



Department of Molecular Biology
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Guidelines for Degree Thesis projects (*examensarbeten*) in Molecular Biology

Examiner (Debra Milton & Matthew Francis)

As examiner for the Masters and Bachelor's Degrees in Molecular Biology, it is our responsibility to ensure that the theses are of high quality, that they are at the correct level (Master's/Bachelor's) and that they are written in a uniform scientific format. We therefore would like to inform about the rules, which are as follows:

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 independent PI is responsible (for example, with a researcher, lecturer or professor position). If the work is carried out outside Umeå University, for instance in a company, then a secondary supervisor employed at Umeå University must to be appointed early in the process.

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, Bachelor's level 15 ECTS: 30 ECTS-credits in Chemistry, with a minimum of 7.5 ECTS-credits in Biochemistry and 60 ECTS in Molecular biology, including at least 7.5 ECTS-credits in Genetics, 7.5 ECTS-credits in Microbiology and in total 15 ECTS in the areas of Plant- and Animal Physiology, and Cell- and Molecular Biology are required.

Degree Thesis, Master's level 15 or 30 ECTS: Basic courses at the advanced level of at least 30 ECTS included in the Master Programme in Molecular Biology.

You must apply for the thesis work via a form that can be downloaded at <https://www.umu.se/en/student/molecular-biology/degree-thesis-and-projects-in-molecular-biology/>. Fill out the form together with the supervisor and hand it in to Viktoria Vedin (Study counsellor) who will check that you are eligible to start a thesis work for the intended Degree. Remember to indicate the time period: the 15 and 30 ECTS projects take 42 and 84 working days, respectively.

If you are eligible to start the thesis work, the final round of approval will be done by Matthew Francis who will assess the project description to see that it is 1) within the molecular biology area, and 2) is appropriately pitched at the right level for the given degree. The form is used as a basis for registration, which will be carried out by Ingela Nilsson (study administrator).

Before you start the project

With input from your supervisor, write a plan for the project. Inform yourself about the requirements for passing the Degree (see below).

During the practical work

Work is to be performed at 100% study tempo. You should also receive sufficient supervision; this must detail particular safety measures relevant to the research environment, as well as provide sufficient guidance to progress in the experimental component. 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 students a minimum of 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 manner, and that the progress is insufficient to merit a continuance, you will receive a notification that the performance is not acceptable. Your



performance is evaluated continuously during the work and if you fail to perform in an acceptable way this will be noted in the intermediary evaluation form that finally has to be signed by you (**see** “Evaluation form for Degree Thesis in Molecular Biology **below**”). The criteria that will be evaluated are: Theoretical competence, technical skill, independence, motivation and initiative, creativity and imagination, adjustment in the group, work ethics and 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:

- 1) Your progress and performance will be recorded and graded by your supervisor, using the “**Final evaluation**” form, which is completed and sent to us. This performance will culminate in giving an oral research presentation to the research group.
- 2) Your work will be examined by a committee of experts in a public poster session (master’s level) or a public oral seminar session (bachelor’s level). If you cannot participate in the poster or seminar session, a seminar at the department/institute can be arranged as an alternative.
- 3) Your written thesis will be examined and graded by either Debra Milton or Matthew Francis.

Your Thesis work will be evaluated according the following criteria (additional criteria for the Master’s level *in italics*). The student should:

- after studying reviews and scientific original articles, show a *substantially* deepened and widened knowledge in the field of molecular biology.
- show an understanding of basic experimental design and choice of methods (*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).

Specific information regarding the Poster examination (master’s level examination)

The poster will be examined by a committee of experts in a public poster session arranged twice a year, at the end of each semester. The poster should be written in English and the allowed size is 90x120-150 cm. It is normally organised as follows: **Title – Name of student, name of supervisor, department – Background – Aim – Results (including methods) – Conclusions or Discussion – References**. If convenient, a separate Materials and Methods could be included. The text should be at least **16pt** and be possible to read at a distance of 1-2 m. Apply for poster session through Ingela Nilsson. Please be aware that the ability to defend the scientific process and the scientific content of your poster will be examined, not the aesthetic or artistic look of your poster per se.

Specific information regarding the oral seminar presentation (bachelor’s level examination)

Your presentation will be examined by a committee of experts in a public oral seminar session. The presentation should be an approximately 20 minutes long using PowerPoint (or similar) presentation and contain **Introduction, Background, Methods, Results, Discussion, Conclusion, Societal aspects and Acknowledgements**. You are expected to attend all the presentations during the seminar day. You are also expected to peer-reviewed (oppose) on another student’s presentation



(ask relevant questions following the presentation). The presentation will also be open to critique by the examiners in attendance, as well as the general audience (public).

Specific information regarding the written thesis (applicable to both masters and bachelors level)

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 (like ourselves) with a general education in 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

Please observe that the title and back page should be written in a uniform way. For templates, contact student administrator Ingela Nilsson, Department of Molecular Biology, Umeå university, 901 87 Umeå (ingela.nilsson@umu.se, tel: 090-785 2869). Follow the instructions in the template and **do not change font or font sizes on the template page**. 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. Submit it as one contiguous document, ideally as a single pdf file.

Follow the instructions for authors given by one of the international journals. In practise this means that it should be organised as follows: **Title, Abstract, Introduction, Materials and Methods, Results, Discussion, and References**. 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 written thesis must also consider **bioethical implications** of the project, as well as **societal implications** of the project.

The report should be submitted electronically to debra.milton.umu@analys.urkund.se for thorough plagiarism check. It has to be submitted at latest **six months after the project is finished**. The supervisor should separately send a statement to matthew.francis@umu.se that the thesis is clearly written, and ready to be examined according to the expected learning outcomes (*förväntat studieresultat*, see assessment form below) for the Bachelor's or Master's Degree. The thesis cannot be examined until this statement has been received.

Title

The 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

The Abstract should clearly describe the aim of the study and the main results. It 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

The Introduction should give sufficient background information to allow a reader with general education in 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. This is a place where 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 with an overview graph. However, you are only allowed to use your own artwork.



Evaluation form for Degree Thesis in Molecular Biology

Student's name: **Personal ID number:**
(yymmdd-**** or date of birth)

Student is registered on the course code: **ECTS credits:**
(Bachelor's level: 5MO092 (15 hp), Master's level: 5MO117 (15 hp), 5MO118 (15 hp) or 5MO119 (30 hp))

Study period: **Examination date:**
(yymmdd to yymmdd) (yymmdd)

Main supervisor's name:..... **Email:**

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 at 100% full time study tempo and plans his/her work for efficient performance</i>				
Bioethical implications <i>The student has demonstrated awareness of bioethical restrictions and regulations associated with the research approach.</i>	—	—	—	
Societal impact <i>Student knows why the research is important, to whom it is relevant, and how it will affect them.</i>	—	—	—	
Communication and scientific writing <i>The student has been able to communicate scientific findings in oral presentations and in the written word</i>	—	—	—	



Final overall grade experimental part (supervisor)	
Grade poster presentation session (examiner) <i>(Masters level)</i> or Grade oral presentation session (examiner) <i>(Bachelors level)</i>	
Grade written report (examiner)	
Overall final grade (examiner)	

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.

Attested by:

Main supervisor

Student

.....
(Please sign your name here)

.....
(Please sign your name here)

Main examiner

.....
(Please sign your name here)



Assessment Form used by examiner for Degree Theses in Molecular Biology.

Explanation and instructions:

In the form below are the expected learning outcomes contained in the syllabus for Degree Thesis projects in Molecular Biology. The idea is that the form should serve as a support for the examiner in the assessment of individual theses. Whenever part or entire expected learning outcome is in *italics*, it refers to Master level only. Otherwise it refers to expected learning outcomes at both the Bachelor and Master levels.

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 7 (Bachelor level) or 8 (Master level) 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 examiner.

The comment field is free to use. It should always be used to justify when the assessment is set to 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 poster/ oral presentation.



Student name:

Date:

	Expected learning outcome	Clarification/ interpretation	Grade	Comment
1	After studying reviews and scientific original articles, show a <i>substantially</i> deepened and widened knowledge in the field of molecular biology.	Be able to summarize and discuss literature relevant for the study		
2	Show an understanding of basic experimental design and choice of methods (<i>show skills in experimental design and choice of methods</i>).	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 analyse the obtained experimental results.			
5	<i>Be able to critically compare these results with previously published data and conclusions.</i>	Only for Master level		
6	Be able to independently present a <i>major</i> 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.		
9	Demonstrates awareness of the bioethical issues associated with the project work	The written report should reflect that the author has an understanding that the work must be performed within strict bioethical boundaries.		
10	Demonstrates awareness of the societal impact stemming from the findings of the project work	The written report should reflect that the author knows why the research is important, to whom it is relevant, and how it will affect them.		