

**Course analysis 2019 for the third-cycle seminar course series “Higher Seminar in Industrial Biotechnology” (3.0 credits) codes FCB3001, FCB3002, FCB3003, FCB3004 (course responsible Christina Divne)**

***Course design***

The seminar course series for doctoral student "Higher Seminar in Industrial Biotechnology" (course codes FCB3001, FCB3002, FCB3003, FCB3004, for years 1-4 respectively, 3.0 ECTS each) focuses on critical analysis of published research within the broader field of biotechnology as well as in more specialized fields of research. Whenever possible, the students also present and critically analyze each other's manuscripts, which can be at any stage of completion. The four courses cover the full extent of the third-cycle education. The courses are examined as a single module through by 80 percent active attendance. As part of the attendance criterion, three mandatory tasks are required: presence, presentation of own manuscript or article, critical review and discussion on manuscripts/articles presented by other students.

When doctoral students work with their own manuscripts, the manuscripts can be at any stage from preliminary draft to revision stage with existing review comments. For students that have not yet authored a manuscript draft, published articles in varying fields of biotechnology (with focus on the students research areas, i.e., bioprocess technology, metabolic engineering, enzyme engineering, and structural biology) are discussed.

Each course (3.0 ECTS) spans one year with two sessions per month, and the students can start at any time during year. Typically, each student presents at two sessions per year, but all students take part in active in-depth review and analysis.

As of December 2019, the seminar series enrolls a total of 10 doctoral students distributed over the four courses (but all students study together): 3 students FCB3001 (year 1), 3 students FCB3002 (year 2), 2 students FCB3003 (year 3), and 2 student FCB3004 (year 4).

***Session setup***

The presenting student emails the reading material (manuscript or article) to all students one week before the course session. All other students prepare a careful review and critical analysis before the course session.

During the course session, the presenter summarizes the contents of the manuscript/article in the form of an oral presentation supported by lecture slides. Discussions regarding all aspects of the manuscript/article (layout/disposition, language, data presentation, data analysis, conclusion etc) take place during and after the presentation. All students are encouraged to ask questions, reflect and discuss.

***General comments***

This course analysis is the first for the revised seminar series FCB3001-FCB3004, which replaces the former series FBB3330-FBB3360. The course evaluation was answered by 10 doctoral students.

***Positive aspects in brief***

The course series is greatly appreciated by the doctoral students. They feel that the in-depth discussions concerning their manuscripts are rewarding, and help them think critically about their own and others' writing style, data presentation, and analysis. Importantly, the students feel that the atmosphere is inclusive and relaxed in a way that supports the intended learning outcomes. The students feel that knowledge about the whole publication process is very important.

The spider diagram displays scores for 10 questions, where +2 means, “strongly agree”, -2 “strongly disagree”, and 0 is “neither agree or disagree”. Any number >0 is a positive response to a statement.

The students were overall very positive (scores in the range +1 to +2), especially 1, 5, 9 and 10.

1. The course helped me to learn about new topics within the field of Biotechnology to get a broader perspective. (+1.60)
5. I had the possibility to practice critical analysis and evaluation. (+1.60).
9. I felt comfortable discussing in an open, inclusive and non-judgmental environment. (+1.70).
10. I consider the course useful for my education. (+1.40).

### **Aspects that can be improved**

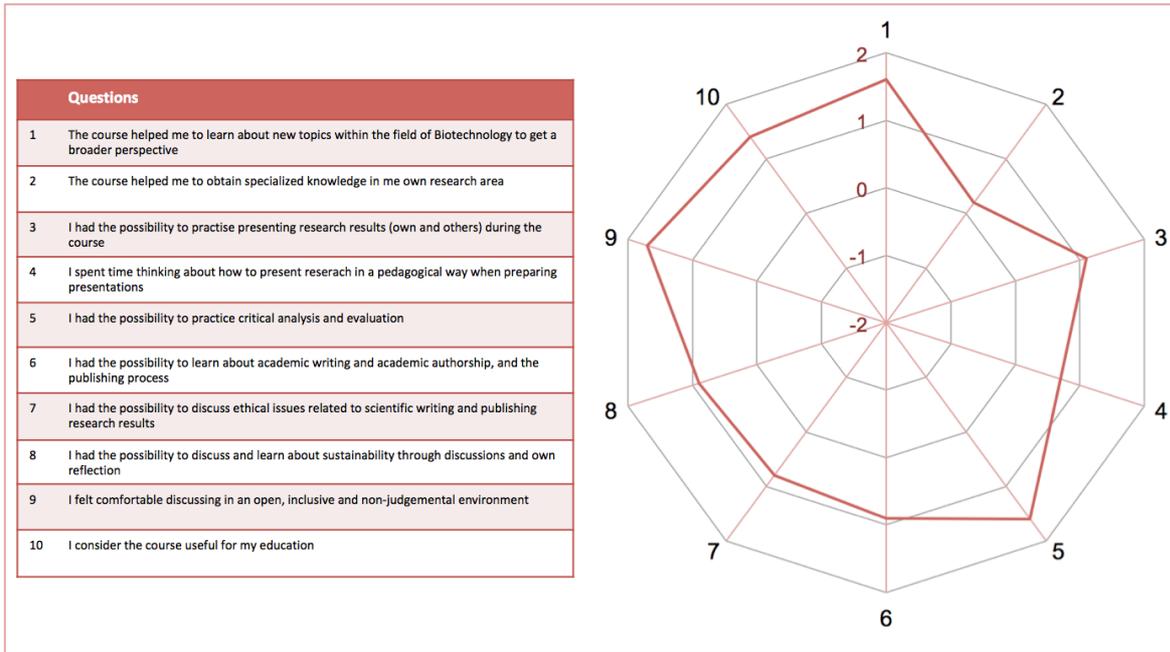
The questions 2 and 4 scored slightly lower (but still positive, i.e. >0).

2. The course helped me to obtain specialized knowledge in my own research area. (+0.20)  
The reason for the low score has (probably) to do with the relatively low number of students and their varying background. For a given paper, there may not be enough students specialized in that specific research area. The composition of students varies over time, and sometimes the group is more homogeneous and at other times less so.
4. I spent time thinking about how to present research in a pedagogical way when preparing presentations. (+0.70).  
This indicates that not that the students perceive that they do not spend time on the pedagogical aspect of the presentations. This is interesting since most of the presentations are quite pedagogical and well adapted for a non-expert audience. Nonetheless, the result indicates that the students would benefit from raising their own awareness of, and paying more attention to, actively thinking about the pedagogical aspects when preparing the presentations.

### **Follow-up and plans for course development during 2020**

On 24 January 2020, the results of the course evaluation were presented to the students, followed by a discussion of how to further improve the course. The course design and execution are not in need of any major revision, but some of the points raised in the course evaluation 2019 deserved special attention. More specifically, the following points:

- 1) We discussed the point that in some sessions not all students were active during the discussions, and despite an overall perception of an inclusive and positive atmosphere, some felt uncomfortable asking questions. There was a consensus that everyone should be encouraged to actively provide opinions, questions, critical analysis, feedback etc. There could be several reasons for lack of active participation, e.g. that students don't feel well prepared, that they are afraid that to ask "trivial" questions, or other. In order to have people more engaged we will try a more structured discussion, for example:
  - Scientific content
  - Disposition
  - Presentation of results
  - Publishing strategy
  - Ethical and sustainable content
- 2) Another concern raised was that attendance was low for "some" sessions, which makes the presenting student feel that their choice of paper/research field is not important or appreciated. We talked about this, and it was emphasized that the learning outcomes of the course includes developing a broader knowledge in the subject Biotechnology and that attendance should not depend on the research area of the paper presented.
- 3) The students also wanted some clarification of how the sustainability should be handled. Most of the articles and manuscripts presented in the course have inherent high sustainability content and we should highlight this in a more natural and concrete way. It is always good to reflect on the UN sustainability goals (which is already done), but for the type of papers typically reviewed, the sustainability can probably be discussed at a deeper level.
- 4) One of the suggestions concerned the possibility to present own research even when a manuscript draft is not available. We concluded that this could be a valuable complement, especially since for some students a manuscript may not materialize until quite late. Plans for a manuscript is usually present long before the necessary results have been obtained, and by including presentation of manuscript plans and preliminary results, the student can get valuable input and ideas for the continuing process (choice of experiments, hypotheses, help to get started with the writing etc).  
These sessions still require that some material is distributed beforehand, and one suggestion was that the presenter distributes a published "example" paper (from the own or other research group) that provides some background on the scientific field/research area in focus, as well as a draft in the form of for ex. a PowerPoint file that described the preliminary results and manuscript plans. During the presentation, the student then outlines the background, existing results and preliminary manuscript plans, followed by discussion in the group.



### What was the best aspect of the course ?

- The aspect of understanding how the publishing system works, as well as learning about writing process.
- Talking about how to best present research results and to practice critical analysis.
- I especially like the discussion of manuscript and learn from others experiences /thoughts.
- Get to know about each other's research and learn about the publishing process.
- To develop a critical view when reading the articles.
- Learn about the academic writing and get comments about own manuscript from people.
- Some interesting talks and discussions.
- Present your own research, get feedback from other PhD students.
- Freedom of choosing the presentation style.
- The environment of presenting and critically analyzing current scientific literature.
- Practicing presenting research, my own and from others.
- The relaxed atmosphere of the course.

### What can be improved in the course ?

- How the sustainability part should work.
- To make sure all students talk during the seminar.
- Give possibility to present own research without it being at the point of a manuscript. This could possibly yield great new ideas / perspectives on the ongoing research.
- The environment is not very inclusive, sometimes I feel too ignorant and I don't dare to ask some questions. I don't perceive interest from the others regarding my research.
- No, everything is good.
- Attendance was low for some sessions - something should be done about this ?
- Everyone should participate actively.
- Sometimes interaction is missing a bit.