Study Guide for the Doctoral Students of Technology

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I Licentiate and Doctorate Degrees in the Field of Technology

Postgraduate education is regulated by the Universities Act 558/2009, Act on the Implementation of the Universities Act 559/2009, and Government Decree on University Degrees 794/2004. Some regulations concerning the postgraduate studies are also included in the university regulations and Degree Ordinance of the University of Vaasa (http://www.uwasa.fi/english/studies/degree-and-postgraduate-students/degree-ordinance)

Licentiate and doctorate degrees in Technology and Business Studies can be completed at the Faculty of Technology. More information about the licentiate and doctorate degrees in Business Studies is available in another study guide. In the field of Technology, the postgraduate degrees of the Licentiate of Science in Technology and Doctor of Science in Technology are offered. It is also possible to complete a Doctor of Philosophy degree at the Faculty of Technology.

Postgraduate degrees can be completed in the following fields of Technology:

1) Automation Technology
2) Energy Engineering
3) Electrical Engineering
4) Telecommunication Engineering
5) Computer Science
6) Industrial Management

The Doctor of Philosophy degree can be completed also in other study subjects of the Faculty, if the student is eligible for doctoral studies in the subject, and the Faculty can offer him or her competent and sufficient guidance in the studies.

The aim of postgraduate education is that
1) the student becomes well-versed in his/her own field of research and its social significance and gains knowledge and skills needed to apply scientific research methods independently and critically and to produce new scientific knowledge within his/her field of research;
2) the student becomes conversant with the development, basic problems and research methods of his/her own field of research; and
3) the student gains such knowledge of the general theory of science and of other disciplines relating to his/her own field of research as enables him/her to follow developments in them.

(Government Decree on University Degrees 794/2004, Section 21)

The Doctor of Science in Technology degree consists of doctoral dissertation and scientific doctoral studies. A student accepted to academic postgraduate education may complete a Licentiate degree before the doctorate degree. The Licentiate of Science in Technology degree consists of licentiate thesis and academic doctoral studies.

A study right for the Doctor of Philosophy degree can be granted to a person who is eligible for doctoral studies and who has sufficient knowledge and skills in the major subject. The studies lead directly to the doctoral degree. The Doctor of Philosophy degree consists of academic doctoral studies and doctoral dissertation.
The academic doctoral studies (60 ECTS) consist of studies in the own field of research and in the field supporting the research area, as well as of general scientific studies. The structure of the degree is the same for both the students completing a Doctor of Science in Technology degree and the students completing a Doctor of Philosophy degree. The more detailed regulations concerning the scope, structure, and contents of the academic postgraduate degrees are given in the curriculum of each study subject. The ways for completing the studies are agreed with the supervisor.

The general aim is that the doctoral degree can be completed in four years with full-time study. An academic postgraduate degree gives the graduate an excellent readiness to work both in academic research and teaching tasks as well as in demanding expert tasks and in research.

A list of accepted doctoral dissertations prepared at the Faculty of Technology is available online at www.uwasa.fi/tekniikka/opiskelu/jatkotutkinnot/vaitoskirjat/
The dissertations are displayed also in the hall of the 3rd floor of Fabriikki building.

Starting the Licentiate and Doctoral Studies

Eligibility for Licentiate and Doctoral Studies and Admission Criteria

Eligible for studies leading to an academic postgraduate degree shall be a person who has completed:
1. an applicable higher university degree;
2. an applicable higher polytechnic degree; or
3. an applicable education completed abroad which in the awarding country gives eligibility for corresponding higher education.

Eligible for studies leading to an academic postgraduate degree may also be a person whom the Faculty judges otherwise to have sufficient knowledge and skills for the studies.

The university may require a student admitted to study for an academic postgraduate degree complete the necessary supplementary studies in order to acquire the knowledge and skills needed for the studies. (Universities Act 558/2009, Section 37)

Admission Criteria

A study right for a Licentiate of Science in Technology or Doctor of Science in Technology degree may be granted to an applicant who has completed a higher university degree in Technology or a degree in Technology on an equivalent level, and whom the Faculty judges to have sufficient knowledge and skills for the academic postgraduate studies in the field of Technology. In case of other studies, admission to academic postgraduate education may be granted if the Faculty considers the previous studies to give sufficient skills and knowledge needed for the academic postgraduate studies in the field of Technology. A higher university degree gives eligibility for postgraduate studies in the field of the advanced level studies in the major subject/specialisation option.
Study right for a licentiate or doctorate degree may be granted also to a field different from the major subject of the Master’s degree. In such case, the student shall complete supplementary studies to compensate the advanced level studies in the major subject. The studies are completed in a way determined by the professor responsible for the doctoral studies in the major subject. The supplementary studies shall be included in the personal study plan of the student in a way that the total scope of the degree is not significantly wider. The studies may be included in the study plan of the postgraduate degree in the same way as minor subjects. The Head of the Unit in the major subject gives statement about the applicant’s eligibility for doctoral studies. The statement shall contain a preliminary plan for the scope and contents of the required supplementary studies in the major subject. Based on a suggestion made by the student, the Head of the Unit in the major subject accepts the personal study plan for the doctoral studies including a suggestion about the required supplementary studies.

In the evaluation of the eligibility for doctoral studies, emphasis is put on the grade of the thesis included in the higher university degree, success in the major subject of the degree, and the suitability of the research area to the resources available for supervising the doctoral studies. In addition, emphasis is put in the process on the submitted research and study plan as well as on other areas indicating readiness for research work.

The accepted students are granted a study right for a doctorate degree. A student accepted to studies leading to a Doctor of Science in Technology degree may complete a Licentiate of Science in Technology degree after completing the studies required for the licentiate degree and submitting an acceptable licentiate thesis.

**Applicants with Master of Science in Technology degrees**

The prerequisite for the major subject of the academic postgraduate studies is that the advanced level studies of the higher university degree in the field of Technology have been completed with at least the grade Good or the applicant has otherwise equivalent and sufficient skills and knowledge needed for the studies. If the prerequisites are not met, they can be supplemented (for example, by taking examinations of the courses included in the basic degrees or improving the grades of the previously completed courses). The supplementation or compensation of the advanced level studies in the subject is decided by the professor responsible for the respective subject. The study plan for the doctoral studies shall include a record of the supplementary studies. The supplementary studies shall be completed in the beginning of the study period. The supplementary studies are not included in the doctorate degree, i.e. they shall be added to the degree requirements.

**Applicants with some other degrees than Master of Science in Technology**

Applicants with some other degree than a higher university degree in the field of Technology may apply for admission to the doctoral studies leading either to a Doctor of Philosophy or a Doctor of Science in Technology degree. However, if an applicant with some other degree than a higher university degree in Technology would like to complete a Doctor of Science in Technology degree, he or she shall supplement the previous studies with studies in mathematics, physics, and other basic engineering subjects as well as studies in the major subject of the doctoral studies in case he or she has not previously completed advanced level studies in it. The scope of the supplementary studies in Technology shall be at least 35 ECTS, and they shall contain studies in mathematics, physics,
computer science, and in the other basic engineering subjects. The required courses are planned in a way that they also support the research area of the degree in the best possible way. The statement about the eligibility for doctoral studies given by the Head of the Unit shall outline a preliminary plan for the scope of the required supplementary studies in the major subject if the applicant has not previously completed advanced level studies in the major to which the application is submitted. The statement shall also take a stand to the complementary studies required from the applicant.

Applicants with general eligibility for doctoral studies and sufficient knowledge in the major subject are eligible for the Doctor of Philosophy degree. The basic engineering studies are not required as part of the Doctor of Philosophy degree. A student admitted to the studies leading to a Doctor of Philosophy degree is not entitled to complete a Licentiate of Philosophy degree.

Applying for the Study Right

It is recommended that a person planning to apply for admission to the doctoral studies contacts the professor of the major subject to agree e.g. on the theme for research and the preparation of the research plan already before submitting the application to the University.

Application for admission to the doctoral studies in submitted in writing to the Faculty. Application forms are available online at http://www.uwasa.fi/tekniikka/english/studies/doc/.

The application for doctoral studies shall clearly state the completed higher university degree and its major subject or other education presented as the basis for the doctoral studies. The following documents shall be enclosed in the application:

1. a certified copy of the degree certificate,
2. a preliminary personal study plan for the doctoral studies, and
3. a preliminary research plan.

Applicants who have completed their previous studies outside Finland shall enclose a transcript of records and a reliable proof of language proficiency to the application in addition to the documents listed above. More detailed instructions for the applicants are available online at http://www.uwasa.fi/english/admissions/admission/doctoral/.

In addition to the evaluation of the eligibility for doctoral studies, the study and research plan submitted by the applicant and the resources available for the supervision and organizing of the doctoral studies by the unit/study subject are taken into consideration in the selection process of the doctoral students.

Research Plan and Study Plan for the Doctoral Studies

The application for admission to the doctoral studies must contain both a preliminary research and study plan. A form for the study plan is available at http://www.uwasa.fi/tekniikka/english/studies/doc/.
The personal study plan shall describe the studies included in the doctorate degree and a preliminary schedule for completing the studies. The degree requirements of the major subject are to be followed when making the personal study plan.

The study plan for the doctoral studies shall be updated and specified with the supervisor at least once a year. The meetings should ensure that the progress in both the studies and the research is good and continuous. If the student would like to make significant changes to the original study plan, they shall be discussed with and approved by the supervisor, and the study administration shall be informed of the changes. The final study plan for the doctoral studies shall be submitted for the acceptance of the Head of the Unit before the licentiate thesis or doctoral dissertation is submitted for final examination.

For more information about the contents of the doctoral studies, please contact the professors of the major subjects. Their contact information is available at http://www.uwasa.fi/tekniikka/english/.

In case of Finnish applicants, the application for doctoral studies is submitted to the following address:
Vaasan yliopisto, Ulla Laakkonen, PL 700, 65101 VAASA.

In case of international applicants, the application for doctoral studies is submitted to the following address:
University of Vaasa, International Office / Doctoral Students, P.O.Box 700, FI-65101 Vaasa, Finland.

**Granting of the Study Right and Registration**

The study right for doctoral studies is granted by the Dean. The granting of the study right for doctoral studies requires that the Head of the Unit of the major subject recommends that the study right is granted, and accepts the personal study plan and research plan, as well as appoints the primary supervisor and the secondary supervisor, if necessary, for the doctoral studies.

The statement should also specify which studies shall be completed to supplement the skills and knowledge needed for starting the doctoral studies if the applicant does not meet some of the admission criteria.

The study right is granted for the studies leading to a Doctor of Science in Technology degree. A student admitted to academic postgraduate education may complete a Licentiate of Science in Technology degree when he or she has completed the set amount of studies required for the degree by the University.

The study right for the doctorate degree shall begin in the beginning of the following month of the acceptance.

The applicants are informed personally in writing about the acceptance to doctoral studies. Also the unsuccessful applicants are informed about the result and the reasons for rejection. An applicant dissatisfied with the result may apply in writing to the Dean for rectification within 14 days of the day when the admission results were released.
Registration

A registration form is sent to the accepted doctoral students, and the form shall be used to register as a student of the University. After this, the students are responsible for registering as attending or non-attending each academic year in order to maintain the right to study. Registration may be done electronically in WebOodi or by contacting the Academic Affairs office (contact information: +358 (0)6 324 8100 or kanslia@uwasa.fi). The Academic Affairs office is located in Luotsi building, address: Wolffintie 34.

Only the students who have registered as attending may attend lectures and other teaching and complete studies at the University. When the research is submitted for examination and during the whole examination process, the student must be registered as attending.

If a student fails to register as attending or non-attending, he or she is removed from the student register. In this case, the student is not allowed to complete studies at the University. The Academic Affairs office should be contacted to reactivate the study right and to put the student back to the student register.

The student union membership is voluntary for the doctoral students. Doctoral students are not entitled to discounts on travelling tickets or to subsidised meals.

Guidance for Doctoral Studies and Plan for the Supervision of Doctoral Studies

The licentiate thesis or doctoral dissertation is written under the supervision of the appointed supervisor. The primary supervisor is appointed when the study right is granted and the applicant accepted as a student. Also other supervisors may be appointed for the doctoral student. At least one of the supervisors shall be a professor of the Faculty.

Guidance and supervision form an important part of the doctoral studies. Each and every student has the right to receive guidance from the beginning to the end of their research work and doctoral studies. The doctoral student and the supervisor should agree in the very beginning of the studies about the general principles of the guidance and supervision, and prepare a Plan for the Supervision of Doctoral Studies (http://www.uwasa.fi/tekniikka/english/studies/doc/).

The tasks of the supervisor are, for example, to guide the student in preparing and updating the study plan for doctoral studies; and give guidance related to planning and completing the research work. The supervisor should assist and support the student in his or her applications for research financing. The supervisor should also read through the research texts produced by the student and give comments, as well as encourage the student to take own initiative and work independently. The supervisor should help the student to connect with other researchers of the field in Finland and abroad, and encourage the student to take part also in international conferences and possibly to work for a certain period of time abroad.

The doctoral students shall commit themselves to completing the studies. They shall report the progress in studies to their supervisor regularly at least once a year. They shall
also submit research texts to the supervisor, and keep the supervisor informed of the plans for financing the research. The doctoral student shall take part in seminars, meetings of researchers and conferences, and also try to conduct the research abroad. He or she shall take responsibility for the research work and studies actively and try to follow the agreed timetable without endangering the quality of the work.

In some stage of the doctoral studies, it is possible that the supervisor is replaced with another supervisor (e.g. if the research area changes significantly, or if there are changes in the personnel). In this case, the Head of the Unit of the major subject appoints a new supervisor or supervisors for the studies, and a new Plan for the Supervision of Doctoral Studies is made with the student. The Head of the Unit is responsible for submitting information about the changes to the study administration.

**Good Scientific Practice and Research Ethics**

It is very important that the doctoral students adopt and understand the good scientific practice in general and particularly in their own field of research. The agreed scientific principles and values shall be followed when conducting the research. The University of Vaasa has accepted the guidelines for good scientific practice and procedures for handling misconduct and fraud in science made by the National Advisory Board on Research Ethics to support the work of the researchers (http://www.tenk.fi/ENG/HTK/index.htm). The matters related to research ethics are more thoroughly covered at the website of the National Advisory Board on Research Ethics (http://www.tenk.fi/ENG/function.htm). For example, the Doctoral Forum arranges training in research ethics. The ethical guidelines of the University of Vaasa are available online at www.uwasa.fi/opiskelu/oikeudet_velvollisuudet/ (in Finnish).

**Doctoral Forum**

Doctoral Forum offers students support in the doctoral studies at the University of Vaasa. The Doctoral Forum offers general scientific training and methodology training for doctoral students. The purpose of Doctoral Forum is to supplement the courses offered by the Faculties and national graduate schools. Emphasis is put especially on the themes dealing with the philosophy of science and methodology which are relevant in the beginning of the studies. After this, each doctoral student may deepen their methodological skills in their own research area and acquire more information about the courses offered by the Faculties and the national graduate schools.

The web pages of Doctoral Forum contain information about the current courses, places available in the national graduate schools, and other news related to doctoral studies. In addition, the pages contain useful information about the progress in doctoral studies and other important matters related to different stages of the studies. For more information, please visit http://www.uwasa.fi/tutkimuspalvelut/english/df/.

**Financing the Doctoral Studies**
The methods for financing the doctoral studies should be planned already in the beginning of the studies. There are several options for financing full-time doctoral studies: For example, doctoral student positions in graduate schools, universities, and projects; personal scholarships; and student financial aid. Persons working outside the University may complete the doctoral studies part-time aside their work.

The aim of the Faculty is that the researchers working under contract for the University do their work primarily in the premises reserved for the study subject. Some of the researchers may also be placed in the research premises of Tritonia. If possible, a room in the academic community will be offered to the students preparing their doctoral dissertation with a scholarship.

In accordance with the Rector’s Decision, an agreement shall be made at the University of Vaasa between the Faculty and the researcher if a place to work in the University premises is offered to a researcher receiving a scholarship. The agreement shall specify the equipment and services available for the researcher, and clarify the status and responsibilities of the researcher.

Scholarships

Some of the options for financing the studies available only for the researchers of the University of Vaasa are the doctoral student positions and separate scholarships available for doctoral students preparing their doctoral dissertations, and scholarships for post-doctoral researchers. Information about the scholarships of the University of Vaasa is available at www.uwasa.fi/tutkimuspalvelut/tutkimusrahoitus/vyrahoitus/.

The sources for outside research funding include, for example, companies, communities, foundations, ministries, Academy of Finland, Tekes, EU, and other Finnish or international organisations. For more information about these options, please visit http://www.uwasa.fi/tutkimuspalvelut/english/.

Graduate Schools

Doctoral student positions (in doctoral programmes) require full-time studies. Graduate schools have a certain intake, and they select students based on the submitted applications. A list of the graduate schools or similar, in which the Faculty takes part, is available online (www.uwasa.fi/tekniikka/opiskelu/jatkotutkinnot, in Finnish).

Student Financial Aid and Adult Education Subsidy

Student financial aid (study grants, housing supplements, government guarantees for student loans) by Kela or adult education subsidy by the Education Fund may be granted for doctoral studies.

Additional information:
- University of Vaasa / student financial aid: +358 (0)6 3248 236 or +358 (0)6 3248 634, opintotuki@uwasa.fi
Tritonia Academic Library

The library organises courses of information search and library services during the academic year. Information about the opening hours, borrowing, interlibrary loans and universal borrowing, info services, databases and collections, user education etc. is available at the library’s website at http://www.tritonia.fi.

Studies Abroad

Participation in international seminars and conferences and in the activities of international scientific communities forms an essential part of the doctoral education. Additional information about the possibilities for studying abroad is available at:

- Research and Innovation Services:
  http://www.uwasa.fi/tutkimuspalvelut/english/exchange/
- International Exchange Coordinator: outgoing.international@uwasa.fi

The Department of Traineeships and Postgraduate Studies in the Center for International Mobility CIMO administers several scholarship programmes and offers support services for the international training or doctoral studies of the Finnish university students and teachers abroad, as well as for the international students and teachers in Finland. The geographical scope of the programmes is extensive, and the role of the countries outside the European Union in the cooperation is significant.
The target degree of the postgraduate education is a Doctor of Science in Technology degree. A Licentiate of Science in Technology degree may be completed before the doctorate degree. It is also possible to complete a Doctor of Philosophy degree at the Faculty. In case of the latter degree, the regulations concerning the completion of a Doctor of Science in Technology degree apply. The scope of the Licentiate of Science in Technology degree is equivalent to two years of full-time study, and the scope of the Doctor of Science in Technology to 3–4 years of full-time study. The doctorate degree may be completed directly after the higher university degree or equivalent without completing the licentiate degree first.

The basic structure of postgraduate degrees is presented in the figure below. A postgraduate degree consists of theoretical studies and research work. The scope of the theoretical studies in the Licentiate and Doctor of Science in Technology degree is 60 ECTS. If the theoretical studies have been completed already as part of the licentiate degree, the doctoral studies consist only of the doctoral dissertation and the possible supplementary studies (if the doctorate degree is completed in a different field of study).

The theoretical studies comprise studies in the field of the research and studies supporting the research field, as well as general scientific studies. At least half of the studies included in the postgraduate degree should be doctoral level studies (more detailed instructions available in the curricula of the study subjects).

The scope of the studies in the field of the research (major subject) is 30–40 ECTS, the scope of the studies supporting the research field (minor subject) is 15–20 ECTS, and the scope of the general scientific studies is 5–15 ECTS.

The objective of the studies in the field of the research is to familiarise the student to a certain research area more thoroughly and widely than in the basic education. The pur-
pose of the studies supporting the research field is to familiarise the student with at least one subject or area supporting the research work. The general scientific studies should support the research and generate general skills and knowledge for scientific work. The studies may consist of courses in, for example, research methodology or the philosophy or history of science. The Faculty recommends that the general scientific studies are selected from the courses offered by the Doctoral Forum of the University of Vaasa (for more information about the courses, please visit http://www.uwasa.fi/tutkimuspalvelut/english/df/). The supervisor shall see to that the selected courses support the whole degree and the attendance is therefore recommendable. Language studies are not accepted as part of the general scientific studies.

Also the kind of doctoral level courses which have been completed before finishing the basic degree but not included in the degree can be accepted to the postgraduate degree. Also some doctoral level courses completed in other universities can be included in the postgraduate degree. The studies supporting the research area (minor subject) may be taken completely outside the home university. More detailed instructions about the studies are available in the curricula of the postgraduate degrees. A majority of the theoretical studies included in the postgraduate degree should be completed by the time the licentiate thesis or doctoral dissertation is submitted for examination.

The most important part of the postgraduate degree is the research work which is done under the supervision of the appointed supervisor. A licentiate thesis is included in the licentiate degree. A student shall prepare and publish a doctoral dissertation to complete a doctorate degree.

**Licentiate Thesis**

The licentiate thesis should show that the student is conversant with the theories in the relevant field of research and is able to apply the scientific methods to the work independently and critically. A licentiate thesis may be either a one single research (monograph) or several scientific publications or manuscripts accepted for publication with a relevant subject matter and a summary of the publications (article-based licentiate thesis). At least three separate articles or other scientific publications must be submitted in case of the latter option. The summary must present the objective, methods, and results of the research. The publications may also include joint publications if the contribution of the doctoral candidate to the work can be clearly indicated and the contribution presented in a separate statement which is enclosed in the work.

**Five** complete copies of the work that is intended to be a licentiate thesis shall be submitted to the Faculty for examination. More information about the layout of the thesis is available in the writing guidelines of the Faculty (http://www.uwasa.fi/tekniikka/english/studies/doc/). A separate abstract shall be enclosed in the research. Before submitting the work, the student shall check from the supervisor that the research is ready to be examined.

Based on the statement by the supervisor and the Head of the Unit, the Dean appoints at least two examiners for the research. At least one of the examiners shall come from outside the Faculty/University. The examiners shall have a doctorate degree or other similar academic qualification. Provisions on disqualification applied also to the examiners are enacted in the Administrative Procedure Act (434/2003, Sections 27–30).
Iners have been appointed, the supervisor of the licentiate thesis agrees with the student and the examiners on the timing of the examination event and other practical matters related to the examination.

The research is presented in public in the seminar of the relevant study subject. Because of the public presentation of the licentiate thesis, the thesis shall be displayed in public for at least 10 days before the presentation of the work. The licentiate thesis shall be saved electronically in PDF format to the library database for public availability. In addition, the research shall be submitted in 10 copies to the University’s Information Desk. If the licentiate thesis is not publicly available online, 20 copies of the work shall be submitted to the Information Desk.

The examiners shall give a justified written statement about the licentiate thesis within 30 days of the public presentation. The statement shall contain a suggestion for the grade of the licentiate thesis. The following grading scale is used in the assessment of the thesis: Fail, Pass, Pass with Distinction.

The licentiate candidate is reserved the right to submit a plea to the statement made by the examiners.

The decision about the acceptance and grading of the licentiate thesis is made by the Dean on the basis of the examiners’ written statement.

The researcher may apply to the Degree Committee of the University of Vaasa for rectification of the assessment within 14 days of the day when the decision was served.

**Doctoral Dissertation**

For a doctorate degree, the candidate shall complete the required doctoral studies, take an independent and critical approach to the research field, as well as prepare a doctoral dissertation and defend it in public.

The doctoral dissertation shall be a research based on independent scientific work and it shall be examined in the public defence of a doctoral dissertation. A doctoral dissertation may be either a monograph or a so-called article-based doctoral dissertation.

*An article-based doctoral dissertation* consists of at least three scientific publications or manuscripts accepted for publication with a relevant subject matter, and of their summary. The articles and the summary shall form such an entity that can be defended in public as a doctoral dissertation. The summary shall present the objectives, methods and results of the research. The summary may also contain new results and discussion not included in the original articles. The articles constitute the material for the summary, and the material shall be commented, supplemented, and evaluated from the perspective of the situation when the summary is written. In the conclusions, a more thorough analysis of the topic may be given through the results of the articles. The aim is to create a summary section which is more than merely a repetition of the included articles.
The publications may include joint publications if the independent contribution of the doctoral candidate can be clearly indicated in them. A written explanation of the candidate’s contribution to the joint publications shall be enclosed in the doctoral dissertation.

The doctoral dissertation shall be written in Finnish, Swedish or English, or in some other language with the consent of the Faculty. The language used in the manuscript shall be the same as in the final doctoral dissertation. An abstract both in Finnish and in the language used in the publication shall always be enclosed in the doctoral dissertation. If the doctoral dissertation is written in Finnish, the abstract shall be in English. If the doctoral dissertation is written in some other language than that of the candidate’s mother tongue, it is recommended that the dissertation is submitted for language revision before submitting it to the examination. The language check should be agreed with the supervisor well beforehand. The supervisor will give more instructions about how to conduct the language check and how to cover the related costs.

Pre-examination of Doctoral Dissertation

The doctoral dissertation may be submitted for official pre-examination when the supervisor of the dissertation gives permission to start the pre-examination process. Permission for the public defence of a doctoral dissertation is granted on the basis of the statements by pre-examiners, and the research cannot be taken to the public defence unless the permission has been granted.

Three copies of the work that is intended to be a doctoral dissertation shall be submitted to the Faculty (e.g. in a folder). The layout of the submitted work shall be carefully checked and the language fluent and without mistakes when submitted to the Faculty for pre-examination.

The Faculty Board appoints at least two pre-examiners for the work intended to be a doctoral dissertation based on the statements by the supervisor and the Head of the Unit. The pre-examiners shall come from outside the university. The pre-examiners shall have the qualifications of a professor or docent, or have a doctorate degree and expertise in the field of the dissertation. The supervisor of the dissertation may not act as a pre-examiner. Provisions on disqualification are enacted in Administrative Procedure Act (434/2003, Sections 27–28). Doctoral candidate is reserved the right to give a statement about the possible disqualification of the pre-examiners before the decision is made by the Faculty Board.

The majority of doctoral studies described in the curriculum shall be completed and saved to the student register before the pre-examination process may be started.

Task of the Pre-examiners

It is the task of the pre-examiners to clarify in their statement if the work intended to be a doctoral dissertation meets the general quality requirements. Attention is paid especially to the following factors:

1. The work intended to be a doctoral dissertation shall present new scientific results in the field of the research.
2. The methods used in the research shall meet the requirements set for a scientific work.
3. The doctoral candidate shall present the results and arguments clearly and in a way that also in other ways meets the scientific requirements.

The pre-examination statement of an article-based doctoral dissertation shall contain an evaluation of the articles and summary, and evaluate whether they form such an entity that can be defended in public as a doctoral dissertation. Even if the articles have been published in scientific publications and they have been evaluated in the publication process, the contents of the articles shall also be evaluated in the pre-examination statements. Judging the whole work, the scientific value of the article-based doctoral dissertation must be the same as that required of a regular doctoral dissertation.

The pre-examiners shall give their statements no later than within three months of the day the official request for statements was received. For justified reasons, the Faculty may grant additional time for the pre-examiners’ work.

In their statements, the pre-examiners may suggest corrections and improvements to the work intended to be a doctoral dissertation. However, the statements cannot be conditional. The pre-examiners either suggest that the permission for public defence of a doctoral dissertation is granted or they suggest that the permission is denied. The pre-examiners may also prepare their statement together.

If necessary, a pre-examiner may discuss the need to revise some parts of the doctoral dissertation with the doctoral student or the supervisor of the work. As a deadline has been set for the pre-examination, the pre-examiner shall not start to act as a supervisor or instructor for the work. The statement shall be given of the work submitted officially for pre-examination, and not of the possible versions of the dissertation corrected during the pre-examination process. If a need for corrections arises, the pre-examiner shall suggest additions, corrections, omissions etc. to the doctoral dissertation (monograph) or the summary (article-based doctoral dissertation) in his or her statement. In the end of his or her statement, the pre-examiner shall clearly express their opinion about granting the permission for the public defence of a doctoral dissertation. The pre-examination statement shall be submitted to the Faculty of Technology. The pre-examiner may submit only minor, stylistic corrections directly to the doctoral candidate, but this shall also be mentioned in the statement.

The statements given to the Faculty by the pre-examiners shall be submitted to the doctoral candidate. The doctoral candidate is reserved the right to make a plea to the pre-examiners’ statements. The Faculty Board shall make a decision about granting the permission for the public defence of doctoral dissertation on the basis of the pre-examination statements.

Unfavourable Pre-examination Statement

An unfavourable pre-examination statement usually leads to the discontinuation of the pre-examination process upon the request of the doctoral candidate. If the pre-examination procedure is cancelled or the Faculty Board does not grant the permission for the public defence of a doctoral dissertation, the doctoral candidate may ask for a new pre-examination once the corrections suggested in the unfavourable statement or other
corrections have been made, and the supervisor of the work is in favour of starting the process again.

**Publishing the Doctoral Dissertation**

The doctoral dissertation shall be put in public display, i.e. “nailed”, at least 10 days before the public defence of the doctoral dissertation. The timing of the nailing is agreed with the doctoral candidate, Custos, and Dean. The doctoral dissertation is displayed in public for the period of at least 10 days before the public defence.

If the doctoral candidate would like to publish the research in the scientific publication series of the University of Vaasa, the candidate shall request in writing to the Publication Committee for permission to publish the research in the Acta Wasaensia series. Publication Secretary Tarja Salo (+358 6 324 8217) gives further information about publishing the doctoral dissertation in the series. Publication guidelines are available at [http://www.uwasa.fi/english/research/publications/brief/](http://www.uwasa.fi/english/research/publications/brief/). The publication process is faster if the research is made according to the university guidelines from the very beginning. It should be noted that at least *six weeks* must be reserved for the printing process and public display of the print-ready manuscript.

A separate title page shall be enclosed in the doctoral dissertation. The page shall contain information about the time and place of the public defence of doctoral dissertation, as well as state that the dissertation is suggested to be examined in public under the permission of the Faculty of Technology. The title page is prepared by the Publication Secretary.

The doctoral candidate shall submit his or her dissertation to the Rector of the University and the Dean of the Faculty at least 10 days before the public defence of a doctoral dissertation.

The research and its central results will be made available to the general public by publishing a dissertation announcement. The doctoral candidate shall submit a dissertation announcement and a photograph at least two weeks before the public defence of the doctoral dissertation to the Communications unit of the University (viestinta@uwasa.fi). The announcement and the photo will be published in the newspapers, university web pages, and in the university journal. More instructions for the announcement are available at the web pages of Doctoral Forum at [http://www.uwasa.fi/tutkimuspalvelut/tohtorifoorumi/prosessi/tiedotus/announcement.html](http://www.uwasa.fi/tutkimuspalvelut/tohtorifoorumi/prosessi/tiedotus/announcement.html).

**Examination of the Dissertation; Opponent(s), Custos, and Grading Committee**

The Faculty Board appoints one or two Opponents to examine the doctoral dissertation and a professor or docent of the University to be the Custos in the dissertation proceedings. As regards the disqualification of the Opponent, the Administrative Procedure Act (434/2003, Sections 27–28) is applied. The Opponent shall have the qualification of a Docent or other similar academic qualification. The doctoral candidate is reserved the right to give a statement about the possible disqualification of the Opponent before the decision is made by the Faculty Board.
The Faculty Board appoints a Grading Committee to accept the doctoral dissertation and to suggest a grade for it. The Grading Committee makes a suggestion about the acceptance and grading of the dissertation. The final decision is made by the Dean of the Faculty. The Grading Committee consists of the Opponent/Opponents, Custos, and a representative of the Faculty. The supervisor of the doctoral dissertation only has a right to speak in the committee and cannot take part in the other activities of the committee. In addition, 1–2 outside members may be appointed to the committee if they have adequate academic expertise in the field of the doctoral dissertation. The Custos convenes the committee, and the committee selects a chairperson among the members who are entitled to vote. The supervisor of the work has always the right to attend the meetings of the committee and has a right to speak in the meetings.

The doctoral candidate is reserved the right to make a statement about the composition of the Grading Committee.

The supervisor of the work is usually appointed as the Custos. The Custos is the host of the Opponent, and acts as a chairperson and a supervisor in the dissertation proceedings. It is also the task of the Custos to introduce the Faculty’s regulations, instructions, and grading scale applied to the evaluation process of the dissertation to the Opponent.

The Opponent appointed by the Faculty Board shall submit a written statement about the doctoral dissertation within 30 days of the public defence of the doctoral dissertation. The statement shall contain a justified evaluation of the scientific value of the dissertation and also an evaluation of the work as regards it fulfilling its purpose as a research. The statement shall also include justified evaluation of the public defence of the dissertation. The Opponent shall also suggest a grade to the dissertation.

The doctoral candidate is reserved the right to make a plea to the Opponent’s statement.

The Grading Committee shall give their statement within 30 days of the public defence of the doctoral dissertation. The chair of the Grading Committee prepares a record which contains the suggested grade and short comments about the public defence.

The Dean makes the final decision about the acceptance or failing of the doctoral dissertation and the grade of the accepted doctoral thesis. The following grading scale is used in the evaluation of doctoral dissertations: fail, pass, pass with distinction.

A doctoral candidate dissatisfied with the assessment of the doctoral dissertation may apply to the Degree Committee of the University in writing for rectification of the assessment of the doctoral dissertation within 14 days of the day when the decision was served.

**Arrangements for the Public Defence of a Doctoral Dissertation**

The public defence of a doctoral dissertation is a public event arranged by the Faculty. The academic traditions explained more thoroughly in www-page (http://www.uwasa.fi/tutkimuspalvelut/tohtorifoorumi/prosessi/dissertation.html) shall be followed in the dissertation proceedings.
After the permission for the public defence of a doctoral dissertation has been granted, the doctoral candidate should discuss the timing of the public defence with the Custos and Opponent. The Dean makes the official decision about the public defence on behalf of the Faculty, and therefore it is recommended that the doctoral candidate also discusses the matter with the Dean.

The doctoral candidate shall be actively involved in the preparations of the public defence. The personnel of the Faculty will help e.g. by booking a room for the public defence and ordering flowers and refreshments to the room. The Faculty personnel may also book the trips and accommodation for the Opponent, if necessary. The doctoral candidate is responsible for the arrangements for the coffee usually served after the public defence. For example coffee and cake may be served after the public defence.

It is recommended that attention is paid to the possible room of the public defence already when agreeing on the timetable. The University of Vaasa has two halls which suit the purpose well. These are the auditorium Kurtén (approximately 100 persons, in Tervahovi) and the auditorium Nissi (approximately 90 persons, in Tritonia). Suitable locations for the possible coffee are, for example, the restaurant Mathilda, restaurant Alma, or the hall of Tritonia.

In accordance with the academic traditions, a post-doctoral party Karonkka in honour of the Opponent shall be organised in the evening after the public defence. In addition to the Opponent and Custos, the doctoral candidate usually invites also relatives, friends, and colleagues to the Karonkka party. The doctoral candidate is responsible for booking the room for the Karonkka party and for other arrangements.

Dissertation Process

1. A manuscript of the work intended to be a doctoral dissertation is submitted to the Faculty
2. Faculty Board appoints pre-examiners for the work
3. Pre-examiners submit their statements to the Faculty
4. The pre-examination statements are submitted to the doctoral candidate and the supervisor
5. Faculty Board decides on the permission for the public defence of a doctoral dissertation
6. Faculty Board appoints an Opponent / Opponents and Custos to the public defence
7. Faculty Board appoints a Grading Committee
8. Publication process of the doctoral dissertation is started
9. Date and time are agreed for the public defence
10. Doctoral dissertation is displayed in public, i.e. nailed at least 10 days before the public defence
11. Announcement of the public defence is published
12. Public defence of a doctoral dissertation
13. Opponent submits his or her statement to the Faculty
14. The Opponent’s statement is submitted to the doctoral candidate
15. Grading Committee submits a statement to the Faculty
16. The statement by the Grading Committee is submitted to the doctoral candidate
17. Doctoral candidate is reserved the right to make a plea to the Opponent’s statement
18. Dean decides on the acceptance of the doctoral dissertation and its grade

The official instructions of the University for the public defence of a doctoral dissertation and “a checklist” are available on page (http://www.uwasa.fi/tutkimuspalvelut/tohtorifoorumi/prosessi/dissertation.html).

Degree Certificate

When the student has completed all the required studies for the licentiate or doctorate degree, he or she must apply for a degree certificate to the Faculty. The Faculty awards degree certificates once a month, excluding July. The application for degree certificate shall be submitted to the Faculty at least 4 weeks before the intended graduation day. The form is available online at http://www.uwasa.fi/tekniikka/english/studies/forms/.

In addition to the degree certificate, a Diploma Supplement intended particularly for international use shall be given to the graduates. An academic title in English shall be awarded for a degree completed in some other language than Finnish or Swedish in accordance with the appendix of the Decree 794/2004.

The degree certificate of a Doctor states the previous degree of the student, the title of the doctoral dissertation, grade of the dissertation, as well as the discipline of the dissertation. If the Doctor of Science in Technology degree is completed without the licentiate degree, also the grade of the major subject (excellent, very good, good, satisfactory, sufficient) is stated in the degree certificate.

In the degree certificate of a licentiate degree, the title of the licentiate thesis and its grade will be stated. In addition, the certificate will state the major and minor subject and other possible study modules as well as their grades.

For general guidance related to licentiate and doctorate degrees, please contact Amanuensis Ulla Laakkonen, contact information: +358 (0)6 324 8903, ulla.laakkonen@uwasa.fi.
The Faculty shall accept the curricula of the licentiate and doctorate degrees. The curricula shall contain information about the objectives, contents, and amount of teaching and guidance, as well as information about other matters deemed to be necessary by the Faculty. The curricula shall be confirmed by the Faculty Board.

Information about academic postgraduate education is send mainly via email to the doctoral students who are registered as attending. The studies are specified in the personal study plan. The personal study plan form is available at http://www.uwasa.fi/tekniikka/english/studies/doc/.

Automation technology (in Finnish)
Energy Engineering (in Finnish)
Electrical Engineering (in Finnish)
Telecommunication Engineering (in English)
Computer Science (in English)
Industrial Management (in English)

**Automaatiotekniikka**
Professor Jarmo Alander


Automaatiotekniikan pääaineen opinnot voivat olla mm. seuraavasti aihepiireistä:

- Mittautustekniikka ja signaalienkäsittely
- Laskennallinen fysiikka
- Säättötekniikka
- Optimointi
- Automaation ohjelmistotuotanto


**Energiatekniikka**

professori Seppo Niemi


**Tutkimusalan opinnoissa** syvennetään polttomootoritekniikan ja sovelletun termodynamian teoriaa. Sisältö rätälöidään opiskelijan työtehtävien, tutkimustyön ja kiinnostuksen mukaan. Opinnot koostuvat kirjallistaan, laskuntoisista ja talousopinnoista.

**Tutkimusalan tukevat opintotyöt** valitaan tutkimustyön tarpeiden perusteella. Opinnoiksi suositellaan fysikaalisen ja kemian tai teknillistä opintokokonaisuutta joko omasta tiedekunnasta tai muusta yliopistosta, mutta myös esim. johtamis- ja talousopinnoista.

**Sähkötekniikka**

Professori Timo Vekara

Sähkötekniikan oppia Vaasan yliopistossa kattaa perinteisen sähkövoimatekniikan eri osa-alueet: sähkön tuotanto, jakelu ja käyttö. Näillä alueilla opiskelija voi Vaasan yliopistossa suorittaa jatkoopintoa sähkötekniikassa.

**Tutkimusalan opinnoissa** syvennetään polttomootoritekniikan ja sovelletun termodynamian teoriaa. Sisältö rätälöidään opiskelijan työtehtävien, tutkimustyön ja kiinnostuksen mukaan. Opinnot koostuvat kirjallistaan, laskuntoisista ja talousopinnoista.

**Sähkötekniikan jatkoopintotyöt** valitaan tutkimustyön tarpeiden perusteella. Opinnoiksi suositellaan fysikaalisen ja kemian tai teknillistä opintokokonaisuutta joko omasta tiedekunnasta tai muusta yliopistosta, mutta myös esim. johtamis- ja talousopinnoista.

**Yleistieteellisiin opintoihin** voi sisällyttää tutkimustyötä tukevia opintoja. Soveltuvia opintotojoukkoja tarjoaa mm. Vaasan yliopiston tohtorifoorumi. Yleistieteelliset opinnot voivat sisältää myös jatko-opinnoitumia ja muut tutkimustyötä tukevia opintoja.

**Tieteen tiettiaiset opintotyöt** valitaan tutkimustyön tarpeiden perusteella. Opinnoiksi suositellaan fysikaalisen ja kemian tai teknillistä opintokokonaisuutta joko omasta tiedekunnasta tai muusta yliopistosta, mutta myös esim. johtamis- ja talousopinnoista.

**Sähköenergiatekniikka**

Tutkimusalan opinnoissa syvennetään polttomootoritekniikan ja sovelletun termodynamian teoriaa. Sisältö rätälöidään opiskelijan työtehtävien, tutkimustyön ja kiinnostuksen mukaan. Opinnot koostuvat kirjallistaan, laskuntoisista ja talousopinnoista.

**Tutkimusalan tukevat opintotyöt** valitaan tutkimustyön tarpeiden perusteella. Opinnoiksi suositellaan fysikaalisen ja kemian tai teknillistä opintokokonaisuutta joko omasta tiedekunnasta tai muusta yliopistosta, mutta myös esim. johtamis- ja talousopinnoista.

**Yleistieteellisiin opintoihin** voi sisällyttää tutkimustyötä tukevia opintoja. Soveltuvia opintotojoukkoja tarjoaa mm. Vaasan yliopiston tohtorifoorumi. Yleistieteelliset opinnot voivat sisältää myös jatko-opinnoitea ja muut tutkimustyötä tukevia opintoja.
västää kesäseminaarista. Tutkijakoulussa on myös palkallisia tutkijapaikkoja, joihin on haku tavallisesti syksyllä.

Vaasan yliopisto on mukana myös Energiatekniikan tutkijakoulussa (http://energia.tkk.fi/fi/tutkijakoulu/), jonka puitteissa järjestetään mm. intensiivikurssseja vaihtuvista erikoisaiheista. Energiatekniikan tutkijakoulu järjestää kerran vuodessa vuosiseminaarin, jossa on yleisöä liittyen ajankohtaisiin energiakysymyksiin. Myös energiatekniikan tutkijakoulussa on vuosittain haettavana palkallisia tutkijakoulupaikkoja.


**Yleistieteelliset opintot**


**Tutkimusalaan tukevat opintot (sivuaine)**

Tutkimusalan opintot perehdyttävät opiskelijan yhteen tai useampaan opinnäytetyön tekemistä tukevaan aihealueeseen. Tutkimusalaan tukevat opintot suositellaan valittavaksi muiden tekniikan alan jatkomatkojien pääaineiden tarjonnasta. Tutkimusalaan tukeviin opintoihin voi sisällyttää myös perusopintotasoisia tekniikan alan opintoja siltä osin kun samoja tai vastaavia opintoja ei ole sisällytetä opiskelijan perustutkimtoon. Lisäksi on huomattava, että perusopintotasoisia opintoja voi jatkomatkoon sisällyttää enintään puolet.

**Tutkimusalan opintot (pääaine)**
Tutkimusalan opinnot perehdyttävät opiskelijan perustutkintoa laajemmin ja syvemmin johonkin tutkimusalaan. Tutkimusalan opinnot sisällyttätävät opinnot tulee valita Vaasan yliopiston ja tutkijakoulujen kurssitarjonnasta siten, että ne tukevat jatko-opiskelijan tutkimustyötä. Myös perustutkintotason opinnot voi sisällyttää tutkimusalan opinnoihin siltä osin kun samojä tai vastaavia opinnoja ei ole sisällytynyt opiskelijan perustutkintoon. Suositeltavaa kuitenkin on että, tutkimusalan opinnot sisällyttävät perustutkintotason opinnojaksot täydennetään jatko-oppintotason opinnojaksojen esimerkiksi erillisellä harjoitustyöllä. Lisäksi on huomattava, että perusopintotason opinnot to voi jatkoopintoon sisällyttää enintään puolet.

**Telecommunication Engineering**

Head of Department Jari Töyli

The PhD candidate in communication and system engineering (ComSys) group should complete 60 credits of courses, seminars, and related activities. Moreover, the PhD candidate must complete the PhD thesis which should contain novel, original, and important contributions in the focused area of research.

Although the thesis quality is the main core for successful PhD program, the required 60 credits are also necessary and the student cannot graduate before completing them. In ComSys group, we have several annual seminars and advanced courses which can be attended by PhD students. It is also possible for our PhD students to attend some advanced courses from other departments in University of Vaasa such as Mathematics to improve the student background. Furthermore, our students can attend some seminars and workshops in other universities and programs in Finland such as GETA and INFWEST. Moreover, it is also possible to earn credits through self-study of certain books or performing project exercises. The PhD student should agree with his supervisor about the courses and the study plans.

The study and research programs in ComSys group can be divided into three main categories as follows:

1. **Telecommunication Theory**, includes several topics such as:
   a. Radio Resource Management
   b. Multiple Antennas
   c. Coding Techniques
   d. Cross Layer Optimization
   e. Game theory applications
   f. Cognitive Radios
   g. Spectrum Sensing

2. **Telecommunication and Systems**, includes several topics such as:
   a. Wireless automation
   b. Wireless sensor networks
   c. Wireless networks for distributed energy systems
   d. Data fusion of wireless sensor networks

3. **Telecommunication Electronics**, includes several topics such as:
a. Design and development of wireless sensors platforms
b. Design and development (Hardware/Software) of Embedded systems
c. Software Defined Radio

The results of our research group are usually published as internal reports as well as international journals and conferences.

**Computer Science**

Head of department Jari Töyli

A student who has completed a higher university degree in the field of Computer Science is eligible for doctoral studies in Computer Science at the University of Vaasa. If the major subject of the previous degree has been some other than computer science, the studies shall be supplemented in a way agreed separately with the study subject. The studies should equal the advanced level studies of the major subject. Agreement about these supplementary studies is made case-by-case with the professor of the subject. Also the study plan for the major subject of the doctoral studies shall be confirmed in this discussion.

*General scientific studies (15 ECTS)*

The general scientific studies consist mainly of the studies offered by the Doctoral Forum of the University of Vaasa. Out of the research methodology studies offered by the Doctoral Forum, the students select studies which support the methods applied to their research work.

*Studies supporting the research field / minor subject (15 ECTS)*

The studies supporting the research field, in other words, the minor subject is selected on the basis of the needs for the student’s research work. The minor subject studies may consist of such studies on a basic degree level which the student has not yet included in his or her previous degree.

*Studies in the field of the research / major subject (30 ECTS)*

The studies in the field of the research are mainly completed in units of 5 ECTS. These units are agreed with the professor of the study subject. The studies shall support the research work of the doctoral student. The studies consist of doctoral level studies in the field of Computer Science, and they can be completed also in other universities/higher-education institutions. The advanced level studies offered at the University of Vaasa may be supplemented to be on the doctoral level by preparing an additional written work. In addition to the actual doctoral courses, the doctoral student may complete studies by taking an examination or preparing a summary based on literature in the field. In addition, an active participation in the international seminars and conferences in the field is encouraged. The form of the active participation may be, for example, to give a presentation in the event or summarising the event. The method for completion and the amount of credits awarded shall be separately agreed with the professor of the study subject.

The University of Vaasa takes part in a cooperation project INFORTE focusing on the field of ICT. International, high-profile events (seminars, workshops and networking) in
the different areas of ICT are organised in the project for companies and the institutions doing research in the field. The doctoral students of computer science are recommended to participate especially in the events organised by INFORTE.

Research work

Regular seminar meetings form an essential part of the research work. The research seminar in computer science has a few meetings both in the autumn and spring semester. The researchers shall present their research plans in the seminar when starting their research work. After the first presentation, they shall report in the seminar annually about the progress in the research. Also areas supporting the research work shall be covered in the seminar meetings. The seminar serves as a meeting place for the doctoral students and the supervisors.

Industrial Management

Head of Department Marja Naaranoja

To apply for doctoral studies in technology at the University of Vaasa, the student must have a higher academic degree with a major in Industrial Management. If the student has majored in a subject other than Industrial Management, the student must add to his or her study plan supplementary studies equivalent to the advanced courses in Industrial Management. The scope of the supplementary studies is agreed upon on an individual basis. To support and enhance the study experience and to improve the co-operation between doctoral students (and regular students), research area specific seminars are arranged at intervals (attendance is voluntary). The doctoral students are furthermore encouraged to participate in the annual European Doctoral Summer School in Technology Management–seminars. Doctoral studies can also be conducted in the international EIASM doctoral student programme and in national schools of research.

Doctoral programme in Industrial Management, Studies

Method Studies

These studies are aimed at supporting the major subject. Agreed upon on an individual basis.

* Theory of Science
* Research Methodology and Theory.
* Historical development and societal impact of the student’s own field of research.

For further methods studies, we recommend the University of Vaasa Doctoral Forum courses.

Studies in support of the student’s field of research / minor subject

According to personal study plan. The studies are set depending on the structure of the previous academic degree, and on the direction of the student’s current research.
Studies in the student’s field of research / major subject

We recommend including studies in at least two of the following areas:

A:
* Production Management and Guidance
* Production Organization; Global Networking
* Logistics
* Sustainable Business

B:
* Financial Management of Production
* Personnel Administration, Resource Management

C:
* Theory of Quality, Quality Assurance
* Creative activity and control
* Product Development, Technology Management

D:
* Material and Production Technology, Production Automation
* Environmental Technology

Can partially be completed by (actively) attending domestic and international doctoral student events, seminars and conferences.

Course work substitutions must be agreed upon individually.