GUIDE ON BACHELOR'S FINAL PROJECTS - CORONAVIRUS
FACULTY OF SCIENCE
Latest update: July 6th, 2020

BACKGROUND
Consideration is being given by the faculty on the options for continuing teaching activities during the current Corona-pandemic. One of the biggest challenges facing us is the continuation of Bachelor's projects.

We realize that progress on Bachelor's projects this academic year will be different to that of future years. For many Bachelor's projects, independent experimenting skills are an essential part, and in many cases cannot be concluded remotely. This will inevitably cause many Bachelor's students to fall behind schedule in their studies. In order to limit this delay as much as possible, we are looking at ways of slightly reshaping Bachelor's projects. As a faculty, we are proud of the standard of the Bachelor's projects, while Master's programmes (including those elsewhere) are very enthusiastic about the degree of knowledge and independence that our new Bachelor's graduates bring to the table. We are very keen to keep it that way, but it requires creativity.

This guide is aimed at looking for ways of limiting the level to which students fall behind schedule in their studies. It is intended to give you ideas and to inspire you yourself to come up with creative solutions on how final projects should be done. Minimizing the delay caused to students starting their projects will help limit the impact on the next group of students starting on their Bachelor's projects.

FOR WHOM
It is important to understand that the breadth of the Faculty of Science is such that Bachelor's projects cannot all be grouped under one heading. Each domain (and within any domain, each degree programme) has challenges of its own to face, vis-à-vis the final projects. This guide is therefore aimed primarily at the domains of NSM, HLS, and EEE. The domain of IS envisages fewer problems relating to the continuation of Bachelor's projects as in many cases they can be carried out remotely.

CUSTOM-MADE
In the NSM, HLS, and EEE domains, the guides will not be applicable in the same way for every degree programme. There is no one clear-cut format for modifying Bachelor's projects. Those in charge of degree programmes should remain critical as to whether there is any scope for creative solutions, and continue to explore options. For many students, there will be options available. If not, we will have to look for solutions to facilitate the progress of students to Master's programmes, thereby meeting their needs as much as possible. Students have now been informed about the rules concerning BSA and the 'Bachelor's before Master's rule'. Because this scenario has far-reaching consequences for students and the degree programme, we are appealing to you to check whether the guides in this document are in any way applicable to your programme. Every modification that is reasonably possible will result in less delay.

GUIDE

What does the final product consist of?
In general, it is a mix of (the list below is not exhaustive):
   a. drawing up research question;
   b. literature survey;
   c. independent experimenting skills (making, measuring, gathering data);
   d. data processing and analysis;
   e. communication skills.

What final attainment levels must be reached?
The starting point for any creative (alternative) solution is the final attainment levels for the degree programme and the Bachelor's project.
   - For the degree programme, check whether the five components mentioned above (a to e) are all the components that apply to the Bachelor's project.
   - Then, determine what exactly students have to demonstrate. What are:
        o the final attainment levels of the programme;
        o the learning objectives of the Bachelor's project;
        o the proof of proficiency requirements?
   What are the minimum requirements that a student should meet?

We make Bachelor's projects as interesting and enjoyable for the students as possible. In normal circumstances, the faculty welcomes this. However, the current exceptional circumstances compel us to restrict ourselves to the precise final attainment levels.

ADDITION, 25 MARCH 2020 - EXAMINATION BOARD CONDITIONS
The Examination Board has set two additional conditions:

1. ***Each of the components a to e, referred to on page 2, must be successfully completed.***
   The sequence of the components and the weighting attached to them may of course differ.
   The Examination Board assumes that any delays will be kept to a minimum, if possible.
2. Component C (independent experimenting skills (making, measuring, gathering data)): The Examination Board is of the opinion that the real 'hands-on' skills are covered during the degree programme. ***If a student has successfully completed a course in which training in these skills is given, and therefore has a command of the skills, then the student has reached the final attainment levels***

How can the final attainment levels be demonstrated?
The five components that a final project consists of (on average) are generally dealt with in chronological order and as a coherent entity. However, dealing with the components as relatively autonomous units does offer alternative ways of producing the final project. Abandoning the chronology aspects allows the possibility of deferring those components for which physical access to the workplace and/or other students is required. This can be done without endangering the quality of the final attainment levels or students' opportunities for reaching them. It means that students can already make a start on the theoretical background at home.

Abandoning the chronology aspects can create extra room for maneuver for a large proportion of students. In any case, many programmes can alter the sequence of the components mentioned. We realize that this does not apply to every programme in equal measure. For some programmes, the 'independent experimenting skills' component is so important and such a major part of the programme,

that bringing forward the more theoretical aspects will not have the desired effect. It may be that students cannot work on the remaining components until they are able to be physically present at the research location. This is the case with laboratory work, for example. However, we do ask that those in charge of the programmes look critically at the size and the duration of this component. The crucial question here is what the minimum requirements are for a student to be able to demonstrate reaching the final attainment levels. Students being delayed on this component will lead to a backlog of delayed Bachelor's experiments once the labs are accessible again.

WHAT ALTERNATIVE ROUTES ARE THERE?

- Remote skills (period until May)
  In all cases, student can start their literature surveys and drawing up their research questions at home. Normally, students would then demonstrate their experimenting skills, sometimes making and measuring something. This may not be possible during the coronavirus pandemic. Often, the gathering of data is the crucial step. However, nowhere is it stated that students should analyse the data they have themselves gathered. The analysis skill could conceivably be demonstrated by analysing certain datasets or through computer models. If this principle is used as a starting point, then students can carry out three of the five components in advance of the gathering of data, while at home in social isolation. Obviously, the students would have to be remotely supervised, though.
- Conducting laboratory work (from June onwards)
  Conducting experiments independently should of course be part of the final project, but can be deferred to a later time. This means that the student in question will not be analysing his own data (or not analysing it thoroughly). For the purpose of reaching the final attainment levels, there is no objection to this. Thought should perhaps be given as to what should be done with the data. One option could be for the data to be analysed by other students later.
- Communication skills
  In most cases, this concerns both written and oral skills. Written skills concern the maintaining of a lab journal according to the rules commonly used in the relevant discipline, presenting measurement readings in tables and graphs, including defect analysis, making a measurement report, including conclusions and recommendations for further research. Only the former is directly linked to the carrying out of lab work. This also applies to the description of the reliability of the work done. This could potentially, temporarily, be divided into two: a report based on components a, b, and d (that students could do at home), and a lab journal or measurement report based on component c. The same applies to oral skills: presentations and discussions do not have to be about everything. The oral and presentation skills could also be tested using digital resources (oral test via Skype, video presentation).

WHAT DOES THIS REQUIRE OF THE PROGRAMME?

The more traditional structure of final projects is being dispensed with. This requires a different kind of effort from the Director of Studies and work placement supervisor:

- Determine critically what the minimum requirements are for reaching the final attainment levels and meeting the learning objectives.
- Check what activities are needed (and in what form) in order for the final attainment levels to be demonstrated. For example, could the lab time be shorter, or fieldwork approached differently? Could the literature survey be extended? Is there greater scope for more flexibility and can more consideration be given to trial structures (proposition, blank, reference, safety, etc.)?
- Remote supervision when drawing up research question, literature survey, and data analysis.
- Making appropriate existing datasets available to students. Finding a dataset that fits in with the subject will probably have to be done on a student-by-student basis and will demand a lot of the supervisors.
- Modifying the way of reporting/presentation of the final project, possibly in two parts.