

# Course memo

## *FCB3001 Higher seminar in Industrial Biotechnology I*

### **Content and learning outcomes**

#### **Course contents**

Industrial biotechnology is a broad research area with a strong connection to sustainable development, where the doctoral students' projects cover both fundamental and applied research within e.g. bioprocess technology, metabolic engineering, biocatalysis, enzyme technology, and identification and characterization of enzymes for sustainable bioprocesses and drug discovery.

The course takes the form of higher seminars in where the doctoral students present, interpret, analyze, critically examine and actively discuss mainly their own work, but also other relevant research literature within the research field. An important aspect is that the research students receive constructive feedback on their own scientific work.

The course aims to provide both broad and specialized knowledge within the students' own research areas in industrial biotechnology and that of the general subject area of biotechnology, as well as knowledge of academic authorship and the international scientific publishing landscape.

#### **Intended learning outcomes**

After completion of the course the student should be able to

- [ILO1] show basic knowledge, both broad and specialized, in the overall subject area of biotechnology with emphasis on the scientific subject area of the course
- [ILO2] show basic ability to present, critically examine and discuss scientific papers in the subjects of biotechnology with emphasis on the scientific subject area of the course
- [ILO3] show basic insights of academic authorship and the international scientific publishing landscape with relevance to the scientific subject area of the course
- [ILO4] demonstrate basic ability identify, discuss and reflect on ethics and sustainability aspects in the research that is discussed within the framework of the subject area of the course

#### **Course disposition**

The course comprises approximately 80 full-time study hours. The course normally extends over an academic year with regular meetings during study-term periods and is the first course in the seminar series.

At each session, a doctoral student presents his/her own work, or if this is not possible another scientific article, where the background, method, results and conclusions are summarized in an educational and concise manner. Anyone who presents can have a desire to get feedback on specific parts of the work, but the group should also discuss the work in its entirety.

Because of the diversity in research background of the student group, considerable consideration should be given to the pedagogical aspect of the seminar. Furthermore, aspects relating to research ethics, social and sustainable relevance should always be identified, highlighted and discussed at the seminar sessions.

In addition to critically reviewing the scientific content, the work's format, language, disposition and presentation as well as publishing technical aspects should also be reviewed and discussed.

The work to be examined must be submitted to all participants well in advance before the session. All participants are expected to read and reflect on the material, as well as to prepare comments and questions. In cases where a doctoral student's own manuscript or article is presented, all participants should, in addition to actively participate in the discussion, also record their views and comments in writing before the seminar.

## **Links to degree objectives**

[ILO1] Show basic knowledge, both broad and specialized, in the overall subject area of biotechnology with emphasis on the scientific subject area of the course

**Links to the Higher Education Ordinance examination goals for Doctoral degree (numbering eISP v. 2.0):**

- A1. *Demonstrate broad knowledge and systematic understanding of the research field as well as advanced and up-to-date specialised knowledge in a limited area.*
- A2. *Demonstrate familiarity with research methodology in general and the methods of the specific field of research in particular.*

**Links to the Higher Education Ordinance examination goals for Licentiate degree (numbering eISP v. 2.0):**

- A1. *Demonstrate knowledge and understanding in the field of research including current specialist knowledge in a limited area of this field as well as specialised knowledge of research methodology in general and the methods of the specific field of research in particular.*

[ILO2] Show basic ability to present, critically examine and discuss scientific papers in the subjects of biotechnology with emphasis on the scientific subject area of the course.

**Links to the Higher Education Ordinance examination goals for Doctoral degree (numbering eISP v. 2.0):**

- B1. *Demonstrate the capacity for scholarly analysis and synthesis as well as to review and assess new and complex phenomena, issues and situations autonomously and critically.*
- B2. *Demonstrate the ability to identify and formulate issues with scholarly precision critically, autonomously and creatively, and to plan and use appropriate methods to undertake research and other qualified tasks within predetermined time frames and to review and evaluate such work.*
- B4. *Demonstrate the ability in both national and international contexts to present and discuss research and research findings authoritatively in speech and writing and in dialogue with the academic community and society in general.*
- B5. *Demonstrate the ability to identify the need for further knowledge.*
- B6. *Demonstrate the capacity to contribute to social development and support the learning of others both through research and education and in some other qualified professional capacity.*

**Links to the Higher Education Ordinance examination goals for Licentiate degree (numbering eISP v. 2.0):**

- B1. *Demonstrate the ability to identify and formulate issues with scholarly precision critically, autonomously and creatively, and to plan and use appropriate methods to undertake a limited piece*

*of research and other qualified tasks within predetermined time frames in order to contribute to the formation of knowledge as well as to evaluate this work.*

- C3. *Demonstrate the ability to identify the personal need for further knowledge and take responsibility for his or her ongoing learning.*

[ILO3] Show basic insights of academic authorship and the international scientific publishing landscape with relevance to the scientific subject area of the course.

**Links to the Higher Education Ordinance examination goals for Doctoral degree (numbering eISP v. 2.0):**

B3. *Demonstrate through a dissertation the ability to make a significant contribution to the formation of knowledge through his or her own research.*

B4. *Demonstrate the ability in both national and international contexts to present and discuss research and research findings authoritatively in speech and writing and in dialogue with the academic community and society in general.*

**Links to the Higher Education Ordinance examination goals for Licentiate degree (numbering eISP v. 2.0):**

B2. *Demonstrate the ability in both national and international contexts to present and discuss research and research findings in speech and writing and in dialogue with the academic community and society in general.*

[ILO4] Demonstrate basic ability identify, discuss and reflect on ethics and sustainability aspects in the research that is discussed within the framework of the subject area of the course.

**Links to the Higher Education Ordinance, and KTH's local, examination goals for Doctoral degree (numbering eISP v. 2.0):**

C1. *Demonstrate intellectual autonomy and disciplinary rectitude, and the ability to make assessments of research ethics.*

C2. *Demonstrate specialised insight into the possibilities and limitations of research, its role in society and the responsibility of the individual for how it is used. As well as demonstrate the ability to contribute to a sustainable social development with knowledge and skills.*

**Links to the Higher Education Ordinance, and KTH's local, examination goals for Licentiate degree (numbering eISP v. 2.0):**

C1. *Demonstrate the ability to make assessments of ethical aspects of his or her own research.*

C2. *Demonstrate insight into the possibilities and limitations of research, its role in society and the responsibility of the individual for how it is used. As well as demonstrate the ability to contribute to a sustainable social development with knowledge and skills.*

## Language of instruction

English

## Detailed schedule

Seminar sessions every two weeks during the study terms. Each session normally lasts two hours. The typical session frequency is nine times per semester or 18 times per academic year, corresponding to approximately 36 scheduled full-time study hours. Outside of the scheduled sessions, all students read and review the work to be evaluated and discussed, and prepare discussion points for the seminar.

## **Key concepts**

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## **Literature and preparations**

### **Specific prerequisites**

Eligible for studies at the third-cycle level.

### **Recommended prerequisites**

No specific prior knowledge is required, but the target group is mainly doctoral students at the CBH school with an own research project on, or interest in, microbial metabolic engineering, biocatalysis, enzyme technology, and identification and characterization of enzymes for sustainable bioprocesses and drug discovery.

### **Equipment**

Laptop computer.

### **Literature**

Literature in the form of the students' own scientific work and published articles are assigned separately for each individual session.

### **Reading instructions**

See course literature.

### **Disability**

Based on recommendation from KTH's coordination for disabilities, the examiner will decide how to adapt an examination for students with documented disability. The examiner may apply another examination format when re-examining individual students.

## **Examination and completion**

### **Grading scale**

P, F

### **Examination**

DEL1 – Attendance, 3,0 hp, grades: P, F

### **Other requirements for final grade**

Active participation at 80% of the seminar sessions, which includes presenting, preparing and actively participating in reviewing and discussing selected scientific work.

## **Examiner**

Christina Divne, divne@kth.se

## **Ethical approach**

All participants are expected to communicate and discuss with each other in a considerate and respectful manner. The seminars should be a forum where everyone feels comfortable to ask their questions openly. Any criticism made in discussions about the reviewed work must be constructive and carefully formulated. Zero tolerance for all forms of unpleasant treatment and harassment. It should also be implicit that the work to be assessed is sent out in good time before the seminar (at least one week), and that the course coordinator and participating students are informed if obstacles or delays arise.

## **Goal-related grading criteria/assessment criteria**

For courses with grades P / F, the learning objectives apply as grading criteria.

## **Examination details**

The requirement for a passing grade is active participation in at least 80% of the course meetings. By active participation is meant that the student's participation in presenting, analyzing, discussing and arguing is included as assessment criteria

## **Opportunity to complete the requirements via supplementary examination**

In the event that complementation is required for a passing grade, the examiner discusses an appropriate solution in consultation with the student concerned. A complementation normally consists of an assignment.

## **Completion of the course**

A research student who due to an imminent dissertation or licentiate seminar cannot complete the course in time before the degree, may, after consultation with the examiner, conduct an adapted examination provided that no more than four seminar sessions remain of the course. Such an examination normally consists of an assignment with a scope that corresponds to the remaining course opportunities.

## **Opportunity for compensatory tasks**

For doctoral students who themselves teach at the undergraduate and / or advanced level during the course, and for this reason can not participate, can in consultation with the examiner be granted attendance at one missed seminar session, provided that the student reviews the work and writes an assignment in the form of a critical and reflective text.

## **Opportunity to raise an approved grade via renewed examination**

As only grades P / F are given, there is no possibility for raising an already approved grade.

## **If the course is changed or discontinued**

If the examination form is changed, the student will be examined according to the examination form that applied when the student was admitted to the course. If the course is

completed, the student is given the opportunity to be examined on the course for another two academic years.

## **Further information**

### **Additional regulations**

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### **Learning platform**

Canvas

### **Offered by**

CBH/Industrial Biotechnology

### **Teacher**

Christina Divne, divne@kth.se

### **Communication with teachers**

Email

### **Course evaluation and course analysis**

All students are offered to complete a course evaluation once a year. The course evaluation is answered and submitted anonymously in the learning platform Canvas. A course analysis is written based on the results of the course analysis, which is made available at KTH's designated place for course analyses. The course analysis summarizes the results from the course evaluation and proposes quality-assurance measures. The results of the course evaluation and course analysis are presented to the students at a course session where previously implemented changes, and new suggestions for changes are discussed.

### **Changes prior to this course offering**

Following the previous course analysis (2019), the results were discussed with the students and a few points were raised that would further improve the course. Firstly, the students raised that all need to be active in the discussions, and it was agreed on that in order to have students more engaged the discussions can be more clearly structured.

Another point raised by the students was the low attendance for some sessions, and whether this could be coupled to poor interest in the specific work to be evaluated presented. We talked about this and all agreed that the topic chosen by an individual student should not decide whether to attend or not since an important purpose is to widen the general knowledge of the third-cycle subject. One should therefore not attend only sessions where articles or manuscripts related to ones own research are evaluated and presented.

A third point was related to the sustainability goal where the students felt that some clarification was needed as to how that topic should be discussed. Since all students in this course have research project that are inherently directed to sustainable development, this point is quite relevant. More specifically, do we always need to have a separate discussion

relating the research to the UN sustainability goals or is it sufficient that the sustainability is discussed as an integral aspect of the work? The conclusion was that for the students' own manuscripts, where the sustainability aspect is always clearly addressed, sustainability can be addressed in a more natural and integrated way, whereas for the already published articles by others, we could have a separate and deeper discussion.

The last point discussed how to make the sessions more engaging for students that are earlier in their studies and do not yet have own manuscripts to present. The decision was that if a student wants to, the article chosen could be accompanied by a brief outline of own research and how it relates to the article, even though no manuscript exists.

### **Add-on studies**

Add-on courses in this seminar course series: FCB3002, FCB3003, FCB3004, FCB3005. Have a discussion with your supervisor which courses may be appropriate in your individual study plan.