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The School of Engineering
Sciences

General syllabus for education at third-cycle level in the subject Vehicle and Maritime Engineering

This regulatory document has been decided by the President (V-2017-0094) pursuant to chapter 6 sections 26-27 of the Higher Education Ordinance. The regulatory document is valid with effect from 21-04-2017 and was last modified on 28-11-2023 (V-2023-0681). The regulatory document regulates the main content of the education, requirements for special qualifications and the other regulations that are needed. The School of Engineering Sciences is responsible for review and questions about the governing document.

1 Content of the education

1.1 The name of the subject in Swedish and in English translation

Farkostteknik/Vehicle and Maritime Engineering

1.2 Subject description

Vehicle and Maritime Engineering encompasses scientific topics related to the development, design, manufacture, use and maintenance of land and maritime vehicles as part of sustainable transport systems. Research in vehicle and maritime engineering concerns, for example, vehicle dynamics, aerodynamic and hydrodynamic properties, construction, materials and acoustic properties. In addition to applied mechanics and mathematics, systems engineering, ergonomics, ecology, behavioural science, injury prevention and logistics are important areas of research

1.3 Specialisations

The subject has no specialisations.

1.4 Organisation of the education

The third-cycle programme in Vehicle and Maritime Engineering consists of a course component and a thesis project carried out in one of the research domains of acoustics, vehicle engineering, rail vehicle engineering, lightweight structures, technical acoustics or naval architecture, which are represented among the research groups associated with the programme. A doctoral student is usually employed at KTH but may also be employed at another university, research institute, government agency or industrial company. The doctoral student has at least two supervisors, one of which is a principal supervisor. The doctoral student and the supervisors determine the individual study plan and the organisation of the research work. An individual study plan must be established upon commencement of the programme. The individual study plan must be approved by the Director of Third Cycle Education at the School of Engineering Sciences, and progress is to be assessed at least once annually in connection with the revision of the individual study plan.

The thesis shall result in the presentation of an independently conducted scientific project in the subject area. The course component of the third-cycle programme in the subject of Vehicle and Maritime Engineering consists of participation and summative assessment in a number of optional and compulsory courses or course components in the areas of research ethics,

sustainable development and gender equality, diversity and equal opportunities. The courses shall be chosen in consultation with the principal supervisor to provide a good basis for the doctoral student's own thesis work and for expanding his/her knowledge of the field. It is also presupposed that, in addition to the compulsory elements included in the course syllabus, the doctoral student actively participates in seminars and similar activities at KTH and keeps abreast of scientific and technological developments in general, e.g., by participating in national and international conferences in the field.

1.4.1 Activities for fulfilment of outcomes for the education according to the Higher Education Ordinance (HF)

Below are described activities for the doctoral student's fulfilment of the learning outcomes for third-cycle education according to the Higher Education Ordinance (HF) and KTH's goals. The individual study plan specifies the activities for each individual doctoral student.

Learning outcomes: Knowledge and understanding

For the Degree of Doctor the doctoral student shall:

- Demonstrate broad knowledge and a systematic understanding of the research field as well as advanced and up-to-date specialist knowledge in a limited area of this field.

Complete third-cycle courses, participate in seminars, read and follow relevant scientific literature. Present one's own contributions at conferences. Read and discuss doctoral colleagues' theses. Write introductions to scientific articles and the doctoral thesis. Participate in research group meetings to present and discuss the methods, results and analyses of one's own work and the work of colleagues

- Demonstrate familiarity with research methodology in general and the methods of the specific field of research in particular.

Complete third-cycle courses, participate in seminars, read and follow relevant scientific literature. Apply relevant methods for specific thesis papers. Collaborate with doctoral colleagues, lab staff, researchers or similar in advanced experimental and/or computerized laboratory environments. Participate in research group meetings to present and discuss the methods, results and analyses of one's own work and the work of colleagues. Goal attainment is usually demonstrated by writing methodological descriptions in scientific articles

For a Degree of Licentiate, the doctoral student shall:

- Demonstrate knowledge and understanding in the field of research including current specialist knowledge in a limited area of this field as well as specialised knowledge of research methodology in general and the methods of the specific field in particular.

Complete third-cycle courses, participate in seminars, read and follow relevant scientific literature. Present one's own contributions at conferences. Writing introductions to scientific articles and the licentiate thesis.

Application of relevant methods for specific thesis papers. Collaborate with doctoral colleagues, lab staff, researchers or similar in advanced experimental and/or computerised laboratory

environments. Participate in research group meetings to present and discuss the methods, results and analyses of one's own work and the work of colleagues.

Learning outcome: Competence and skills

For the Degree of Doctor the doctoral student shall:

- Demonstrate the capacity for scholarly analysis and synthesis as well as to review and assess new and complex phenomena, issues and situations autonomously and critically.

Complete thesis work, as a compilation thesis or monograph, to answer previously untested hypotheses. Author a detailed problem formulation in scientific articles, author results and conclusions in scientific articles and present one's own critically reviewed research in relation to other research.

- Demonstrate the ability to identify and formulate issues with scholarly precision critically, autonomously and creatively, and to plan and use appropriate methods to undertake research and other qualified tasks within predetermined time frames and to review and evaluate such work.

Complete thesis work, as a compilation thesis or monograph, to answer previously untested hypotheses. Author a detailed problem formulation in scientific articles, author results and conclusions in scientific articles and present one's own critically reviewed research in relation to other research.

- Demonstrate through a dissertation the ability to make a significant contribution to the formation of knowledge through his or her own research.

This outcome is considered achieved and verified with a thesis approved by an examining committee. With the thesis, the doctoral student must describe his/her own research efforts and justify how his/her own research, in the form of published peer-reviewed articles in international scientific journals or in the form of manuscripts of sufficiently good quality that they can be assumed to be published in international scientific journals, has contributed to increased knowledge in the subject.

- Demonstrate the ability in both national and international contexts to present and discuss research and research findings authoritatively in speech and writing and in dialogue with the academic community and society in general.

Presentations at scientific international conferences and/or in an industrial context, presentations at national research centres and in-house seminars, detailed feedback from research colleagues at in-house seminars and prior to the doctoral defence.

- Demonstrate the ability to identify the need for further knowledge.

This outcome is considered achieved by the doctoral student reading and following relevant literature and informing himself/herself about the continuous development in his/her research area and having the ability to critically assess the same and propose relevant questions in his/her research field. This outcome is documented, for example, by writing relevant reflections on further work in the thesis and/or in journal articles

- Demonstrate the capacity to contribute to social development and support the learning of others both through research and education and in some other qualified professional capacity.

First- and second-cycle education or company presentations, by assisting in the supervision of theses or by transferring knowledge to potential industrial partners as well as by taking an increasingly active role in the work of the research group, e.g., knowledge transfer to other doctoral students.

For a Degree of Licentiate, the doctoral student shall:

- Demonstrate the ability to identify and formulate issues with scholarly precision critically, autonomously and creatively, and to plan and use appropriate methods to undertake a limited piece of research and other qualified tasks within predetermined time frames in order to contribute to the formation of knowledge as well as to evaluate this work.

Reporting of a qualified paper with a disciplinary foundation, the licentiate thesis, which can either constitute the first complete part of a doctoral thesis or part of a compilation thesis. Critical review of previous work in the field, summarised in the scientific articles authored/co-authored by the doctoral student and in the licentiate/doctoral thesis, scheduling and compilation of research results for an upcoming conference presentation and deadline for summary/manuscript.

- Demonstrate ability in both national and international contexts to present, discuss research, and research findings in speech and writing and in dialogue with the academic community and society in general.

Presentations at scientific international conferences and/or presentations in an industrial context, presentations at national research centres and in-house seminars, detailed feedback from research colleagues at in-house seminars and for the licentiate seminar.

- Demonstrate the skills required to participate autonomously in research and development work and to work autonomously in some other qualified capacity.

By identifying the need for new knowledge and proposing new research accordingly and by knowledge transfer to potential industry partners. Documented in the scientific articles and in the licentiate thesis.

Learning outcomes: Judgement and approach

For the Degree of Doctor the doctoral student shall:

- Demonstrate intellectual autonomy and disciplinary rectitude as well as the ability to make assessments of research ethics.
By assessing and discussing ethical aspects with supervisors in the selection and design of research problems, where relevant. Application for ethical approval, if necessary. The impact of the research results on society at large is discussed with supervisors and fellow researchers. Clear account of the research student's own contributions to the thesis. Scientific integrity is promoted by a compulsory research ethics component of the doctoral programme (under the supervision of an actor independent of the local research environment), as well as plagiarism-check of the thesis.

- Demonstrate specialised insight into the possibilities and limitations of research, its role in society and the responsibility of the individual for how it is used.

By participating in and following discussions and debates in the academic environment, both locally (the departmental level) and in a wider context. The impact of the research results on society at large is discussed with supervisors and fellow researchers

For a Degree of Licentiate, the doctoral student shall:

- Demonstrate the ability to make assessments of ethical aspects of his or her own research.

By assessing and discussing ethical aspects with supervisors in the selection and design of research problems, where relevant. Application for ethical approval, if necessary. The impact of the research results on society at large is discussed with supervisors and fellow researchers

- Demonstrate insight into the possibilities and limitations of research, its role in society and the responsibility of the individual for how it is used.

By participating in and following seminars, discussions and debates in the academic environment, both locally (the departmental level) and in a wider context. Collaboration across subject boundaries, either in courses or research tasks

- Demonstrate the ability to identify the personal need for further knowledge and take responsibility for his or her ongoing learning.

. This is documented to some extent in scientific articles and should be discussed in the licentiate thesis. Formulation of the doctoral student's individual study plan to be updated annually.

KTH's outcome in sustainable development

For both the Degree of Licentiate and the Degree of Doctor, the doctoral student shall:

- Demonstrate with knowledge and skills the ability to be able to contribute to sustainable societal development towards an equal, inclusive and climate-neutral society.

By giving the doctoral/licentiate student the opportunity to influence how sustainable development issues are addressed in the programme. By participating in and following seminars, discussions and debates in the academic environment, both locally (the departmental level) and in a wider context. Participation in relevant courses on sustainable development. Collaboration across subject boundaries, either in courses or research tasks. The doctoral/licentiate student is encouraged to participate in external conferences with a focus on sustainable development. Reporting of such assessment upon publication of scientific articles, the introduction to the thesis and at the public defence of the thesis/licentiate seminar

1.4.2 Compulsory courses

Courses or course components of at least 1.5 credits each in Research Ethics, Sustainable Development and Gender Equality, Diversity and Equal Conditions, thus totalling at least 4.5 credits, shall be included in the degree. These courses/course components must be at third-cycle level.

1.4.3 Recommended courses

The Higher Education Ordinance requires every doctoral student conducting teaching to have completed a higher education pedagogical course. Completion of courses in scientific writing and research methodology during the programme is also recommended.

1.4.4 Conditional elective courses

The subject area of Vehicle and Maritime Engineering does not include any conditionally optional courses.

1.4.5 Requirements for the degree

Degree of Doctor

A Degree of Doctor comprises 240 credits. At least 120 credits must consist of the doctoral thesis

Thesis

Quality requirements and possible other requirements for the thesis.

A doctoral thesis must include new theoretical or empirical research results in the chosen subject area that the doctoral student has developed through theoretical or empirical research. It must also include a review describing previous research in the chosen subject area. Third-

cycle courses and study programmes are planned so that thesis work can begin as early as the first semester. The quality of the doctoral thesis must be such as fulfils reasonable requirements to be accepted for peer-reviewed, international scientific publication. A doctoral thesis often takes the form of a compilation thesis, and at least some parts of such theses should be published or accepted for publication before the thesis is presented. In cases where a doctoral thesis is based solely on work that has not yet been published or accepted for publication in peer-reviewed international scientific journals, the director of third-cycle education should request prior opinions from the examining committee regarding the scientific depth of the work. This extra review of the thesis is in addition to the review by the supervisor and the mandatory advance reviewer.

Courses

The doctoral student shall have completed courses of at least 60 credits, of which 45 credits must be at third-cycle level and no more than 10 credits can be at first-cycle level.

Degree of Licentiate

A Degree of Licentiate comprises at least 120 credits. At least 60 credits must consist of the academic paper.

Thesis

Quality requirements and possible other requirements for the licentiate thesis.

Within the third-cycle subject of Vehicle and Maritime Engineering, a Degree of Licentiate in engineering and technology can be obtained upon request by doctoral students who were not originally pursuing a Degree of Licentiate, in which case further admission for a Degree of Doctor shall take place. This degree requires the student to have completed and presented in writing a qualified paper with a disciplinary foundation, a licentiate thesis. Theses can either be in the form of a compilation thesis or a monograph.

This degree requires that the doctoral student has taken courses under the same conditions as for a Degree of Doctor, with the difference that the required total is 30 higher education credits, and that compulsory and conditionally optional courses are counted as optional. Further, the doctoral student must have reported a qualified paper with a disciplinary foundation, the licentiate thesis, which can either constitute the first complete part of a doctoral thesis or part of a compilation thesis.

Courses

The doctoral student shall have completed courses of at least 30 credits, of which 15 credits must be at third-cycle level and no more than 10 credits can be at first-cycle level

1.4.6 Other elements in the education to promote and ensure goal fulfilment

Presentation of one's own research, partly with reconciliation steps, including mid-term and final seminars, and partly by participation in conferences and critical review of others' research, is expected during the programme. The ISP will be monitored annually.

2 Admission to education at third-cycle level (qualification etc.)

Admission to education at third-cycle level is regulated in Chapter 7, Section 40 of the Higher Education Ordinance and in the admission regulations at KTH. KTH's regulations on specific

prerequisites and such abilities in other respects as are needed to assimilate the education in the relevant subject at the doctoral level are set out below.

2.1 Specific prerequisites

In order to be admitted to third-cycle education in Computer Science, the applicant must have knowledge of English equivalent to English 6.

To be admitted to third-cycle courses and study programmes in the subject of Applied Physics, the applicant must have earned at least 60 higher-education credits at no less than second-cycle level in the subject of Physics or other subjects deemed to be directly relevant to the specialisation in question. These requirements are also considered to be fulfilled by those who have acquired substantially equivalent knowledge through other means.

2.2 Assessment criteria for testing the ability to assimilate the education

The following assessment criteria apply for testing the ability to assimilate the education:

Selection for third-cycle education is based on assessed ability to assimilate such education. The ability assessment is primarily based on having passed courses and programmes that satisfy the entry requirements. Particular consideration is given to the following:

1. Knowledge and skills relevant for thesis work and the subject.
These can be shown through attached documents and a possible interview
2. Assessed ability to work independently
 - a. ability to formulate and tackle scientific problems
 - b. ability to communicate well in speech and writing
 - c. maturity, judgement and ability to analyse critically and independently

The assessment may be based, for example, on degree projects and discussion of these at a possible interview.

3. Other experience relevant for third-cycle education, e.g. professional experience.
These can be demonstrated through attached documents and, potentially, an interview.

3 The other regulations needed

3.1 Transitional regulations

Doctoral students admitted to a previous general syllabus are entitled to follow either the new syllabus or the syllabus under which they were admitted. Requests to adopt a new syllabus are made to FA-SCI. However, changing syllabi requires that the new syllabus can be achieved in time.

KTH Appendix: Goals for qualification and assessment criteria

Goals according to Appendix 2 of the Degree Ordinance to the Higher Education Ordinance, including requirements specified by KTH with examples of assessment criteria that can determine whether the doctoral student has achieved the goals. *The assessment criteria in the table are examples and developed as a support and inspiration for activity descriptions in part 1.4.*

Degree of Doctor

Knowledge and understanding	
Intended learning outcomes	Assessment criteria with reference to numbering in eISP
Demonstrate broad knowledge and systematic understanding of the research field as well as advanced and up-to-date specialised knowledge in a limited area of this field.	<p>The outcome has been achieved through the doctoral student having</p> <p>A1.1: authored original scientific works where their own contributions are significant and identifiable. The works are of such quality that they have been published, or are expected to be published, in international scientific journals or conferences that apply peer review.</p> <p>A1.2: demonstrated both broad and specialised knowledge in the research area by writing a thesis in which the research results were placed and discussed in a broader perspective, and presented a reference list of others' research results that spans the relevant breadth of the research area.</p> <p>A1.3: demonstrated, at a seminar, a course or in the thesis or its public defence, a good ability to account for how their own research results relate to the research front within the research area, and justify how their own results advance this.</p> <p>A1.4: actively participated in seminar activities where their own results were presented and discussed, as well as asked questions and provided feedback on other students' and researchers' presentations.</p>
Demonstrate familiarity with research methodology in general and the methods of the specific field of research in particular.	<p>The outcome has been achieved through the doctoral student having</p> <p>A2.1: been examined with an approved result regarding intended learning outcomes in scientific methodology, which may be a course or equivalent learning element at third-cycle level.</p> <p>A2.2: described basic theories in scientific theory and correctly applied one or more of these in their own research.</p> <p>A2.3: practically applied to the research area appropriate methods and developed the ability to independently perform, interpret and critically examine the results in order to clarify whether the method and its execution were appropriate to obtain credible results that answer the scientific question.</p> <p>A2.4: justified their choice of method and execution in relation to the issue and to alternative methods.</p> <p>A2.5: described the advantages and disadvantages of different scientific methods used in their own research area, as well as the methods used in the broader definition of the research area</p>

Competence and skills	
Intended learning outcomes	Assessment criteria with reference to numbering in eISP
Demonstrate the capacity for scholarly analysis and synthesis as well as to review and assess new and complex phenomena, issues and situations autonomously and critically.	<p>The outcome has been achieved through the doctoral student having</p> <p>B1.1: demonstrated the ability to independently formulate and critically analyse both existing and new complex phenomena.</p> <p>B1.2: presented concrete examples of scientific questions and problems of a complex nature from their own research and described how these were tested and how the results were analysed.</p> <p>B1.3: described the interpretation of the results and how these were combined with existing knowledge to give rise to a new explanatory model.</p> <p>B1.4: in cases where it is applicable, presented concrete examples of results that have given rise to falsification of a hypothesis and revision of the hypothesis.</p>
Demonstrate the ability to identify and formulate issues with scholarly precision critically, autonomously and creatively, and to plan and use appropriate methods to undertake research and other qualified tasks within predetermined time frames and to review and evaluate such work.	<p>The goal has been achieved through the doctoral student having</p> <p>B2.1: presented examples of independently performed experiments / simulations / tasks that were preceded by detailed time planning.</p> <p>B2.2: in cases where it is applicable, presented examples of their own hypotheses that have been tested within the framework of their own research project and described the choice of method and outcome. In cases where the result did not turn out as expected, the research student shall have reported on possible sources of error and what measures were taken to move forward in the project.</p> <p>B2.3: presented examples of and described and argued for the choice of methods for individual research tasks.</p> <p>B2.4: described how it was ensured that the education could be completed on time and whether there were obstacles to staying within the time frame, as well as what measures were taken and their outcome.</p>
Demonstrate through a dissertation the ability to make a significant contribution to the formation of knowledge through his or her own research.	<p>The goal has been achieved through the doctoral student having</p> <p>B3.1: authored original scientific works where their own contributions are significant and identifiable. The works are of such quality that they have been published, or are expected to be published, in international scientific journals or conferences that apply peer review.</p> <p>B3.2: authored a thesis, based on the scientific work, of good scientific and linguistic quality that was authoritatively defended and discussed in a public defence of the doctoral thesis and been examined with a pass grade by an independent examining committee.</p>
Demonstrate the ability in both national and international contexts to present and discuss research and research findings authoritatively in speech and writing and in dialogue with the academic community and society in general.	<p>The goal has been achieved through the doctoral student having</p> <p>B4.1: in cases where it is applicable, participated in national and international conferences and presented their own research results in poster form or verbally, as well as participated in scientific discussions with other researchers in the research field.</p> <p>B4.2: described how experience from conference or seminar presentations contributed to developing their own ability to</p>

	<p>communicate and defend scientific results, as well as how the presentations were received by other participants and whether valuable information could be obtained that helped their own studies progress.</p> <p>B4.3: been examined with a pass grade for intended learning outcomes in communication or presentation technology in a suitable compulsory or optional course at third-cycle level.</p> <p>B4.4: described basic concepts, tools and methods in presentation or communication technology, as well as demonstrated the ability to put the knowledge into practice by formulating different types of scientific presentation material of good quality.</p> <p>B4.5: presented their research results in a pedagogical way for other students and researchers at academic seminars, for a general audience or for another category of recipients, where the formulation of presentation material and speech was based on pedagogical knowledge adapted to the audience's knowledge level and also answered questions at an adequate level for the audience.</p> <p>B4.6: participated in outreach activities related to their own research in order to contribute to the dissemination of knowledge and exchange of knowledge with relevant stakeholder groups such as other universities, companies, authorities, schools etc.</p>
<p>Demonstrate the ability to identify the need for further knowledge.</p>	<p>The outcome has been achieved through the doctoral student having</p> <p>B5.1: by means of concrete examples, described how the lack of essential knowledge needed to carry out a task was rectified and how this affected the possibility of carrying out the task. This may involve widely differing tasks and knowledge, with the proviso that the third-cycle students themselves must have realised that knowledge was lacking and handled this with measures relevant to the purpose.</p> <p>B5.2: demonstrated insight that the knowledge front in higher education and research is in constant change and development and that definitive answers cannot always be obtained, as well as the ability to determine whether certain knowledge already exists, for example by means of thorough and critical examination of existing scientific literature.</p> <p>B5.3: demonstrated the ability to question, evaluate and adapt their perception of their own level of knowledge and ability in relation to the prevailing knowledge front.</p>
<p>Demonstrate the capacity to contribute to social development and support the learning of others both through research and education and in some other qualified professional capacity.</p>	<p>The outcome has been achieved through the doctoral student having</p> <p>B6.1: presented their research results in a pedagogical way for other students and researchers at academic seminars, for a general audience or for another category of recipients, where the formulation of presentation material and speech was based on pedagogical knowledge adapted to the audience's knowledge level and also answered questions at an adequate level for the audience.</p> <p>B6.2: participated in outreach activities related to their own research in order to contribute to the dissemination of knowledge and exchange of knowledge with relevant stakeholder groups such as other universities, companies, authorities, schools etc.</p> <p>B6.3: actively supervised other students in theoretical and / or practical projects. Third-cycle students should, with examples,</p>

	<p>account for and reflect on various aspects of their own input, for example how the supervision was structured, whether pedagogical methodology was applied, how it was ensured that the person who was supervised understood the instructions etc. Third-cycle students should also reflect on different roles of teachers and students and how personal dynamics and supervision techniques can affect the outcome of learning and interaction.</p> <p>B6.4: been examined with a pass grade for intended learning outcomes in teaching and learning in higher education in a suitable compulsory or optional course at third-cycle level. The third-cycle student is thus assumed to be able to describe basic concepts, materials and methods, as well as conditions for teaching and learning in higher education, as well as to analyse, evaluate and develop teaching and learning. Third-cycle student is thus also assumed to be able to show the ability to evaluate and analyse different methods and approaches in higher education and to show the ability to take a student perspective into account.</p> <p>B6.5: demonstrated the ability to collaborate and communicate in writing and speech, undertaken tasks and assignments that were planned and completed on time and demonstrated the ability to comply with applicable rules and directives and thereby acquired general knowledge and skills required in different societal functions.</p>
Judgement and approach	
Intended learning outcomes	Assessment criteria with reference to numbering in eISP
<p>Demonstrate intellectual autonomy and disciplinary rectitude as well as the ability to make assessments of research ethics.</p>	<p>The outcome has been achieved through the doctoral student having</p> <p>C1.1: demonstrated intellectual integrity in the sense that their own choices and positions have been justified and defended on the basis of independent critical thinking in relation to proven experience and scientific basis.</p> <p>C1.2: described how they ensured that their own scientific procedure in theory and practice was carried out in an honest and ethical manner.</p> <p>C1.3: reflected on possible existing or hypothetical ethical dilemmas related to their own research area or to scientific research in general, and reported on their own ethically independent stance in the existing or hypothetical situation.</p> <p>C1.4: been examined with a pass grade for intended learning outcomes in ethics in a suitable compulsory or optional course at third-cycle level. The research student is thus assumed to be able to describe basic theories in research ethics and relate these to their own approach and research work.</p>
<p>Demonstrate specialised insight into the possibilities and limitations of research, its role in society and the responsibility of the individual for how it is used</p>	<p>The outcome has been achieved through the doctoral student having</p> <p>C2.1: presented concrete examples of how their own research results, and the research area in general, can contribute new knowledge to the research front in the area and justify its societal relevance.</p> <p>C2.2: critically reflected on limitations of their own research results, and the research area in general, in order to contribute to solving</p>

	<p>societally relevant problems, as well as identify possible situations where their own research results can be used in both a positive and negative way.</p> <p>C2.3: demonstrated good ability to reflect on how their own research results can contribute to sustainable societal development and can, where relevant, also link these to the prioritised global sustainable development goals.</p> <p>C2.4: described how their own actions and approach take into account the concept of sustainability.</p> <p>C2.5: been examined with a pass grade for intended learning outcomes in sustainable development in a suitable compulsory or optional course at third-cycle level. The research student is thus assumed to be able to describe basic theories in sustainability and relate these to their own approach and research work.</p>
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Degree of Licentiate

Knowledge and understanding	
Intended learning outcomes	Assessment criteria with reference to numbering in eISP
<p>Demonstrate knowledge and understanding in the field of research including current specialist knowledge in his or her artistic field as well as specialised knowledge of research methodology in general and the methods of the specific field of research in particular..</p> <p><i>Main differences in relation to the doctoral degree: For the licentiate degree, it is enough to be able to show “knowledge and understanding”, as opposed to “broad and systematic understanding”. Also, “deep up-to-date specialist knowledge” is replaced by “up-to-date specialist knowledge”.</i></p>	<p>The outcome has been achieved through the doctoral student having</p> <p>A1.1: authored original scientific works where their own contributions are significant and identifiable. The works are of such quality that they have been published, or are expected to be published, in international scientific journals or conferences that apply peer review.</p> <p>A1.2: demonstrated both broad and specialised knowledge in the research area by writing a licentiate thesis in which the research results were placed and discussed in a broader perspective, and presented a reference list of others’ research results that spans the relevant breadth of the research area.</p> <p>A1.3: demonstrated, at a seminar, a course or in the licentiate thesis and its public defence, a good ability to account for how their own research results relate to the research front within the research area, and justify how their own results advance this.</p> <p>A1.4: actively participated in seminar activities where their own results were presented and discussed, as well as asked questions and provided feedback on other students’ and researchers’ presentations.</p>
Competence and skills	
Intended learning outcomes	Assessment criteria with reference to numbering in eISP
<p>Demonstrate the ability to identify and formulate issues with scholarly precision</p>	<p>The goal has been achieved through the doctoral student having</p>

<p>critically, autonomously and creatively, and to plan and use appropriate methods to undertake a limited piece of research and other qualified tasks within predetermined time frames in order to contribute to the formation of knowledge as well as to evaluate this work</p> <p><i>Main differences in relation to the doctoral degree: For the licentiate degree, it is emphasized that this is “limited research work” that will contribute to the development of knowledge, in contrast to the doctoral degree where one must be able to show the ability to “conduct research”.</i></p>	<p>B1.1: demonstrated the ability to independently formulate and critically analyse both existing and new complex phenomena.</p> <p>B1.2: presented examples of their own questions that were tested within the framework of their own research project, as well as described the choice of method and outcome. In cases where the result did not turn out as expected, the research student shall have reported on possible sources of error and what measures were taken to move forward in the project.</p> <p>B1.3: presented examples of independently performed experiments / simulations / tasks that were preceded by detailed time planning.</p> <p>B1.4: presented examples of and described and argued for the choice of methods for individual experiments.</p> <p>B1.5: described how it was ensured that the education could be completed on time and whether there were obstacles to staying within the time frame, as well as what measures were taken and their outcome.</p>
<p>Demonstrate the ability in both national and international contexts to present and discuss research and research findings in speech and writing and in dialogue with the academic community and society in general.</p> <p><i>Main differences in relation to the doctoral degree: The licentiate degree requires the student to communicate their research “clearly”, as opposed to communicating “with authority”.</i></p>	<p>The goal has been achieved through the doctoral student having</p> <p>B2.1: in cases where it is applicable, participated in national and international conferences and presented their own research results in poster form or verbally, as well as participated in scientific discussions with other researchers in the research field.</p> <p>B2.2: described how experience from conference or seminar presentations contributed to developing their own ability to communicate and defend scientific results, as well as how the presentations were received by other participants and whether valuable information could be obtained that helped their own studies progress.</p> <p>B2.3: been examined with a pass grade for intended learning outcomes in communication or presentation technology in a suitable compulsory or optional course at third-cycle level.</p> <p>B2.4: described basic concepts, tools and methods in presentation or communication technology, as well as demonstrated the ability to put the knowledge into practice by formulating different types of scientific presentation material of good quality.</p> <p>B2.5: presented their research results in a pedagogical way for other students and researchers at academic seminars, for a general audience or for another category of recipients, where the formulation of presentation material and speech was based on pedagogical knowledge adapted to the audience’s knowledge level and also answered questions at an adequate level for the audience.</p> <p>B2.6: participated in outreach activities related to their own research in order to contribute to the dissemination of knowledge and exchange of knowledge with relevant stakeholder groups such as other universities, companies, authorities, schools etc.</p>
<p>Demonstrate the skills required to participate autonomously in research and development work and to work autonomously in some other qualified capacity..</p> <p><i>Main differences in relation to the doctoral degree: The doctoral student's future contribution to society through research and</i></p>	<p>The goal has been achieved through the doctoral student having</p> <p>B3.1: authored original scientific works where their own contributions are significant and identifiable. The works are of such quality that they have been published, or are expected to be published, in international scientific journals or conferences that apply peer review.</p> <p>B3.2: authored a licentiate thesis based on their own studies of good</p>

<p>education is toned down and the focus is on the doctoral student being able to work on activities that require skills in research work but not a doctoral degree.</p>	<p>scientific and linguistic quality that have been defended and discussed at a licentiate seminar and examined and given a pass grade by an independent examiner.</p>
<p>Judgement and approach</p>	
<p>Intended learning outcomes</p>	<p>Assessment criteria with reference to numbering in eISP</p>
<p>Demonstrate the ability to make assessments of ethical aspects of his or her own research.</p> <p><i>Main differences in relation to the doctoral degree: The ability to make ethical research assessments is limited to their own research and not in general.</i></p>	<p>The goal has been achieved through the doctoral student having</p> <p>C1.1: demonstrated intellectual integrity in the sense that their own choices and positions have been justified and defended on the basis of independent critical thinking in relation to proven experience and scientific basis.</p> <p>C1.2: described how they ensured that their own scientific procedure in theory and practice was carried out in an honest and ethical manner.</p> <p>C1.3: reflected on possible existing or hypothetical ethical dilemmas related to their own research area or to scientific research in general, and reported on their own ethically independent stance in the existing or hypothetical situation.</p> <p>C1.4: been examined with a pass grade for intended learning outcomes in ethics in a suitable compulsory or optional course at third-cycle level. The research student is thus assumed to be able to describe basic theories in research ethics and relate these to their own approach and research work.</p>
<p>Demonstrate insight into the possibilities and limitations of research, its role in society and the responsibility of the individual for how it is used.</p> <p><i>Main differences in relation to the doctoral degree: For the licentiate degree, only “insight” is required, as opposed to “in-depth insight” for the doctoral degree.</i></p>	<p>The goal has been achieved through the doctoral student having</p> <p>C2.1: presented concrete examples of how their own research results, and the research area in general, can contribute new knowledge to the research front in the area and justify its societal relevance.</p> <p>C2.2: critically reflected on limitations of their own research results, and the research area in general, in order to contribute to solving societally relevant problems, as well as identify possible situations where their own research results can be used in both a positive and negative way.</p> <p>C2.3: demonstrated good ability to reflect on how their own research results can contribute to sustainable societal development and can, where relevant, also link these to the prioritised global sustainable development goals.</p> <p>C2.4: described how their own actions and approach take into account the concept of sustainability.</p>
<p>Demonstrate the ability to identify the personal need for further knowledge and take responsibility for his or her ongoing learning.</p> <p><i>Main differences in relation to the doctoral degree: The same requirement to be able to identify the need for additional knowledge with the addition of being able to take responsibility for their own knowledge</i></p>	<p>C3.1: by means of concrete examples, described how the lack of essential knowledge needed to carry out a task was rectified and how this affected the possibility of carrying out the task. This may involve widely differing tasks and knowledge, with the proviso that the third-cycle students themselves must have realised that knowledge was lacking and handled this with measures relevant to the purpose.</p> <p>C3.2: demonstrated insight that the knowledge front in higher education and research is in constant change and development and</p>

development, which may be considered to be implied for a doctoral degree.

that definitive answers cannot always be obtained, as well as the ability to determine whether certain knowledge already exists, for example by means of thorough and critical examination of existing scientific literature.

C3.3: demonstrated the ability to question, evaluate and adapt their perception of their own level of knowledge and ability in relation to the prevailing knowledge front.