measures for mitigation are important.

1	2	3	4	5
Risks not analysed	Risks informally analysed	Risks scientifically analysed	Risk mitigation measures taken	Risks scientifically analysed and adequately mitigated

5. Presentation

The presentation includes the documentation of the artefact, but it may also concern a prototype or an animation.

a. *Completeness*

1	2	3	4	5
Very poor	Poor	Marginal	Good	Very good

b. *Correctness*

1	2	3	4	5
Unreliable presentation	Many errors found	Acceptable number of errors	Few errors found	No errors found

Final mark

Six of the twelve criteria concern the kernel of the artefact: the functionality and the construction, while the six others cover other aspects. To reach a final judgment, the scores on the 12 criteria need to be aggregated. This can be done by means of multiplicative weights, which allows expressing differences in relative importance among the criteria. By default, all weights could be taken equal; alternatively, the weights for the criteria 1a … 2c could be made bigger than those for 3a … 5b. Also other motivated choices can be appropriate. In case multiplicative weights are used the motivation to do this should be documented.

Appendix V - Approval Form Post-Master level

In case you have to upgrade a MSc course to a Post-MSc level by means of an additional assignment, you need this cover letter from the lecturer, stating that you have finished the course on a Post-Master level. Please fill in the requested information below, and demand your lecturer and programme director for a signature for approval. After approval, upload this document in Hora Finita (T&SP Element → Proof of attendance)

Name of the student:	
Course:	
MSc Course code:	
Lecturer:	
Description additional assignment ***(including the reason why this assignment is on Post-Master's level)***	

APPROVAL

I hereby declare that the additional (design) assignment on the Master's course in …….. is on a Post-Master's Level:

Trainee's signature	Lecturer's signature	Dr.ir. T.H.J. Vaneker Programme Director

Appendix VI – Graduation Assessment Form

Name trainee: Project Title:	Student number: Course Code: 201300260 EC: EC

Committee members: Dr.ir. T.H.J. Vaneker (programme director) (responsible professor) (daily supervisor) (external examiner)	Professional doctoral programme: ☐ Not graduated ☐ Graduated ☐ Graduated, with distinction Report: ☐ Public ☐ Confidential, until: *(max 5 years)* ……

Signature programme director: …… Signature responsible professor: ……	Date:

GRADUATION CRITERIA

Criteria	What went well / what could be improved
Design Product: • Mastering state-of-the-art knowledge • Insight into the possibilities of new technologies in the field • Quality of Design in relation to requirements, functionality, realisability and innovativeness, • Out-of-the-box thinking • Design validation • EngD Thesis	
Design skills: • Able to analyse complex problems • Able to apply design cycle process • Knowledge of design methods • Self-critical on design results • Able to apply related disciplines such as economics, environment, life cycle and safety • Able to develop give an outlook on the practice • Risk management • Value management • Defense at exam session, answering and understanding of questions	
Professional skills: • Independent, critical, creative • Project meetings (preparation, feedback, leading) • Planning and project management (well defined and regularly updated plan to transform design steps to results) • Critical attitude towards own professional development • Communication with stakeholders, social skills • Presentation skills	

Appendix VII – Approval form for Graduation

Please fill in the requested information below, and ask your thesis supervisor and the programme director for a signature for approval of your professional doctoral thesis and the educational programme.
After approval by your thesis supervisor and the programme director, send a copy of this document to engd@utwente.nl for the approval by the Dean of TGS.

Professional Doctoral candidate		
Name:		
s-number:		
Place of birth:		
Date of birth:		
EngD Programme		
EngD programme:	***Robotics***	
Faculty:		
Title thesis:		
Graduation date:		
Pre-education Professional Doctoral candidate		
Academic Title:		
Discipline:		
Year of graduation:		
Institute/University:		
Graduation committee		
Name including title:	***Affiliation:***	***Role in the committee*:***
1. Dr.ir. T.H.J. Vaneker ***2.*** ***3.*** ***4.*** ***5.*** ***6.***	***University of Twente***	***Programme Director*** ***Thesis Supervisor*** ***Daily Supervisor*** ***External examiner*** ***Company Supervisor***
Signatures		
Thesis Supervisor	***EngD Programme Director***	***Dean TGS***
	Dr.ir. T.H.J. Vaneker	Prof.dr. A. Need

Choose from chair (this is the EngD programme director concerned), thesis supervisor, daily supervisor, company supervisor or expert

Appendix VIII - Links and contacts

USEFUL LINKS	
EngD Charter:	
Hora Finita: https://horafinita.utwente.nl/	
Hora Finita manual: www.utwente.nl/en/education/tgs/currentcandidates/phd/hora-finita/phd/research_phase/	
Course catalogue Osiris: www.utwente.nl/onderwijssystemen/en/about_the_applications/osiris/	
Academic calendar (check the MSc calendar): www.utwente.nl/ces/planning-roosters/en/academic-calendar/calendars/	
Course schedules: https://rooster.utwente.nl/schedule	
Center for Training & Development (Professional Development courses): www.utwente.nl/nl/ctd/	
Canvas: http://canvas.utwente.nl	
EngD intranet:	
International trainees: https://www.utwente.nl/en/education/international-students/	
University of Twente Campus map: https://www.utwente.nl/download/campusmap.pdf	
Library, ICT & Archive: www.utwente.nl/lisa/en/	
CONTACTS	
General questions regarding the EngD programme and Hora Finita	Brenda Kroeze Room: Ravelijn room 5256 Email: engd@utwente.nl Telephone: 053 489 3520
EngD Robotics specific issues	Tom Vaneker Email: t.h.j.vaneker@utwente.nl Telephone: 053 489 2427
Design project issues	Contact your Thesis Supervisor
HR related questions (traveling, housing, salary, contract)	Rita Schoonbeek Email: a.h.schoonbeek@utwente.nl Telephone: 053 489 4994
Osiris issues	Student Services Email: studentservices@utwente.nl
Canvas issues	Alexander Jansen Email: canvas-et@utwente.nl
ICT issues	Email: servicedesk-ict@utwente.nl Telephone: 053 489 5577
Student Affairs Coaching & Counselling (SACC) (for information, advice or support in case you have questions concerning matters that occur during your study)	Email: sacc@utwente.nl Telephone: 053 489 2035

Appendix IX – EngD Thesis template

Cover: see https://www.utwente.nl/nl/intranet/huisstijl/templates/varianten-omslagen.zip

Table of content

Appendix X – The Netherlands Code of Conduct for Academic Practice

This Netherlands Code of Conduct for Academic Practice was drawn up at the request of the Association of Universities in the Netherlands (Vereniging van Universiteiten, VSNU) in 2004. The wish for a Code of Conduct stems from the generally shared conviction that staff members1 at institutions that fulfil a societal role are held to a proper exercise of their duties. Rules governing that correct exercise of duties should be established in writing to provide a shared frame of reference and, if necessary, a basis for calling each other to account.

1) The Code applies to academic practice, which is understood to include scientific and scholarly teaching and research at all universities2 that have declared to uphold this Code. More precisely, the Code is intended for the individual academic practitioner, this being any person who is involved in academic research and teaching under the auspices of a university; this includes students. The Code also applies to those who bear administrative responsibility for academic practice.
2) The Code presumes the autonomous setting in which universities operate, which is a fundamental aspect of academic freedom. It is a university's responsibility to promote this freedom within the framework of its curricula and research programmes.
3) At the same time, the Code presumes that a university is a collaborative venture of diverse parties. This includes academic staff and academic practitioners in training, such as students and PhD students, as well as bodies that commission research and valorisation, such as the government, civil society organisations, businesses, research-funding organisations and users. The integrity of each academic practitioner is an essential condition for maintaining these stakeholders' faith in science and scholarship. Integrity is the foundation of good and reliable academic practice.
4) The Code contains principles that all members of the academic community should observe both individually and vis-à-vis each other and society. These principles can be read as general notions of good academic practice and as a self-regulatory instrument. The overarching principle is that every academic practitioner is bound by the frameworks established by Dutch and international legislation. These legal frameworks are not discussed in this Code of Conduct. A second overarching principle is transparency; every academic practitioner must (be able to) demonstrate how they put these principles into practice.
5) The principles defined in this Code are detailed further in the respective "Elaboration" sections. These elaborations, which provide a set of standards for the conduct of teachers, researchers, students and administrators, reflect the national and international best practices of good academic teaching and research. Under particular circumstances, deviation may be justified. The applicability of the provisions depends on the concrete circumstances under which the academic practitioner operates. Moreover, the circumstances under which the university operates are also subject to change. Nonetheless, every academic practitioner must be able to explain and motivate if – and if so, to what extent and why – they are at variance with the elaborations of the Code of Conduct (the rule of 'apply or explain').
6) The Code contains this preamble, the principles and their associated elaborations, violations of academic integrity, and the universities' prevention policy. It sets out six principles of proper academic practice: Honesty and scrupulousness Reliability Verifiability Impartiality Independence Responsibility
7) All universities and their academic staff will make the necessary efforts to familiarise themselves with the content of this Code. In addition, they will ensure that the Code is discussed within the academic community in order to enhance awareness of what good academic teaching and research entails.
8) Academic practitioners must comply with the Code of Conduct and have a duty to promote the best practices amongst their peers. University administrative bodies are under an obligation to promote and enforce compliance with the Code. Universities have public and binding regulations governing the independent resolution of complaints regarding violations of academic integrity.
9) The authors of this Code of Conduct are well aware that the Code does not address all problems. There are conceivable 'grey areas' and dilemmas in science and scholarship to which this Code is not directly applicable. Researchers are urged to put such cases forward for discussion within the academic community.
10) As the focus of the Code is on describing the conduct expected of academic practitioners, it does not contain complaints procedures. Such procedures are described in institutions' own academic integrity complaints regulations. The institutional complaints regulations and the Landelijk Model Klachtenregeling Wetenschappelijke Integriteit all include an appendix clarifying to which violations of academic integrity the complaints regulations in any case apply. It should be emphasised that a deviation from one of the rules in this Code of Conduct does not necessarily constitute a violation of academic integrity.
11) The Netherlands Code of Conduct for Academic Practice was adopted by the General Board of the Association of Universities (Algemeen Bestuur van de Vereniging van Universiteiten) on 17 December 2004, and came into force as from 1 January 2005. The Code was revised on 25 May 2012, and again on 31 October 2014 in consultation with the Royal Netherlands Academy of Arts and Sciences (KNAW).

PRINCIPLES AND ELABORATIONS

1. HONESTY AND SCRUPULOUSNESS

Principle

Academic practitioners are honest and forthright about their research and its applications. Scientific and scholarly activities are performed scrupulously and should remain unaffected by the pressure to achieve.

Definition

Researchers are called upon to be open and nuanced about margins of uncertainty and other limits on the interpretation and applicability of their own research and that of their fellow practitioners. Communication regarding research results should be dispassionate and realistic. The actions of an academic practitioner are scrupulous when they are performed with the dedication and precision that a proper exercise of the profession requires.

Elaboration

1.1 Academic practitioners know that the ultimate aim of science is to establish facts and they therefore must present the nature and scope of their results with the greatest possible precision. Accordingly, they do not prevaricate about their findings or about attendant uncertainties. Scrupulousness also entails the presentation of doubts and contraindications.

1.2 Every academic practitioner demonstrates respect for the people and animals involved in scientific teaching and research. Research on human subjects is exclusively permitted if the persons concerned have freely given informed consent, the risks are minimal and their privacy is sufficiently safeguarded. Research involving animals is only permitted if the statutory permits have been granted and in conformity with the relevant legislation.

1.3 Accurate source references provide a clear indication of the intellectual provenance of cited and paraphrased text. This also applies to information gathered from the Internet and from anonymous sources. The texts and research results of others are never reproduced without a reference.

1.4 Authorship is acknowledged. Rules common to the academic discipline are observed.

1.5 Academic practitioners do not republish their own previously published work or parts thereof as though it constituted a new contribution to the academic literature. When republishing previously published findings, they indicate this with a correct reference to the source or by another means accepted within the discipline. In many disciplines it is permissible and even customary to reprint short texts from works published with or without co-authors without a source reference when it concerns brief passages of introductory, theoretical or methodological explanation.

1.6 crupulousness is expressed through precision and nuance in academic instruction and research, in publishing research results and in other forms of knowledge transfer.

1.7 Scrupulousness is not restricted to academic research or to reporting on research activities, but also applies to relationships among scientific practitioners, between supervisors and PhD students, between teaching staff and students and with society.

1.8 Good mentorship is essential: students, PhD students and junior staff members occupy hierarchically subordinate positions. The responsibilities of persons involved in teaching and research at the institution are clearly defined and observed at all times.

1.9 Academic practitioners avoid personal relationships that may give rise to reasonable doubts concerning the objectivity of their decisions, or that may result in any form of coercion or exploitation of a hierarchically subordinate person.

1.10 Academic practitioners ensure that they maintain the level of expertise required to exercise their duties. They do not accept duties for which they lack the necessary expertise. If necessary, they actively indicate the limits of their competence.

1.11 Academic practitioners are co-responsible for the quality of the curricula they teach and for the scientific or scholarly and societal value of the research programmes in which they participate. They act according to their own preferences only insofar as these are reconcilable with this responsibility.

2. RELIABILITY

Principle

Every academic practitioner supports and strengthens the fundamental reliability of science and scholarship through their own conduct. Academic practitioners conduct and report on their research and transfer their knowledge through teaching and publishing in a reliable manner.

Definition

Academic practitioners act reliably when they perform their research in a conscientious manner and provide a full account of the research conducted. This ensures that scientific and scholarly research can be traced, verified and re-tested. Reliability applies both to the conduct of academic practitioners and to their written work. Research publications should make mention of the statistical uncertainty of research results and the margins of error.

Elaboration

2.1 Research data have indeed been collected. The statistical methods used are in accordance with the methodological standards for the type of data used. The selective omission of research results is reported and justified..

2.2 Speculation spurred by results of academic research is recognisably presented as such in reports. Conclusions on the basis of the presented results are not speculative in nature.

2.3 Peer and other reviewers do not misuse an author's ideas as formulated in the article under review.

2.4 Academic practitioners provide a complete and honest overview of their skills whenever a decision concerning their career or duties is pending.

2.5 When transferring information to students, the selective representation of available knowledge is either avoided or justified. A clear distinction is made between transferred academic knowledge and personal opinion or related speculation.

3. VERIFIABILITY

Principle

Presented information is verifiable. Whenever research results are published, it is made clear what the data and conclusions are based on, from where they originate and how they can be verified.

Definition

Conduct is verifiable when it is possible for others to assess whether it complies with relevant standards (for instance of quality or reliability).

Elaboration

3.1 Research must be replicable in order to verify its accuracy. The choice of research question, the research set-up, the choice of method and the references to sources used are accurately documented in a form that allows for verification of all steps in the research process.

3.2 The quality of data collection, data input, data storage and data processing is closely guarded. All steps taken must be properly reported and their execution must be properly monitored (lab journals, progress reports, documentation of arrangements and decisions, etc.).

3.3 Raw research data are stored for at least ten years. These data are made available to other academic practitioners upon request, unless legal provisions dictate otherwise.

3.4 Raw research data are archived in such a way that they can be consulted at all times and with a minimum expense of time and effort.

3.5 The source of all educational material, written as well as oral, is stated.

4. IMPARTIALITY

Principle

In their scientific or scholarly activities, academic practitioners are led by no other interest than academic interest, and they are always prepared to account for their actions.

Definition

Academic practitioners are impartial and objective when they do not let personal interest, preference, affections, prejudice or the interests of the commissioning or funding body affect their judgement and decisions.

Elaboration

a. Academic practitioners allow others to take an independent intellectual position on topics. This applies particularly in the case of hierarchical relationships such as the relationship between a teacher and a student or a supervisor and a PhD candidate.
b. The choice of methods and criteria is made solely to establish facts, and is not led by external goals such as commercial success or political influence.
c. A reviewer carefully reflects whether they can offer an impartial assessment of a manuscript, for instance when it concerns a competing research group.
d. In assessing the performance of others (peer review of research and manuscripts), academic practitioners are led by scientific or scholarly arguments, and they refrain from assessing a manuscript if there could be any doubt about the impartiality of their opinion.
e. Academic practitioners only take up and defend a certain scientific or scholarly viewpoint when there are sufficient grounds to support that viewpoint. Competing viewpoints must be mentioned and explained.
f. Academic practitioners avoid exclusively using their own textbooks for courses, in any case at undergraduate level.
g. Every academic practitioner affiliated with a university provides an up-to-date and complete list of their relevant ancillary activities on the university website.
h. In its annual report or on its website, every university explains its procedures for reporting the ancillary activities of staff.

5. INDEPENDENCE

Principle

Academic practitioners operate in a context of academic freedom and independence. Where restriction of that freedom cannot be avoided, this is clearly stated.

Definition

When presenting insights as correct and relevant, academic practitioners are independent when they only allow themselves to be influenced by others' judgements to the degree that such judgements are based on scientific or scholarly authority. They do not allow themselves to be influenced on other grounds.

Elaboration

5.1 Whenever third parties engage an academic practitioner to teach or conduct research, the practitioner is allowed to perform the assignment – within the parameters defined – without interference by the commissioning party. The research question is of a scientific or scholarly interest and should go beyond the commissioner's particular concern. The method employed is scientifically valid. The commissioning party has no influence on the research results.
5.2 Assignments carried out with third-party funding demonstrably contribute to academic teaching and/or research.
5.3 The relationship between the commissioning party and the performing party is always made explicit, for instance where there is a consultancy assignment or other connection. Any possible appearance of a conflict of interest is always avoided, or mentioned in publications.
5.4 The option to publish academic research results is assured. Arrangements with external research funders always stipulate that the academic practitioner is at liberty to publish the results within a specified, reasonable period.
5.5 External funders of scientific and scholarly activities are identified by name. In the case of research activities, this can mean their names are stated in publications or in conference papers presenting the results of sponsored research; in the case of teaching activities this can mean they are referred to in the course announcement and teaching material.

6. RESPONSIBILITY

Principle

Academic practitioners acknowledge their responsibility for the societal implications of their work. They are willing to discuss and explain their choice of research themes.

Definition

Academic practitioners are cognisant of the fact that they receive funds and facilities to conduct academic research and that they are free to make their own research choices, which they explain to the best of their ability.

Elaboration

6.1 Researchers are willing and able to justify their choice of research themes both in advance and in retrospect. Researchers provide a clear and full account of how research funds were used and which choices this involved.

6.2 Academic practitioners allow themselves to be judged on the quality of their output in an honest and loyal fashion, and they cooperate in internal and external assessments of their research.