**Guide to Bachelor & Master projects at SLU**

**Overall aim of the projects:**

An independent project is a project where you will apply your in-depth knowledge, skills and approach to an issue in the field of the education. Often, the independent project is at the end of your education where you will plan, conduct and present an academic study.

**Rules on publishing:**

Independent projects (degree projects) that have received a pass grade are deposited and published in Epsilon, SLU’s electronic publishing tool. The student owns the copyright to their independent project and equivalent work. According to the Copyright Act, SLU must obtain the permission of all authors involved to publish their work. The department must document and archive this permission. If an author does not agree to publishing, the work must still be deposited to register metadata and archiving

**Overall guidelines to the projects can be found in the handbook:**

[Education planning and administration handbook | Studentwebben](https://student.slu.se/en/rules-rights/rights-and-responsibilities/regulations/)

9. [Independent project (degree project)](https://student.slu.se/en/rules-rights/rights-and-responsibilities/regulations/#exarbete9)

Useful information about independent projects such as grading criteria and other regulations at the NJ faculty are found using this link:

[Independent project at the NJ faculty | Medarbetarwebben](https://internt.slu.se/en/targeted-info/faculties/nj-faculty/support--tools/utbilda/nj-msc-thesis/)

**Expectations of the different roles:**

* Specific detail can be found using this link:

[guidance-independent-project\_eng-v2022-02-28.pdf](https://internt.slu.se/globalassets/mw/utb/examensarbete/guidance-independent-project_eng-v2022-02-28.pdf)

**Who is responsible for what?**

**Student**

The student is responsible for writing a work plan and schedule in consultation with their supervisor. The student carries out their independent project with the aim to meet the intended learning outcomes. The student initiates meetings with their supervisor in accordance with the stipulated supervision hours (10 hours/15 credits or 20 hours/30 credits). A student’s right to supervision only concerns a specific course instance.

**Supervisor**

The supervisor’s function is to supervise the student to help them meet the intended learning outcomes. The supervisor should inform the student of the available number of supervision hours, help them plan their independent project and co-write their work plan. A supervisor can supervise several students within the same course instance. In certain cases, a student is allowed several supervisors – one must act as the principal supervisor, the others as assistant supervisors. A supervisor can discourage students from submitting the final version of their independent project for defence if it risks receiving a fail grade. However, it is ultimately up to the student to decide what to do.

If necessary, the supervisor must submit bases for assessment to the examiner. If a student did not achieve a pass grade, occasional supervision may be offered after the course ends.

**Head of department**

The head of department at the department where the principal supervisor works is responsible for ensuring that there are supervision resources.

**Examiner**

The examiner and supervisor cannot be the same person. There may be several examiners in one course instance; however, there may only be one per student project. The examiner assesses and grades a student’s independent project, using the intended course learning outcomes and grading criteria as the starting point. The examiner must make the grading decision without any influence from the supervisor. If necessary, the examiner can require bases for assessment from the supervisor. If several students have written an independent project, the assessment of student performance must be individual. If necessary, the examiner may request that each student provides a report of their individual work on an independent project.

Students who do not receive a pass grade for the course instance in question have the right to be reassessed in the same manner as for other courses.

**Course coordinator**

The course coordinator has a general role and coordinating function at department level, and they approve the work plan. The course coordinator is contacted if, for example, there are cooperation problems or if the student wishes to change subject or supervisor. The course coordinator is also responsible for applying course evaluation procedures on independent projects.

**External partners**

Agreements with external partners are made through separate agreements, and between SLU and the partner in question, not the student (any remuneration exempted). In cases where the student carries out their project externally and has an external supervisor, they must also have a principal supervisor at SLU who is responsible for ensuring that the project is carried out in accordance with SLU guidelines and a course syllabus.

**Bachelor projects: EX0876 Independent project in Food science, G2E**

Course link, with information about course objectives, learning outcomes, contents etc : [Independent project in Food science, G2E | New search | Studentwebben](https://student.slu.se/en/studies/courses-and-programmes/course-search/course/EX0876/40123.2425/Independent-project-in-Food-science-G2E/)

**Goals and Purpose of the Thesis Work**

"The purpose of this course is for the student, based on previously acquired knowledge, to independently plan, execute, and present their own work within a specified timeframe. Through this independent project, the student will develop skills in academic writing and deepen their subject knowledge. After completing the course, the student should be able to:

* Identify issues and formulate research questions within a given subject,
* Independently search for, compile, evaluate, and critically interpret relevant information and data based on the formulated research question,
* Critically discuss the content, results, and conclusions of a scientific work, and reflect on how the research question and choice of methods relate to the scientific and practical foundations of the subject,
* Reflect on societal and ethical aspects as well as sustainability aspects within the subject,
* Present a scientific work in writing, according to current practices within the subject, adapted for the specified audience and following given guidelines,
* Orally present a scientific work and critically review and provide constructive feedback on another student’s work,
* Identify their own developmental needs in competence and knowledge within the area of the work."

**Project Format:**

15 pages +-10%

Follow the Structure in the Template: <https://slu-se.instructure.com/courses/458/pages/mall-for-uppsatser>

* Title
* Introduction
* Method
* Results (and Discussion)
* Discussion
* Conclusions (Outlook)

**Presentation (PowerPoint or Equivalent)**

* **Duration**: 10-15 minutes + questions
* **Opposition**: Both oral and written
* **Your Comments** (opposition) on another student’s thesis should be sent to the student and to your own examiner.

**Formats for the Work – Experimental, Literature Study**

* Language: English is the most common (and accepted—although the course language is technically Swedish)
* Written and Oral Presentation
* Opposition
* Requirements for Passing the Work (=> Completed Course)

**Time frame:**

A bachelor project is 10 weeks long, which includes the initiation process of the project writing as well as presenting and defending the project. So in reality the student has about 7-8 weeks of actually doing research and writing their thesis.

Here comes an overview of the different tasks that should be done and the timeframe for the student projects

|  |  |
| --- | --- |
| Week | Tasks |
| Before course starts | -Students should find a research project and supervisor, supervisor needs to find an examiner.-Registration form should be filled in and signed by the parties involved and sent to the director of studies at the department |
| 1 | -Work plan should be written. The signed plan should be given to the director of studies at the examining department. The work plan should be revised during the course of the project if needed.-Supervisor and/or examiner go through the grading criteria with the student. -Student and supervisor discuss the student’s need of developed competence and knowledge to pursue the planned project, and note in the work plan how to accomplish this |
| 2 | -Clarify aim of the project if this is not already established, can be good to have a meeting about the working plan if external partners are involved for their input and expectations of the collaboration.-student downloads the SLU template to understand the report format and expectations- Search of relevant literature may start-student familiarize themselves with reference program, ask the library for help if needed |
| 3-7 | -Research and report writing |
| 8 | First Draft sent to opponent Send abstract to examiner |
| 9 | -Oral defence and opposition-feedback to opponent.-work continue on working with improving text based on feedback |
| 10 | -send final report to the examiner |

**Example titles bachelor projects (can be written in Swedish or English):**

 Dairy matrix - mjölk och mjölkprodukter bortom mättade fettsyror.

 Näringstäthet i relation till miljöpåverkan - hur utvärderar vi bäst livsmedel ur ett hälso- och miljöperspektiv?

 Näringsinnehållet i mjölk resp vegetariska alternativ.

 Påverkansfaktorer som styr mot önskad mjölkråvara, främst för framställning av ost och mjölkpulver.

 Framtida användningsområden för skummjölk inom hantverksmässig mejeriproduktion.

 Instrumental techniques to study bread staling.

 Poultry meat quality in relation to modern production systems.

 Äkthet på växtoljor, vilka parametrar ska man använda.

 Vilka marina/terrestra organismer kan man tänka sig som nya fiskfoder.

 Mindre bioaktiva komponenter i ovanliga växter, kryddor och ogräs.

 Hälsa eller ohälsa i samband med köttkonsumtion?

 Alger och andra nya källor till fleromättade fettsyror.

 Flow of non-starter lactic acid bacteria from field, to farm, to milk and cheese.

 The importance and use of colostrum.

 Novel techniques e.g. Hyperspectral imaging, ultrasound and computer tomography (CT) in quality assurance of different foods.

 Methods to study protein degradation and formation of free amino acids in cheese during the ripening process.

 Current knowledge in technological aspects and analytical determination of milk coagulation.

 Role of minerals in milk coagulation and cheese manufacture: A Review.

 Seasonal variation of Swedish milk quality and composition.

 Dairy farmhouses; artisan products and methods.

 Production and use of lactic acid starters in artisan dairy products.

 Bacteriocin production by lactic acid bacteria - a review.

 Effects of processing on fish product quality.

 Viltkött - ett hållbart alternativ i köttkonsumtionen?

 Kvalitetsaspekter hos viltkött.

 Karaktärisering och artbestämning av nya metylotrofa jästsvampar för hållbar proteinproduktion.

 Vill du hjälpa Åland att utveckla en hållbar livsmedelsstrategi? Eller vill du vara en del av Ålands mathantverk?

 Role of ingredients in noodle quality.

 Genetiska markörer för mjölkkvalitet.

 Problematisering kring totalantalet bakterier i mjölk.

 Meat quality aspects of exotic/traditional species.

 Aspects of egg/egg-product quality (you can choose different species, products…).

 Different rennets and their contribution in manufacture and maturation of cheese.

 Laktos i ost – vilka mängder talar vi om? Lactose in cheese – are levels of concern?

 Opastöriserad mjölk- nytta och risker?

 Current trends and methods in analysis of Lactobacillus.

**Master projects: EX1028 Independent project in Food Science A2E - Agriculture**

Course link, with information about course objectives, learning outcomes, contents etc: [Independent project in Food Science A2E - Agriculture | New search | Externwebben](https://www.slu.se/en/education/programmes-courses/course/EX1028/30214.2425/Independent-project-in-Food-Science-A2E-Agriculture/)

**Goals and Purpose of the Thesis Work**

The aim of the course is for the student, based on previously acquired knowledge, to independently plan, carry out and present an academic study within a given time frame. Through the independent project, the student will develop their skills in the academic work process and deepen their subject knowledge considerably.

On completion of the course, the student will be able to:

* independently and creatively identify and formulate scientific questions;
* independently search, compile, evaluate and critically interpret relevant information and literature;
* within given time frames, independently plan and by using adequate methods carry out a scientific study related to the agricultural sector;
* analyse and evaluate data and/or findings on a scientific basis;
* discuss contents and conclusions in a scientific work critically, and reflect on how the choice of question and method relates to the scientific and practical basis of the subject;
* reflect on social and ethical aspects, sustainability aspects within the subject as well as ethical aspects of research and development;
* present a scientific work in accordance with the prevailing practice of the discipline, adapted to the intended audience and according to the instructions given;
* write a summary in English of a scientific report according to the instructions given;
* write a popular science summary of a scientific work according to the instructions given;
* present a scientific work orally and critically review and discuss, as well as give constructive criticism of, another student’s project, including method, conclusions and the context of the work in a wider perspective;
* identify their own skill and knowledge development needs in the subject of the project,
* relate the scientific questions to the agriculture sector’s complex system of resources and value-creating processes.

**Compulsory parts of the thesis course**
• Carry out a project and write a thesis (in English)
• Give an oral presentation and defend the thesis at the end of the course (in English)
• Make an opposition to another student’s MSc thesis (in
English)
– Orally in association to the presentation
– In writing, summarizing your opposition
• Submit your thesis to “Urkund”
– To allow control for plagiarism by your examiner

**Project Format:**

**You must write, present and defend your master
thesis in English**
• The scope of the thesis should be around 30 pages+-10%
– excluding title page, abstract, table of contents, acknowledgments, reference list, popular scientific summary and appendixes

Follow the Structure in the Template: https://slu-se.instructure.com/courses/458/pages/mall-for-uppsatser

• Title

• Abstract in Swedish (Swedish-speaking students) & English (200-250 words, ca ½ A4)

• Introduction

• Method

• Results (and Discussion)

• Discussion

• Conclusions (Outlook)
• Popular scientific summary in English (500-1000 words, about one A4)

**Oral presentation**
• Each student has 45 minutes at his / her disposal for
– Presentation (about 25-30 minutes)
– Student opposition (about 10 minutes). Opposing student should comment on e.g., language, disposition, scientific content in both written and oral presentation. The student opponent must also send a written summary of his/ her opposition to his/ her examiner.
– Presenting student is expected to answer questions and respond to comments

**Time frame:**

A master project is 20 weeks long, which includes the initiation process of the project writing as well as presenting and defending the project. So in reality the student has about 17-18 weeks of actually doing research and writing their thesis.

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| Week | Tasks |
| Before course starts | -Students should find a research project and supervisor, supervisor needs to find an examiner.-Registration form should be filled in and signed by the parties involved and sent to the director of studies at the department |
| 1 | -Work plan should be written. The signed plan should be given to the director of studies at the examining department. The work plan should be revised during the course of the project if needed.-Supervisor and/or examiner go through the grading criteria with the student. -Student and supervisor discuss the student’s need of developed competence and knowledge to pursue the planned project, and note in the work plan how to accomplish this |
| 2 | -Clarify aim of the project if this is not already established, can be good to have a meeting about the working plan if external partners are involved for their input and expectations of the collaboration.-student downloads the SLU template to understand the report format and expectations- Search of relevant literature may start-student familiarize themselves with reference program, ask the library for help if needed |
| 3-17 | -Research and report writing-students have to have time to read literature, research and assess result + write report so in practice this means about 6-8 weeks for research really  |
| 18 | First Draft sent to opponent Send abstract to examiner |
| 19 | -Oral defence and opposition-feedback to opponent.-work continue on working with improving text based on feedback |
| 20 | -send final report to the examiner |

**Example titles Master projects in Food Science:**

* Effect of Germination on the Cooking Behavior of Millet and Legume Flour
* Image-Based Classification of Faba Beans from Different Varieties
* Impact Factors Controlling Desired Raw Milk Quality for Cheese and Milk Powder
* The Nutritional Content of Milk and Vegetarian Alternatives
* Nutritional Density in Relation to Environmental Impact
* Dairy Matrix – Milk and Dairy Products Beyond Saturated Fatty Acids
* Impact of Freezing Storage on Milk Coagulation Properties and Cheese Yield
* Mung Bean Protein Components: Extraction, Characterization, and Gelation/Fibrillation
* Grain Morphology Profiling Using Cgrain Instrument
* Impact of Wheat Flour Lipid Composition on Baking Properties
* Comparison of Lamb Meat Fatty Acids in Imported vs. Swedish Lamb
* Fatty Acid Composition in Arctic Char Fed Red Yeast Diet
* Milk Microbiota Survival During Long-Term Freezing Storage
* Characterization of Milk from Endemic Sri Lankan Species
* Characterization of Rennet from Swedish Ruminants
* Variation in Microflora of Milk by Feed and Milking Routines
* Turning Food Waste into Plant-Based Protein
* Lactose Levels of Concern in Cheese
* Effect of Algae as Feed on Cow Milk Protein Profiles
* Microbiota Development in Artisan Cheeses Post-Best-Before Date
* Microbial Composition of Dairy Farmhouse Starter Cultures
* Plasmin Activity and FFA Levels in Milk Affected by Lactation Number
* Dairy Value Chain's Impact on Long-Ripening Cheese Quality
* Germination and Fermentation Effects on Milled Flour Quality
* Dietary Fiber, Starch, and Phenolic Profile of Swedish Pea Fractions
* Pulse Milling and Sieving: Functionality of Fractions
* Investigating Exopolysaccharides in Oleaginous Yeasts
* Microbial Lipid and Carotenoid Production from Logging Residues
* Extraction and Analysis of Substances in Oleaginous Yeasts
* Valorization of Ice Cream Waste Alternatives

**Klara’s Master's Thesis Tips for students**

**Experiments**

1. Create a plan; detailing the experiments/analyses you will conduct.
2. Understand the purpose of each analysis—what results do you hope they will yield?
3. Do a trial run on less valuable samples before testing your own samples.
	* By practicing the experiment once beforehand, you’ll identify potential challenges.
	* Are there any critical steps (some may require extreme caution, precision, or speed to avoid disrupting the reaction)?
	* A trial run ensures all solutions and reagents are ready and gives you an idea of how long the analysis should take.
4. Start early in the day to give yourself ample time to complete the analysis.
5. If analysing many samples or working with time-intensive analyses, begin early in the week to allow time for completion. If you start on a Friday and don’t finish, you may have to wait until Monday, risking sample degradation if they are sensitive.
6. When you get your results, analyse them immediately or at least note down results in excel or in word. It’s often easier to write about and interpret results when the analyses and samples are still fresh in your memory.
7. Be clear in your lab notebook about which samples, results, and analyses you refer to. If anything unusual occurs, document it.
8. Be careful in the lab and avoid working alone.
9. If the analyses feel overwhelming, talk to your supervisor, who may help organise your time.
10. Don’t hesitate to ask for lab assistance. If uncertain, it may be better for your results to have someone demonstrate to you how; to use a pipette, help you choose the correct stir-bar size, or to operate the pH meter etc.
11. When writing and saving data do no not overwrite raw data, always make a copy that you analyse/ manipulate.

**Writing**

1. Plan which sections of your thesis you want to write and complete by certain dates and set a deadline for each section.
2. In your schedule, allocate at least a week at the end for revising and editing the entire report.
3. Talk to your supervisor about how you should set-up your report for reviewing, do they want to read the different bits as you finish them or do they just want to read the whole report at the end? Is there anything in the writing which you fina particularly challenging and would like extra feedback on or assistance in? when I wrote my PhD thesis I sent my supervisors different sections for review as I competed them e.g, material and methods first, then a week later results, two weeks after discussion etc.
4. Discuss the aim of your study with your supervisor (and any external collaborators if relevant). A clear purpose makes structuring the project and text much easier.
5. Plan the structure of your report carefully. A good outline is essential. For me, deciding on my thesis outline took a lot of time and effort. I re-wrote many sections and moved them about to match the different structures I was trying out to get the most cohesive and well written thesis as possible.
6. Start writing early. I often draft and write materials and methods while conducting experiments. It’s easier to recall details and allows you to note instrument names and models right away.
7. Write the results and discussion as separate sections. Though this might feel tedious, first writing down your results and then discussing them helps maintain a clear structure. To discuss results, they must first be presented as results. By writing results first, you can ensure you have reported and noted all findings before starting the discussion. The results section should only contain your findings and should mirror your material and methods in the structure. The discussion, often the most challenging section, involves integrating and comparing other researchers’ findings to explain your results.
8. Download and set up VPN to access various databases: <https://student.slu.se/en/study-support/it-support/support/access-to-databases-requires-vpn/>
9. Download and learn to use a reference management program like Mendeley or EndNote. These are available through the library: <https://www.slu.se/en/subweb/library/write-and-cite/reference-management-software/>
10. If you need help with writing, the library offers assistance. <https://www.slu.se/en/subweb/library/services-and-courses/personal-help/drop-in/>