



## **Course PM BB200X**

### **Degree Project in Biotechnology, Second Cycle, 30.0 credits** **Examensarbete inom bioteknik, avancerad nivå, 30,0 hp**

#### **Objectives**

The aim of the degree project course in Biotechnology is to train the student in using analytical, technical and engineering skills and biotechnological techniques in a creative and inventive manner to solve a complex and challenging task within the area of biotechnology. The training is to stimulate maturation of the student in professional project planning, independent project implementing, scientific reporting and public scientific presentation and opposition. In addition, the project work is meant to apply research and knowledge in favor of humanity and society in terms of sustainability, and economic and societal aspects.

#### **Intended learning outcomes**

After completion of the degree project, the student should be able to:

1. Demonstrate knowledge of the chosen topic's scientific foundation and applications, in-depth insight into current research and development, as well as in-depth knowledge of methodology.
2. Demonstrate ability to holistically, critically and systematically search, collect and integrate knowledge, and identify one's need for further knowledge.
3. Demonstrate ability to identify, analyze, assess, and handle complex phenomena, issues and situations, even with limited information.
4. Demonstrate ability to plan and with adequate methods carry out advanced tasks within given time frames, and evaluate this work.
5. Demonstrate ability to develop and evaluate products, processes, systems, methods, or technical solutions, while taking into consideration human conditions and needs, and the society's aim for economically, socially and ecologically sustainable development.
6. Demonstrate ability to clearly present and discuss conclusions and the underlying arguments with other groups both orally and in writing.
7. Demonstrate ability to make judgments considering relevant scientific, social, and ethical aspects.
8. Demonstrate the skills required to participate in research and development work, or to work independently in other advanced activities.

## **Course plan**

<http://www.kth.se/student/kurser/kurs/BB200X>

## **Examination**

Examination (Pass/Fail) is assessed upon the following tasks:

1. Project plan
2. Project execution and management
3. Master's thesis
4. Public oral presentation
5. Public opposition on another second cycle degree project in biotechnology, including written summary of opposition.

## **Eligibility**

Requirements for students admitted to 270 or 300 credits programs: At least 240 credits of total 300 credits (or 210 credits of total 270 credits) in courses within engineering in biotechnology should be completed. Additionally, at least 110 credits should consist of compulsory courses at school year 1-2.

Requirements for students admitted to 120 credits Master's program: At least 60 credits of total 120 credits should be completed. Additionally, at least 30 credits should originate from the specialization for second-cycle studies within the main field of study for the Master's program.

## **Course communication**

Communication is primarily done via the course web (<https://www.kth.se/social/course/BB200X/>), where all relevant information, for example dates, documents, degree project presentation, seminar schedules and lists for assigning opponent, should be posted.

## **Course duration**

The extent of the work should correspond to 20 weeks of full-time effort. The course is primarily scheduled at two times per school year, starting in the first week of period 1 (running period 1 and 2) or in the first week of period 3 (running period 3 and 4). Additionally, three alternative start dates are offered each semester, but the course will be given only if a minimum of four students have registered for a specific date.

## **Literature**

Each student will search for and study scientific literature relevant for the specific research project.

## **Project initiation and synopsis**

The students should find a suitable project and supervisor, and present a synopsis for the project to the examiners of the course. If the project is performed at organizations other than

KTH, two supervisors are needed: one external supervisor at the institution in question and a main supervisor located at KTH.

The project must have a scope within biotechnology and must have the potential to let the student fulfill the intended learning outcomes (see above). It is therefore important that the synopsis is handed in in good time before the intended course start, for evaluation by the examiners. If there are any doubts that the project is suitable, contact the examiner for a discussion as soon as possible. Furthermore, in the case of confidentiality issues with the project, this must be discussed with the examiner.

### **Start-up meeting**

At the course start, the examiner arranges a start-up meeting for the students, main supervisors, co-supervisors and assistant examiners. The course PM, including the course goals, schedule, student documentation and evaluation process will be presented. Peer groups of 3-4 students are formed, for the oral presentations and opposition, and as peer support during the course.

Students performing their degree project abroad should participate online at the start-up meeting.

Supervisors and assistant examiners need to attend a start-up meeting and keep updated every year if involved in supervision of degree projects.

### **Half-time meeting**

A half-time meeting is held in project week 10, between the student, the main supervisor and co-supervisor, and the examiner. The aim of the meeting is to evaluate the project progress, the student performance and the student compliance towards the project plan. If required, the project plan is revised.

Students performing their degree project abroad will have an online half-time meeting with the main supervisor and the examiner.

### **Extension of time**

If the project progress is substantially delayed due to periods of illness, parental leave or other exceptional circumstances the examiner should be notified immediately. The duration of the project may be accordingly adjusted if needed.

### **Project plan**

The student should prepare a project plan using the knowledge from prior education in project management. The project plan should be handed in twice during the project, at week 2 and prior to the half-time assessment.

### **Master's thesis**

The student should write a master's thesis, under supervision of the supervisors. The student should hand in a final version of the thesis to the examiner and the opponent at least 1 week before the oral presentation.

## **Language**

The master's thesis and all other documents should be written in Swedish or English, while the abstract of the thesis should be written in both languages. Also the oral presentation should be given in Swedish or English.

## **Format and requirements of the master's thesis**

The thesis must be written only by the student and should adhere to the standards of scientific reports within biotechnology. The report shall include: Cover page, Table of contents, Abstract, Introduction, Materials and Methods, Results, Discussion, Future perspectives, Acknowledgements, References, and (if applicable) Tables and Figures, and Appendices with raw data or computer program code. The text should have a maximum of 10,000 words, excluding references, tables, figures and appendices. The thesis should be handed in together with the final version of the project plan to the examiner at least one week before the oral presentation.

## **Plagiarism**

Plagiarism is handled according to the KTH policy for plagiarism. The thesis and all other documents, and the oral presentation, must be original and are subjected to plagiarism check.

## **Oral presentation**

The oral presentations are scheduled the last week of the course. They are organized as public seminars, one for each of the peer groups formed at the start-up meeting, where each student gives a presentation.

Students performing their degree project abroad should be present at KTH to present their degree project at this seminar.

Each oral presentation should consist of 25-30 minutes project presentation, followed by 15 minutes of constructive discussions between the student and the opponent (see Critical assessment below), as well as with the other students and the public audience.

The examiner and the main supervisor must be present to ensure fulfillment of the learning process and learning outcomes. External supervisors and assistant examiners should also be present if possible. If circumstances do not allow participation of the external supervisor at the oral presentation, a presentation should be given at the external institution/company in the presence of the external supervisor.

## **Critical assessment**

Students have to critically assess another student's report in writing, as a reflection including questions to be raised, and orally as an opposition after the oral presentation. There should be one opponent assigned to each degree project.

## **Opposition report**

The opponent summarizes his/her opposition in a written document. This document should

have a maximum of 2,000 words and should contain 4 sections: (i) The author and the title of the project to which the opposition report pertains; (ii) A summary of the project in the opponent's own words (iii) The questions the opponent intends to ask; (iv) The opponent's own assessment and reflections on the strengths and weaknesses of the work. The document should be handed in to the examiner at latest two days before the oral presentation.

### **Project documentation**

The work should be documented in accordance with an agreement between student, supervisor(s) and examiner at the Start-up meeting and detailed in the final project plan. The project documentation should adhere to the standards of project documentation within biotechnology, consisting of, e.g., lab book, blog or wiki.

### **Evaluation**

Evaluation of the work, following the grading criteria for the course, (see Course PM Supplement), is performed by the main supervisor and the examiner, with the help of information from the other supervisors. Evaluation will be based on the student's work, the project plan, the working process, the final report, the opposition and the oral presentation.

### **Grading**

Pass/Fail (P/F)

Grading is done by the examiner based on evaluation of: the project plan, the master's thesis, the oral presentation, the opposition and the student's progress towards the learning outcomes throughout the project, all of which need to have the grade Pass in order for the whole course to be given the grade Pass.

### **Contacts**

Course examiners:

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