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Regulation for bachelor's theses at Chalmers - implementation and assessment

Apply to MSc in engineering programmes (not Architecture and Engineering) from the academic year 2022/2023.

Policy document at Chalmers

This document is a guide for the implementation and assessment of bachelor's theses and is aimed at students, heads of programmes, supervisors, examiners, coordinators and vice heads of department.

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1. Background

According to the present structure of MSc programmes in engineering and architecture at Chalmers, year three of all five-year professional programmes includes a thesis worth 15 higher education credits. This thesis is called the bachelor's thesis. The regulation in this document only deals with the bachelor's thesis in MSc in engineering programmes apart from Architecture and Civil Engineering (AT). The regulation does not deal with the bachelor's thesis in the Master of Architecture programme. Bachelor's thesis in the programmes Architecture (A) as well as Architecture and Civil Engineering (AT) are regulated in the respective course plans.

The regulation is intended to contribute to the equal treatment of all students irrespective of programme affiliation and choice of bachelor's thesis course. The regulation has been revised by education officers at Education Support and have been anchored with the affected programme heads, vice heads of department and coordinators of the bachelor's thesis course.

1.1. Course plan and requirements

The bachelor's thesis courses in Chalmers' MSc in Engineering programmes (not AT) have syllabuses with common content. The syllabuses are adopted by the Vice President for Undergraduate Education. Every department that has a bachelor's thesis course has an appointed coordinator for coordination of bachelor's theses.

Bachelor's theses are carried out in groups of 3–6 students. Each Bachelor's thesis group has a supervisor and an examiner. The supervisor and examiner must not be the same person. There is more information about roles and areas of responsibility in the bachelor's thesis course in annex 8.

Before the start of each course, important dates for the bachelor's thesis course are updated on Chalmers Education pages. The common activity-free time for bachelor's theses is: Tuesday, Thursday afternoon and Friday morning. The introduction to the bachelor's thesis is held in study period 3, week 1, on Tuesday at the specified time slot in the schedule for each course code. On this occasion, information is given on the implementation of the project and the bachelor thesis specific general skills.

The bachelor's thesis should be written in Swedish but can be written in English if there are special reasons to do so. It is then important that students are aware of what language their bachelor's thesis is to be written in when they choose their bachelor's thesis in the bachelor's thesis choice module. A thesis written in English is evaluated by the same criteria as theses written in Swedish.

1.2. Eligibility

To ensure a minimum of prior knowledge for admission to the bachelor's thesis, students have to complete at least 105 hp of their first three years on the basis of their current

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programme affiliation (C 2018-0956). This requirement has to be met after that study period 1 of year 3 has been reported to LADOK, however, at the latest when the selection of bachelor projects closes (for dates see the time plan on Chalmers Education pages). Students are responsible for only applying to projects they have the right prior knowledge for.

1.3. Initiation and allocation

The departments generate proposals for bachelor's theses. Their proposals are reviewed by the programme head and permitted/rejected for the programme concerned. The students can define and propose a project based on their own ideas. The student should contact a teacher/researcher and/or the coordinator of the bachelor's thesis course at a suitable department to find a supervisor for the project (for deadline see the Chalmers Education pages). Students' own proposals for projects have to be of the same quality as department proposals and students should draw on the assistance of a prospective supervisor and/or examiner. The students should also contact the programme head, who will decide if the project will be relevant and permitted for the student's programme. No more than half of the places in a thesis project are reserved for the students who made the proposal. The other places are open to other students in programmes where the bachelor's thesis project has been approved. All project proposals are made available to students and the students then make a choice via Chalmers Education pages.

The selection of projects has to be done within the given time frame and late choices may be made when the regular allocation is complete. The student can then choose from the projects that are allowed for their program and have places left. The coordinator at Education Support will contact the student and offer a place. The regular allocation is strictly according to the principle that the student who has most credits in their programme has priority. In the event of an equal number of credits, lots are drawn. Due to more applicants than places on individual projects, students may be without a place on any of the projects they have indicated in the selection upon completed allocation. These students are contacted via their email used in Ladok by the coordinator at the Education Support and are offered to choose from the projects that are allowed for their program and have places left. Allocation of these places takes place according to the "first come, first served" principle. Those who do not respond to the offer within the specified time will not be allocated a project place.

1.4. Aim and learning objectives

The syllabuses for the bachelor's thesis formulate the aim in the following way:

In the bachelor thesis project, the student will integrate, extend and develop knowledge and skills within a smaller, specialized part of the field of the programme. The bachelor thesis also aims to develop skills in application of engineering problem solving and research methods.

The learning objectives are formulated in the following way (After completing the course students will be able to):

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Knowledge, understanding, skill and ability

- formulate and delimit a problem within the chosen subject
- plan a project in order to solve and report the problem with given resources
- search for, compile and assess relevant literature and other background information
- integrate and develop knowledge relevant for the chosen project
- reflect on how the project group worked together to meet common goals
- document the work process in a project journal
- communicate the results of the bachelor thesis work in relation to the chosen problem in written and oral form

Judgement and approach

- critically examine, evaluate and constructively question another project with respect to problem, approach and result
- assess if societal and ethical issues need to be considered for the chosen problem and, where relevant, analyze these aspects in the essay/report.
- reflect on the need for further knowledge and provide suggestions for future projects in the subject

1.5. Course evaluation, publication and archiving

As on other courses, students on bachelor's thesis courses must have the opportunity to make comments on the course, including through a course survey and course evaluation meeting. The process is described in the document Procedure for assessment of bachelor's and degree thesis courses [Rutin för värdering av kandidat- och examensarbetskurser (C 2017-1666)]. See this document for further information.

Theses are published electronically by placing the completed bachelor's thesis in Chalmers Open Digital Repository (ODR). At that point all co-authors of the bachelor's thesis and the examiner need to approve publication. The archiving and possible printing of the bachelor's thesis are the responsibility of the department.

2. Implementation

2.1. Supervision

At one of the first meetings of the group the supervisor has to communicate the scope of supervision and what role the supervisor has (see annex 8). The supervisor should also introduce the **group contract for bachelor's theses** (see annex 1). The discussion between the students on the group contract can take place without the supervisor. The agreed rules for cooperation in the group contract have to be made available to the supervisor, while the part about the level of ambition does not need to be available.

The supervisor is responsible for regular meetings being held to give the students sufficient supervision and that, if necessary, a risk assessment is made for parts of the project implementation. The supervisor is also responsible for a mid-project meeting being held

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during or shortly after the examination period between study periods 3 and 4. At the mid-project meeting the group should make a situation report and also be given feedback from the supervisor. It is particularly important that the supervisor gives clear feedback to the group if its work is proceeding in such a way that the group's performance risks being failed. When required, the supervisor is also obliged to give such feedback to the group at other times during the course. The supervisor also has to inform the examiner in these cases.

2.2. Planning and documentation

Each group has to continuously keep a **project diary** (annex 2). The project diary is used to follow up work in the group and is part of the basis for individual grading. The group also has to write a **contribution report** (annex 2), which sets out the contribution of each student to the bachelor's thesis. The contribution report is needed to assess the contribution of each individual group member to different parts of the implementation and results of the project. The group can choose whether the contribution report will be part of the essay/report, part of the project diary or a free-standing document. The project diary and the contribution report have to be made available so that the supervisor is able to read through them before supervision meetings.

The group has to write and submit a **planning report** (annex 3). The planning report has to give a clear statement of the subject/problem the bachelor's thesis will deal with, and how it will be addressed. In the planning report, the group also has to decide whether **societal and ethical aspects** need to be taken into account in their final essay/report and give their reasons for this. Support for students in making this analysis and for the examiner in assessing it is available in annex 7 and in the digital resources reached via Chalmers Education pages. Submission no later than study week 4 in study period 3. The examiner decides on the exact date and time and on the method for submitting the planning report.

2.3. Bachelor thesis specific general skills

Decision C 2022-0003 states that the same general skills will be implemented in connection to the bachelor's thesis for all MSc in engineering programmes apart from Architecture and Civil Engineering (AT). The purpose of this part is to support the students' work so that they can complete the bachelor's thesis work in a good way. The bachelor thesis specific general skills consist of information and communication elements and are described on the corresponding page on Chalmers Education pages and the course page in Canvas "Generella kompetenser i kandidatarbetet" which is accessible when the student is registered on a course code for the bachelor's thesis. The general skills are handled by the department of Communication and Learning in Science and have to be fulfilled for the examiner to approve the final grade of the bachelor's thesis. The general skills must be implemented together with a specific project. This means that for a failed student who does a new project a later academic year, the general skills must be implemented during the implementation of the new project, regardless of whether parts or all general skills were approved during the previous project.

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2.4. Presentation and opposition

The department is responsible for scheduling the presentation of its bachelor's theses. The presentation and opposition take place at the end of study period 4, the week before the examination week. Opposition is mainly held of bachelor's theses carried out at the same department. However, departments with few bachelor's theses can coordinate with other departments that have bachelor's theses aimed at the same programme or subject area. In addition to the presenting group and the opponents, the examiners of the presenting and opposing groups also attend, preferably along with the supervisor of the presenting group.

To be given an individual assessment all students have to participate actively in the presentation and opposition. Groups that have four or more members are therefore divided up into two presentation sessions (the students are divided up into two sub-groups; each sub-group presents the whole project), while groups with three or fewer members are given one presentation session.

Each reporting session is 30 minutes; this period has to accommodate the presentation (15-20 min), opposition and any questions from the examiner and other participants. An opposition is held directly after each oral presentation. The opposing group (sub-group) have 10 minutes for their opposition.

Since the opposition is assessed individually and the time for oral opposition is short, each student also has to write an individual opposition. The students in the opposing (sub-)group have each to submit their written opposition to their examiner, their supervisor, the presenting group and the presenting group's supervisor at least three working days before the first presentation date (the exact date is given on Chalmers Education pages for bachelor theses). There is more information on **presentation** and **opposition** in annexes 5 and 6.

3. Examination

The bachelor's thesis course is graded on an individual basis. The individual grade is based mainly on the group's performance but also on the individual's performance. The examiner and supervisor are responsible for there being supporting documentation for the grades set.

3.1. The group's performance

The assessment of the group's performance is the basis for the individual assessment and is called the base grade. To be passed the group must complete all components/submissions. The base grade is based on the following four components:

Table 1. Parts of base grade

Components/assignments considered in grades	Examined on the basis of	Scale factor * points for component	Who makes the assessment?
Planning report	Instructions for planning report – Annex 3	1*(0-10)	Examiner
Essay/Report	Assessment criteria for bachelor's thesis (HISS)	5*(0-10)	Examiner
Product	Dependent on specialist subject	2*(0-10)	Examiner
Process	Project diary – annex 2 Supervisor's contact with the group	2*(0-10)	Supervisor

In the assessment of the bachelor's thesis, points at component level are used instead of directly using the graded marking scale of F-3-4-5. The reason is to prevent the scale being too coarse when the components are weighed together. Each component/submission is assessed on a component point scale that is 0-10 points for all components. The component points are linked to the graded marking scale of F-3-4-5 in the following way: four points is the lower limit for grade 3, six points is the lower limit for grade 4 and eight points is the lower limit for grade 5.

The component points received are multiplied by the components scale factor so that the components are given different weights. After that the points received for the four components are added up to obtain the total number of points. In this way, the group's total points can be a maximum of 100 points. The aggregate total points are then converted into a base grade, but with additions of + and – according to the following table.

Table 2. Conversion table from total points to base grade

Conversion table from total points to base grade										
Point limit	p<40	40≤p<60			60≤p<80			80≤p<100		
Grade	F	3			4			5		
Point limit		40≤p<47	47≤p<54	54≤p<60	60≤p<67	67≤p<74	74≤p<80	80≤p<87	87≤p<94	94≤p<100
Extra		-	None	+	-	None	+	-	None	+

3.1.1. Assessment of the planning report

The examiner assesses and grades the planning report and is responsible for speedy feedback to students, no later than within ten working days. This component includes the group's decision about whether to take account of ethical and societal aspects in their

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essay/report. To aid their assessment the examiner can use the annex Societal and ethical aspects – support for students’ analysis and examiners’ assessment (annex 7).

The planning report has to be completed in due time during the project. If it is not submitted at the set time, the group gets zero points for this part. Then the planning report has to be submitted at a later deadline agreed by the examiner and the group (but not more than about a week later). If no planning report is submitted then either, the members of the group can be failed on the course. If a deficient report is submitted at the regular deadline, the examiner has to return it for another deadline. This is so that the planning process, which is so important for the work of the group, actually takes place. The revised planning report is then assessed according to the regular criteria but after that a point deduction of five component points is made (i.e. the group can at most get five component points and the grade of 3 for the component, see table 1 Parts of base grade). If the planning report is still deficient at a second deadline, the members of the group can be failed on the course.

3.1.2. Assessment of the essay/report and the product

The group has to submit its essay/report to the examiner at the end of study period 4, eight days before the presentation days (the exact date is given on Chalmers Education pages). It is the version that is submitted on this occasion that is assessed and that also forms the basis for grading the group’s performance. The essay/report is submitted to the opposing group at the same time. For information about the organization of the essay/report, see annex 4.

In the examination, the assessment of the quality of the written essay/report is linked to the learning objectives for the bachelor’s thesis. The assessment criteria for bachelor’s theses (HISS) are used as support in examining the essay/report.

If the examiner has made the assessment that an analysis of societal and ethical aspects is relevant, the analysis has to be included in the essay/report. See annex 7 for information about how the analysis can be shaped and how it is assessed.

The group is responsible for the essay is following Chalmers’ guiding principles concerning academic honesty and integrity (see <https://www.chalmers.se/en/education/your-studies/rights-and-obligations/academic-integrity-and-honesty/>). The examiner is responsible for having the essay/report checked in a plagiarism tool. An essay/report containing plagiarism is not passed. Plagiarism can also result in disciplinary measures according to Chalmers’ Rules Discipline.

The product is examined through an assessment dependent on the specialist subject by the examiner. If the examiner assesses that there is no product in the project, the 20 possible points for this part are added to the assessment of the essay/report.

3.1.3. Assessment of process

The process component makes up 20 per cent of the base grade and is examined by the supervisor. The supervisor’s assessment is based on the group’s project diary and the supervisor’s contact with the group. In the process component, an assessment is made of

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how well the group handles collaboration with one another – both day-to-day cooperation and the group’s collaboration when faced with challenges. The learning objective “Reflect on how the project group worked together to meet common goals” is examined within the process component. Read more in annex 2 about how the process is assessed and examined.

3.1.4. Failed group performance and supplement

If the group performance is assessed as a fail, the group can be given the opportunity to supplement it within a period agreed by the examiner, the supervisor and the group. The highest grade that a group that has been failed can be given after submitting a supplement is the grade 3. If the examiner assesses that the supplements necessary are so extensive that they make up the bulk of the work that should have been done in the project, no opportunity to submit a supplement is given. The students are failed and have to come back the next time the course is given. The examiner also has the possibility of giving individual students a pass grade even though the other students in the group are failed.

3.2. The individual’s performance

Every student has to be given an individual grade. The starting point for the individual assessment is that every member of the group is at the base grade given to the group. Following the individual assessment, the grades in the group can vary. Two components are assessed individually: The individual’s contribution to the group’s performance and Presentation and opposition.

Table 3. The parts of the individual grade

Components considered in grades	Examined on the basis of	Impact on the individual’s grade	Who makes the assessment?
The individual’s contribution to the group’s process, collaboration and results	Supervisor’s contact with the group (annex 2) Project diary (annex 2) Contribution report (annex 2)	Can have a great impact on the individual’s grade	Supervisor
Presentation and opposition	Annexes 5 and 6	Together a maximum of +- 1/2 of a grade level.	Examiner

3.2.1. Assessment of the individual’s contribution to the group’s performance

The supervisor assesses in what way and to what extent each individual in the group has contributed to the group’s performance. This is based on the supervisor’s continuous contact with the group and on the group’s project diary and contribution report. See annex 2 for support in this assessment.

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3.2.2. Assessment of presentation and opposition

The assessment of the student's performance in presentation and opposition is combined with the individual grade achieved so far. The final grade can be affected if the individual grade borders on a higher or lower grade. This means that, taken together, performance in presentation and opposition can affect the grade by at most $\pm 1/2$ of a grade level. Read more in annexes 5 and 6.

3.2.3. Other supporting information for assessment of the individual's performance

The supervisor is free to have the members of the group make oral and also written assessments of their own and the other group members' performance in addition to what is made in the project diary and contribution report. Such assessments can help the supervisor and examiner to set the individual grades. However, it is not the students who set grades and for that reason there is no part of formal point assessment in the organization of the examination.

3.2.4. Failed individual performance and supplement

A student in a group can be failed even when the group as a whole is passed if the contribution report, the project diary and the supervisor's assessment are in agreement that the student concerned does not meet the performance requirements. The most common reason for failing a student is that the student has not participated in the work to the extent expected. The student who has been failed can come back in a new project in a later run of the course.

To be passed each student must carry out the oral presentation and discussion. The course memo states how a student can report an acute valid reason for not carrying this out. In the case of a valid reason, the department has to give the student the opportunity to supplement their presentation and opposition before the end of the retake period in August. A student who does not do their supplement is failed on the course.

3.3. Feedback about base grades and individual grades

The examiner is responsible for the students being given feedback about base grades and individual grades. The examiner can delegate this to the supervisor. The supervisor is responsible for giving feedback about the individual's contribution to the group's process, collaboration and results

The examiner should be available on one occasion when grades are discussed. The supervisor should, of course, be summoned if there is a discussion about the grades of a certain group.

Annex 1 Group contract for bachelor's thesis

Since you group members may have different ideas about how your cooperation should take place, you have to draw up a contract in which you make clear what rules for cooperation apply and how you intend to handle a situation when someone does not live up to your agreements. Since you may also have different levels of ambition, the contract also has to make clear your different levels of ambition so that a very ambitious member can cooperate with a somewhat less ambitious member without them having incorrect expectations of one another.

If you want to, you can start from this draft contract, but you can also choose to draw up a contract written wholly by you for your cooperation.

Contact details

NAME	PHONE NUMBER	EMAIL

Rules of cooperation (please use more space if needed)

How do you handle ...	What do you choose to do?	Action on misshandling
meetings, e.g. <ul style="list-style-type: none"> • booking procedure • meeting methods • attendance • late arrival • ... 		
division of work, e.g. <ul style="list-style-type: none"> • areas of responsibility • allocation of sub-tasks • deadlines • ... 		
decision-making, e.g. <ul style="list-style-type: none"> • When to apply majority decisions, consensus or allocation of decisions 		

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<ul style="list-style-type: none"> • documentation of decisions • ... 		
time log and diary <ul style="list-style-type: none"> • how, who, when? • what? • praise and criticism • breach of contract? • ... 		
document and file management <ul style="list-style-type: none"> • how, who? • version management? • ... 		

Ambition

Formulate your common objective for this thesis in a couple of sentences Try to say something both about your essay/report and any product.

Our objective is...

Level of ambition: How much effort does each of you intend to invest in this course?

Name	Moderate	A great deal	A very great deal

Do you have any common grade objective for this thesis? In that case, what is it? _____

Signatures of all group members:

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Annex 2 Instructions for project diary and contribution report and for the supervisor's assessment of the individual's contribution to the group's process

Project diary

The project diary should be seen as a collective name of the following three documents that are all produced as part of every project.

1. **Project plan:** (Is produced as a single document in the initial phase of the project)
 - Description of the project's aim and objectives and of any restrictions of its scope.
 - Description of coming resource needs.
 - Presentation of distribution of roles in the group (division of responsibility)
 - Time and activity plan for the project.

2. **Time log:** (Written continuously)

Time reporting covering all group members that states the number of working hours devoted to the project along with the associated main activity during the period of time. The scope can be one note per day.

3. **Diary:** (Written at least once a week)

The diary should describe in chronological order the phases of work in the project work, joint and individual work in various tasks performed, problems that have arisen, suggestions of various solutions and reflections about them and any solution implemented. Other information that can be included is meetings, weekly planning, sub-objectives, etc. The diary should be kept relatively continuously and the activities for a particular week have to be written before the end of the week.

The diary can be a Word document or some form of web-based document. The most suitable form for the time log is an Excel document. The form of documents is decided at the first meeting between the supervisor and the project group.

Contribution report

The contribution report has to be written continuously and is a basis for individual assessment. It can contain:

Areas of responsibility

- Planning
- Information gathering/reading part
- Methods – choice/development
- Implementation

Contribution to problem-solving, synthesis and analysis

- Problem-solving
- Creativity, wealth of ideas
- Creation of model

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- Analysis of project-related material
- Contribution to discussion
- Conclusions

Main author of sections

- State sections
- Any division of editorial responsibility should be stated

Assessment of process and of the individual's contribution to the group's process, collaboration and results

The supervisor is responsible for grading of the process component, which makes up 20 per cent of the base grade. In making this assessment the supervisor has their own continuous contacts with the group to draw on along with the project diary and contribution report. One way for the supervisor to assess the group's process is to continually check on the areas stated in the group contract during the course (annex 1). Other questions to build on can be:

- How does the group handle deviations from the planned work flow?
- How do the students reflect about their collaboration in the group?

The learning objective "reflect on how the group has collaborated to fulfil common objectives" is examined within the process component.

The supervisor is also responsible for the part of the individual grade that is made up of the individual's contribution to the group's process, collaboration and results. The supervisor has their own continuous contact with the group, the project diary and the contribution report as their basis for this assessment.

Annex 3 Instructions for the planning report

The planning report has to give a clear statement of the subject/problem the bachelor's thesis will deal with, and how this will be done. The following headings and information must always be included. Note that the following headings must be included irrespective of whether the study is wholly literature-based, contains an empirical investigation or is a design project. The planning report does not need to answer all of the following questions, but the students should consider these issues at an early stage in the project and consistently cover more and more of them. It is a good idea for the students and supervisor to exchange a number of drafts of the planning report before it is submitted.

Title

A preliminary title has to be given in the planning report

Background

The background has to contain reasons why the subject chosen is of interest from an academic perspective and/or from an engineering perspective or, where relevant, from the perspective of the customer/client. In certain cases, this heading has to include a brief history of the subject. After reading the background all readers should understand why the subject is relevant. The following issues should be considered:

What is the subject/problem to be examined? Why has the subject/problem come up? Why or for whom is it an interesting or relevant subject/problem? Can the specific subject/problem be related to a more general discussion?

Aim

The aim specifies what the project is intended to result in and what type of results will be achieved. A project can have several different aims that are related to the subjects/problems presented in the background. In most cases, however, it is appropriate to only have a general aim, which is then broken down into more detailed parts further on in the process and essay/report in the bachelor's thesis.

Problem/Task

This section is often the most important part of the planning report (and of the final essay/report). It aims to identify the question(s) to be raised in the project. It is important that the group does a problem analysis even if a problem (task) is already specified in the project proposal. The reason is that the real primary problem often differs from the problem initially proposed by the client/proposer/customer. The problem analysis is also intended to break down the problem/task into smaller and more detailed sub-problems/sub-tasks, which can also lead to the formulation of sub-aims. By doing this the students gain a much better understanding of the different aspects of the problem/task. Without this information it is impossible to identify what information is needed, what information sources are needed and what approaches are suitable.

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A good problem analysis that identifies sub-problems/sub-tasks and sub-aims often builds on the use of theories and models from the literature. A review of the literature should therefore be carried out early on in the process.

Scope

The scope has to take up what parts of the problem will be not taken up in the essay/report and the reason for this. The reasons given for the scope are important.

Method/Implementation

How the group has intended to implement the work is their choice of method. In design-centered projects this may appear to be obvious, but there may also be important choices of method in this case. Wholly literature-based bachelor's theses are also feasible, but even a literature study has to have an ordered and structured work process and methodology.

The method section should also describe how to collect data and how to establish how well the aim of the project has been fulfilled. In practical projects this can be through measurements of various types. It can also be through computer simulations. What aspects are important in order to know whether the aim of the project has been achieved? Data collection can also be an important part of testing or other evaluation of the product developed in a design-focused project.

Number of study objects/test cases and how are they selected? Type of investigation method/test method? How will the data/test results collected be analyzed and presented? What does the process for the literature work look like?

Societal and ethical aspects, assessment of whether they need to be taken into account for the problem chosen

In the planning report the group is expected to write a brief text in which the group assesses whether societal and ethical aspects need to be taken into account and analyzed further in the essay/report. The group will benefit from using annex 7 as support along with the digital resources available on Chalmers Education pages about the bachelor's thesis.

Timetable

This part of the planning report describes what will be done and when it will be done. The people to be contacted should also be stated here. The dates or at least the weeks when the students will submit interim reports and the final presentation have to be stated here. The timetable will obviously be fairly rough to begin with.

It is important to note that the activities in the project cannot be viewed sequentially as these activities are dependent on one another, which means that there will be a number of iterations between them. It will only be possible to use the knowledge built up in a good way by iterating between them. The same thinking also applies to report writing, i.e. the updating of a section also requires the updating of other sections. Report writing should therefore be done continuously during the whole of the project.

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Annex 4 Instructions for the essay/report

The outline of the essay/report builds on its subject and content; the chapters of the main part are arranged differently depending on what type of project the group is working on. For example, in a design-focused project great weight is attached to parts that form no part of a literature study.

A basic model for this type of essay/report has the following structure:

- Title page
- Brief summary/Abstract
- Contents
- Introduction
- Main part
- Conclusion/Discussion
- Sources
- Annexes

In cases where an analysis of societal and ethical aspects has been judged to be relevant, this analysis has to be included in the essay/report. The analysis can either be placed as a separate text in some part of the report structure or be included throughout in, for example, the Introduction, Main Part and/or Conclusion/discussion.

The Conclusion/Discussion has to include a section where the group reflect on the need for further knowledge and make proposals of future problems within the subject.

For more information about formal requirements, see the course page in Canvas “Generella kompetenser i kandidatarbetet” which is accessible when the student is registered on a course code for the bachelor’s thesis and also the Chalmers Writing Guide¹.

All essays/reports must have an abstract as well as title in English and a brief summary in Swedish.

The essay/report should be aimed at other students with the same subject specialization unless there are strong reasons for some other target audience.

¹ <http://writing.chalmers.se>

Annex 5 Instructions for and assessment of presentation

An oral presentation is included in the examination. This component is compulsory and is held by (sub-)groups, i.e. at most three students make presentations at the same time.

Organisation of the presentation

Each (sub-)group has to present the work of the whole group orally and has 15-20 minutes at their disposal to do this. The oral presentation has to be so full that other students on the same programme who have not read the essay/report are also able to follow the presentation. Visual aids should be used to illustrate the presentation.

Assessment of the oral presentation

The examiner takes account of the following points in their assessment

Content

The (sub-)group has made a good selection from the material in the essay/report and the project as a whole and it has been presented in a way that is well-adapted to the recipients and situation and the specific subject area.

Structure

The content is well structured and the presentation is therefore easy to follow. The introduction and close are clearly marked and help the recipients to absorb the content. The different parts are well linked and form a unified whole together. The transition between different speakers and between sections is well planned and does not lead to any disturbing breaks in the presentation.

Presentation technique

Each individual speaker in the group establishes and maintains good eye contact with the audience and speaks freely with memory prompts.

Visualisation

The visualisation material (images, graphs, point lists, text) used is clear and does not contain too much information. The material is readily comprehensible. The speakers give a clear and understandable account of the material shown. The run-through of the visual material is logical and well considered.

Adjustment to time

The group stays within its timeframe. The distribution between different group members is relatively even.

Handling of questions

The individuals reply well to relevant questions.

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Annex 6 Instructions for and assessment of opposition

Oral opposition

The opposing group presents and discusses their comments at the oral presentation. They highlight both what is good what is less good in the bachelor's thesis. The oral opposition is assessed individually, but the opposing group has to prepare their opposition together and during the opposition session the group members have to cooperate in asking questions and discussing the bachelor's thesis.

The purpose of the opposition is to clarify and anchor the content of the essay/report and to make any supplementary points that are required to make the discussion relevant to everyone in the room. To make the opposition work in an auditorium it is of the utmost importance that the opponents do not situate the discussion at a detailed level.

Written opposition

The written individual opposition involves a review that sheds light on and discusses the merits and deficiencies of the essay/report. It has to shed light on and discuss the content of the report. The text itself has to be a free-standing document, 400-600 words long, in which comments have been worked on and summarised in a readily accessible way. The following points can serve as a basis for the review:

- The organisation and structure of the essay/report
- Definition of the problem
- Method/implementation
- Scope
- Theory
- Analysis
- Results and handling of results
- Design and formal aspects of the essay/report

Assessment of the opposition

Both the written and the oral contributions are assessed by the examiner. A well- conducted oral opposition is characterised by relevant questions, the follow-up of questions and the ability to create a context for the auditorium. The opposition has to be opened and closed in a well-considered way and its content has to be well-adapted to the communication situation. Personal attacks and other hostile comments lead to a fail grade for the opposition.

A well- conducted written opposition means that the text gives an overall picture of the essay/report and is able to shed light on the most important issues. An assessment is also made of whether the written opposition is a balanced and well-formulated critique of the essay/report concerned and how well the opponents have studied it.

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Annex 7 Societal and ethical aspects – support for analysis and assessment

In academic year 2017/2018 the following learning objective was added to the syllabuses for the bachelor's thesis:

- assess whether societal and ethical aspects² need to be taken into account for the problem chosen and, where relevant, analyse these aspects in the essay/report.

This annex is intended to provide support both for students in their analysis work and for examiners and supervisors in their assessment. There is also support in the form of brief films about ethics on Chalmers Education pages that students should see.³ In the examination, the group's performance has to be assessed in the planning report and, when considered relevant, also in the report (according to the HISS criteria), the presentation and the opposition.

In the planning report, the group has to write a short text in which they assess whether **societal and ethical aspects** need to be taken into account and analysed further in the essay/report.

If the group reaches the conclusion that societal and ethical aspects do not need to be taken into account, the group has to give the reason for this in the planning report. The examiner is responsible for assessing the text in the planning report on the basis of how well the group discusses and draws conclusions about ethical and societal aspects of their own project. The examiner also makes their own assessment of the relevance of ethical and societal aspects in the project and then determines whether the students also have to analyse such aspects in the essay/report. If this is so, the examiner is also responsible for assessing that analysis and this is done on the following basis:

- not missed any of the obviously relevant ethical aspects (values) for the project;
- given a clear and distinct description of the ethical aspects (values) that are or could have been relevant;
- discusses both advantages and disadvantages of the project from an ethical and societal perspective;
- give adequate reasons for any decisions they have taken linked to this.

In order to achieve clarity and completeness, the student group will benefit from using the decision analysis model set out below. By working with the decision analysis model students can, in certain cases, also choose less problematic methods (implementation) or final objectives (outcomes) for the study and thereby reduce the original ethical problems. The model can be used both to make an initial assessment in the planning report and then – if the examiner judges that it is relevant – in the essay/report. Note, however, that the

² Sometimes the concept values is used identical to aspects

³ <https://www.chalmers.se/utbildning/dina-studier/kandidat-och-examensarbete/kandidatarbete/genomfora-kandidatarbete/#samhalleliga-och-etiska-aspekter>

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students do not have to give a report in the text of how they went through each stage of the model but have instead to focus on the insights and results it may have given them. Depending on the conclusions reached by the students it may be relevant to report them at various places in the report such as: introduction (background, reasons, scope), method, discussion.

Decision analysis model for critical thinking about ethical issues

This model is intended to be used in such a way that the group goes through the questions once, giving preliminary answers to them. When the group has done this, they can go through the questions again to make a deeper analysis.

1. Which ethical aspects (values) are relevant to the project?

There are a few central ethical aspects where it is always important to examine whether they are relevant – and if they are – to comply with them. There are that we must not do **harm**, that we must do **good** and that we must not restrict the **autonomy** and **integrity** of other people. Doing good has to be given a broad interpretation, both interdisciplinary good/benefit, and extradisciplinary good/benefit, are relevant. For example, it may be the case that the project does not have any specific benefit for society but that there are still good reasons for implementing it since it would add something of interest and relevance to basic research. Depending on the project there may be other relevant aspects to take into account.

2. How can we implement our project so as to avoid ethical problems in our method?

Given that the group is going to implement a particular project, there can be a number of different ways of carrying it out, where some implementation options are more problematic than others. One example is a project in which the students' issues can be examined by animal experiments. Here there should be a discussion of whether the animal experiments can be replaced with other types of experiments, or can use fewer animals, make the experiment less painful and so on. Another example is a project that has the aim of developing a technical solution to reduce the anxiety problems people experience. The students have intended to test this solution on their friends and acquaintances. In such a project it is important to be aware, and discuss, that the method may lead to problems for the participants' well-being.

3. What benefit or ethical problems can there be with this probable result (outcome) of the project that should be taken into account?

When the project has been implemented, it can benefit both research and society. It is important to describe the benefit in concrete terms and to also describe whether the completion of the project risks leading to harm in various ways. One example is a project that is implemented in a city neighborhood in order to increase the safety and participation of residents through a resident- driven innovation, where thought should be given to what will probably happen after the end of the project.

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4. Who are affected by the implementation of the project or by the probable result (outcome) of the project?

How are they affected? Are there ethical problems linked to this that should be taken into account?

In an ethical analysis of a project, it is of the utmost importance to ask who are affected by the project and how they are affected. For example, if a project is intended to modify crops genetically to make them more resistant to pesticides, one effect of this may be that when these crops are put on market the farmers who work with these crops in poorer parts of the world will incur great (financial and/or physical) harm from this. Since harm to already vulnerable groups can be particularly serious from an ethical perspective, considerations of this type should be given great weight.

5. What should we do if we do not find any relevant ethical aspects (values) concerning the project?

If the student group has gone through steps 1-4 above and analysed its project and the project's possible effects without finding any relevant ethical or societal aspects, the group should change analysis level (system level). Depending on what level the project is analysed at, its intra- and extradisciplinary relevance can be assessed in different ways. As an example, the group's project is to ultimately contribute by adding an extra scalar boson to the standard model. As such, the group's project probably does not activate any relevant ethical aspects in its implementation or its outcome. But it is still possible to imagine that in a wider scientific perspective, which the students' project contributes to, their results may have a number of different positive and negative implications for both research and society. Another example can be a project that aims to contribute to more efficient fuel use in lorries that can lead to less emissions and cheaper operation of the individual vehicle, where a higher system level can be the role of diesel vehicles in a transport system, where negative consequences can be greater opportunity costs for the development of engines not run on fossil fuels. When the students change analysis level, they go through steps 1 to 4 again.

Annex 8 Descriptions of roles

The following is a starting point for what the different roles are responsible for in the bachelor's thesis course. This can differ from department to department, but the intention is that, for example, an examiner will have the same areas of responsibility as their counterpart in another department. One important starting point is that the supervisor and the examiner must not be the same person. In the following being responsible means that the role is responsible for the task but that the task can be delegated when needed.

Supervisor

- Communicate the scope of the supervision and the role of the supervisor to the students in the group and that, if necessary, assure that a risk assessment is made for parts of the project implementation.
- Introduce the group contract/agreement (annex 1).
- Introduce the project diary and contribution report (annex 2).
- Be responsible for a mid-project meeting being held with the group.
- Carry out individual grading of the work process in the bachelor's thesis.
- Attend the group's presentation (and preferably also their opposition).
- Be responsible for regular meetings being held to give the students sufficient supervision.

Examiner

- Be responsible for the project proposals maintaining good quality (before they are posted on the Study Portal and the head of programme has to review them).
- Inform the group about the date for and method of submitting the planning report (annex 3). Assess the planning report. Be responsible for the students being given feedback about the assessment of the planning report.
- Be responsible together with the departmental coordinator for arranging time slots for the presentation of the bachelor theses and that these are communicated to the students in the project groups at the department.
- Attend the group's presentation and opposition.
- Carry out the individual grading of the course in accordance with chapter 3 of the regulation for bachelor's theses.
- Check that all parts of the bachelor thesis specific general skills are approved before the reporting of the final grades can be done.
- Be responsible for the students being given information about their grades. The examiner should be available for a discussion about grades.

Coordinator

- Coordinate information and communication within the department regarding the bachelor's thesis course.

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- Communicate the scope of the supervision and the role of the supervisor to the supervisors.
- Coordinate planning between the department's divisions regarding the production of bachelor's theses.
- Hold information about what projects in the department are student-initiated.
- Be responsible for projects being made accessible on the department's Canvas page.
- Be responsible for projects being entered in the Study Portal's module for bachelor's thesis selection and arranging presentation session for the departments' projects for the students before the selection period.
- Communicate with the coordinators during the allocation of bachelor's theses.
- Be responsible together with the examiners at the department for arranging time slots for the presentation of the bachelor theses and that these are communicated to the students in the project groups at the department.
- Be responsible for arranging information sessions at the course start for the department's bachelor's theses. On these occasions, information on implementation of all parts of the bachelor thesis work is given, including for the bachelor specific general skills, which is done with support from the department of Communication and Learning in Science.

Vice head of department (At certain departments the vice head and coordinator are the same person.)

- Appoint the coordinator and inform the staff affected at the department of the role of the coordinator.
- Ultimately responsible for supervisors and examiners being appointed at the department.
- Ultimately responsible for project proposals being generated at the department.
- Inform themselves about their department's bachelor's thesis course ahead of agreement conversations with the educational areas.

Head of programme

- Responsible together with the director of studies for students being given information about the bachelor's thesis course from the perspective of the programme regarding the main field of study and other practical questions.
- Present wishes about subjects for projects to departments.
- Check on suitability regarding student-initiated projects in relation to the programme plan.
- Approve and rejects proposed projects from departments for their programme.
- Decide on which students that will be granted an exemption to complete a bachelor's thesis.
- Follow up the bachelor's thesis course, including with a course board meeting.

Director of studies

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- Be responsible together with the head of programme for students being given information about the bachelor's thesis course from the perspective of the programme regarding the main field of study and other practical questions.
- Produce input for signature by the head of programme regarding any students who are being given exemptions to complete a bachelor's thesis.
- Enter supplementary credits from credit transfers ahead of the allocation bachelor's theses.

Coordinator for allocation of bachelor's theses

- Provide information about and decide the timetable for the bachelor's thesis allocation process.
- Develop and update the bachelor's thesis choice model continuously.
- Update central webpages on Chalmers Education pages about the bachelor's thesis.
- Allocate bachelor's theses to students.
- Communicate with all groups affected in undergraduate studies at Chalmers during the allocation process.

Regarding reporting of grades

- The department administrators report the final grades in LADOK for the bachelor's thesis after that the examiner both approved all parts of the project work and checked that all parts of the bachelor specific general skills are approved.