

Guidelines for Degree Thesis projects (*examensarbeten*) in Plant Biology/Plant Molecular Biology

Examination committee

The examination committee for the Masters Degree in Plant Biology/Plant Molecular Biology strives to ensure that thesis works are of high quality and that the theses are written in a clear, comprehensible manner and in a uniform format.

Members of the committee are: supervisor(s) of the student, Leszek Kleczkowski (UmU), Laszlo Bako (UmU), Stephanie Robert (SLU). Aim of this document is to inform students as well as supervisors about the rules related to the initiation, implementation, reporting and evaluation of thesis works, as detailed below:

Supervisor

Only PIs with a Ph.D. degree can be supervisors. A graduate student or a postdoc may act as a guide on the daily basis, but a graduated PI is responsible. If the work is carried out outside Umeå University, for instance in a company, a supervisor at Umeå University has to be appointed.

Student

PLEASE CHECK! Are you eligible to start the Degree project? It is unfortunate if you are prevented from carrying out the work after all the planning has been done. The requirements are as follows:

Degree Thesis, Master's level 15, 30 or 60 ECTS: Basic courses at the advanced level of at least 45 ECTS included in the Master Programme in Plant and Forest Biotechnology. Students coming from other master programmes are expected to have a comparable portfolio of completed advanced level courses.

You have to apply for the thesis work through the web (antagning.se) and via a registration form that can be downloaded at <http://www.upsc.se/study-at-upsc/student-information.html>. Fill out the form together with the supervisor and hand it in to Laszlo Bako who will check that you are eligible to start a thesis work for the intended Degree. Remember to indicate the time period: the 15, 30 and 60 ECTS projects take 42, 84 and 170 working days, respectively. If you are eligible to start the thesis work, the project description will be assessed whether the suggested project is 1) in the area of plant biology/plant molecular biology and 2) at the right level, before it can be approved. The form is used as a basis for registration in LADOK, which will be carried out by Rebecca Gramner.

Before you start the project

With input from your supervisor, write a concise project plan containing aims, description of tasks, a workflow with specified experimental methods and a timetable. Project plan must be submitted and approved before the course starts. Inform yourself about the requirements for passing the Degree Thesis (see below).

During work

You should get sufficient supervision. You are not allowed to be in the laboratory without some kind of supervision. The progress of the work should be evaluated by the supervisor together with the student 2-3 times during the project to ensure that the plan is feasible and that enough data will be obtained at the end of the work (see evaluation form below). If you fail to carry out the work in a satisfactory way you will early on (within two to three weeks) receive a warning that the performance is not acceptable. Your performance is continuously evaluated during the work and this warning will be a written intermediary evaluation form that has to be signed by you (**see "Final evaluation" below**). The criteria that will be evaluated are: Theoretical competence, technical skill, independence, motivation and initiative, and creativity and imagination as well as scientific writing. If you fail in any of these

categories you will have time to improve before the final evaluation is done, otherwise you will not pass the course.

Examination

Your thesis work will be evaluated in three stages. First, your progress and performance will be recorded and graded by your supervisor using the “**Final evaluation**” form, which is completed and sent to the examination committee. Second, your work will be examined by the committee at a seminar presentation. Third, your written thesis will be examined and graded by the examination committee.

Your Thesis work will be evaluated according the following criteria. The student should:

- after studying reviews and scientific original articles, show a substantially deepened and widened knowledge in the field of plant biology/plant molecular biology.
- show skills in experimental design and choice of methods.
- obtain practical experimental skills, and show an ability to apply these skills in combination with theoretical knowledge.
- be able to critically examine and analyze the obtained experimental results.
- be able to critically compare these results with previously published data and conclusions.
- be able to independently present a major task in the form of a scientific presentation.
- demonstrate understanding of the requirements for solving a scientific problem.
- carry out a research project and present the results in a thesis with a scope that corresponds to the level of the Degree.

The grades are **Pass** (Godkänd, G), **Pass with distinction** (Väl godkänd, VG), or **Fail** (Underkänd, U).

The Thesis

General advice

The thesis should be written in English with sufficient information to make it easy to understand. Think of the reader as a person with a general education in biology or molecular biology, but who do not necessarily have specialized knowledge in the topic studied. Avoid excessive use of abbreviations and acronyms, and avoid them altogether in the title. Abbreviations may be necessary in figures and table heads, but they must then be explained in the legend. If you have to use them in the main text, explain them when they are first introduced.

Your thesis is based on your own work and it has a single author: you. Therefore, use the pronouns *I*, *me* and *my* (not *we*, *us* and *our*) for your results and conclusions. If someone else was involved in a particular experiment, or if you want to mention someone else’s unpublished results, the full name and affiliation of that person must be clearly mentioned (and you must have her/his permission).

Note! Figures from a published article, a book, or from the internet cannot be used. The copyright for these usually belongs to the publishers (not the authors!).

Format and submission

Follow the instructions for authors given by one of the international journals. In practice this means that it should be organised as follows: **Title, Abstract, Introduction, Materials and Methods, Results, Discussion, and References**. The title page has no page number, page one is the abstract page and the following pages should be numbered consecutively. Format the report for the international A4 page size (not the American letter format), and use single-space throughout. Results and Discussion can be combined if that is suitable. Figures and Tables are best inserted in place in the text but could also be assembled at the end. There is no space limit, and hence no need to place data in a supplemental part.

The report should be submitted electronically as one contiguous document, ideally as a single MS Word or pdf file to laszlo.bako.umu@analys.urkund.se for thorough plagiarism check. Be aware that it has to be submitted three weeks before the planned date of defence but not later than **six months after the project is finished**. The supervisor should separately send a statement to laszlo.bako@umu.se that the thesis is clearly written, and ready to be examined according to the expected level of achievements (*föväntat studieresultat*, see attachment) for the Master’s Degree. The thesis cannot be examined until this statement has been received.

Title

Should be short and informative, describing the purpose and/or main result of the thesis. No abbreviations or acronyms, except very standard ones (e.g. DNA).

Abstract

Should clearly describe the aim of the study and the main results. Should be written as a single paragraph of typically half a page and never more than one page. Avoid abbreviations or acronyms, except very standard ones (e.g. DNA). No literature references here.

Introduction

Should give sufficient background information to allow a reader with general education in plant biology or plant molecular biology, but without specialist knowledge, to understand the remaining parts of the thesis. The Introduction should also clearly define the purpose of the study and place that purpose into the context of current knowledge of the field. In this section you should give background references to the relevant published work. In scientific publications, the introduction section is usually not illustrated, but in a student thesis it can sometimes be helpful to include an overview figure or graph. However, you are only allowed to use your own artwork.

Materials and Methods

Should describe the experimental procedures in sufficient detail for the reader to duplicate them. For previously published procedures, just give the appropriate reference.

Results

For each experiment or set of data, describe why it was done, what was done, the outcome, and the conclusion drawn.

Discussion

This is the place where you can discuss your results in the context of what has been published previously, and the wider implications of your results. You should also critically discuss if there are uncertainties or problems etc., and what could be done about them. You don't have to repeat a description of your results here.

References

Should follow the format of one of the international scientific journals. They should either be numbered (with text references given as numbers) or arranged alphabetically after the first author's family name (with text references given as first author and year).

The seminar

The seminar should be given in English and should last no longer than 20-25 min. Upon reading the thesis work students will receive a short written criticism from each committee member at least one week before defense. Following their presentation students are expected to give a concise, point-by-point response to the criticisms, supervisor is fully responsible that changes are introduced into thesis work in response to criticism. Defense seminars are public events and students must ensure that their thesis defense is advertised on the UPSC billboard well in advance.

Publishing

The Department of Plant Physiology has agreed on an open access policy for internet publishing of project/ degree theses in the DIVA (*Digitala Vetenskapliga Arkivet*) database. The following information will be registered: title of the thesis, course, level, student's name and department. It will also be registered if the thesis work has been carried out in collaboration with an external party outside Umeå University.

Evaluation form for Degree Thesis in Plant Biology/Plant Molecular Biology.

Supervisor/Department: _____

Student/PIN-code: _____

Course/credits: _____

Category	Evaluation 1	Evaluation 2	Evaluation 3	Final evaluation
Theoretical competence <i>Ability to attain relevant theoretical information during the project.</i>				
Technical skill <i>Student is able to learn required techniques quickly.</i>				
Independence <i>Student is able to work independently after being given sufficient instruction.</i>				
Motivation and initiative <i>Student takes his/her own initiative to read and organize the work for completing the project.</i>				
Creativity, imagination <i>Student has his/her own ideas to proceed in the project.</i>				
Adjustment in the group <i>Student adjusts and participates in group activities.</i>				
Work ethics <i>Student works full time and plans his/her work for efficient performance</i>				
Scientific writing	—	—	—	

Final overall grade experimental part (supervisor)	
Grade seminar presentation (examination committee)	
Grade written report (examination committee)	
Overall final grade (examination committee)	

Grading system

This form should be used for the continuous and final evaluation of students during their Degree Thesis work. Use the following grades: **Pass (Godkänd, G)** **Pass with distinction (Väl godkänd, VG)**, or **Fail (Underkänd, U)**. This form may be especially helpful if the student is weak and needs encouragement to improve. If the student fails in any of the categories during one or several of the evaluations, the student should be informed and also sign below. The student can pass the course even if he/she fails in a few of the initial evaluations, provided that a significant improvement occurs.

Supervisor: _____ **Student:** _____
Signature Signature

Examiner: _____
Date Signature

Assessment Form used by the examination committee for Degree Theses in Plant Biology/Plant Molecular Biology.

Explanation and instructions:

In the form below are the expected learning outcomes contained in the syllabus for Degree Thesis projects in Plant Biology/Plant Molecular Biology. The idea is that the form should serve as a support for the examiner in the assessment of individual theses.

Each learning outcome is assessed separately and all are summed to generate an overall assessment of the thesis.

The assessments are done on a three-point scale:

3 = very high goal achievement,

2 = high goal achievement,

1 = Insufficient goal achievement,

The assessment contains eight learning outcomes and each learning outcome needs to be assessed with high or very high goal achievement for the report to pass. A failed Degree Thesis projects can be corrected by the student and returned to the examination committee for re-evaluation.

The comment field is free to use. It should always be used to justify when the assessment is set 1.

Note: The final grade for the thesis consists of three parts with the following priorities. 1) The written thesis. 2) The supervisor's evaluation, and 3) The oral presentation.

Student name:

Date:

	Expected learning outcome	Clarification/ interpretation	Grade	Comment
1	After studying reviews and scientific original articles, show a substantially deepened and widened knowledge in the field of molecular biology.	Be able to summarize and discuss literature relevant for the study		
2	Show skills in experimental design and choice of methods.	Methods used or discussed should be well explained.		
3	Obtain practical experimental skills, and show an ability to apply these skills in combination with theoretical knowledge.	Conclusions made should be supported by data and presented in an understandable way in figures and tables.		
4	Be able to critically examine and analyze the obtained experimental results.			
5	Be able to critically compare these results with previously published data and conclusions.			
6	Be able to independently present a major task in the form of a scientific presentation	The work should be well structured with an understandable text that reconnects with previous knowledge in the field		
7	Demonstrate understanding of the requirements for solving a scientific problem.	The work has an identified and formulated question with a specified / justified relevance		
8	Carry out a research project and present the results in a thesis with a scope that corresponds to the level of the Degree.	The written report should reflect that the author has put a full time on the thesis during the course.		