Analysis of courses FCB3081-FCB3084, 2024, Higher Seminar in DNA/RNA Science I-IV

Conducted according to the KTH's *General Course Analysis Template – 2019-04-15*

0. Author (Name, email)

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1. Description of the course evaluation process

Describe the course evaluation process. Describe how all students have been given the possibility to give their op inions on the course. Describe how aspects regarding gender, and disabled students are investigated.

FCB3081-4 are PhD levels seminar courses organized at the department of Gene Technology (GTE) at KTH. Beyond the course, the seminars serve as departmental platform for meeting with colleagues and sharing on-going research. This course evaluation was conducted using an online platform Socrative, which enables anonymous web-based course evaluation, and considering all the course participants (FCB3081-4) as a single group. The reason for choosing Socrative is that the single seminar series (called DNA club) consists of four separate courses (FCB3081-4), each administrated in two or more student cohorts, those who started in spring, and those who started in the autumn. Here, I continued using the Socrative questionnaire (established 2022), with minor modifications to original version. The questionnaire follows the KTH's guidelines and strategy, being adopted to the PhD level seminar courses. Figure 1 below lists the questions asked and how they relate to KTH's LEQ, blended learning, and to the classification strategy of questions at KTH (https://intra.kth.se/polopoly_fs/1.933205.1600689782!/LEQ_v314_slutversion_en.pdf).

Q nr.	Question	Q type*	Scaled		KTH 5-1 (A-E) scaled:
1	The atmosphere on the course was open and inclusive	KTH_LEQ__d	KTH 5-1 (A-E)		
2	The course was challenging in a stimulative way	KTH_LEQ__c	KTH 5-1 (A-E)		A = Totally agree = 5
3	I was able to learn by collaborating and discussing with others	KTH_LEQ__n	KTH 5-1 (A-E)		B = Partially agree = 4
4	This course supported my PhD work	mod_e	KTH 5-1 (A-E)		C = I don't know = 3
5	I received relevant feed-back and suggestions to my projects	mod_j	KTH 5-1 (A-E)		D= Partially disagree = 2
6	I participated actively in the discussions	mod_m	KTH 5-1 (A-E)		E = Totally disagree = 1
7	The course was organized in a hybrid format. How much of the seminars did you follow in the room versus Zoom?	hybridFormat	5-1 (A-E)		A-E indicated below
8	To me, the possibility to attend the course via Zoom is:	hybridFormat	5-1 (A-E)		A-D indicated below
9	I find participating the seminars via Zoom (following the seminars, interactions, questions) to be:	hybridFormat	5-1 (A-E)		A-E indicated below
10	I find the PI talks:	PI talks	5-1 (A-E)		A-E indicated below
11	On average, how many hours per week did your work with the course (including scheduled hours)	KTH_LEQ__bg	open-ended		
12	What was the best aspect of the course?	KTH_LEQ	open-ended		
13	What would you suggest to improve?	KTH_LEQ	open-ended		
14	How could the zoom experience be improved?	AV_hybridFormat	open-ended		
15	Is there anything else that you would like to add?	KTH_LEQ	open-ended		

* bg = background, a-n explained in KTH questionnaire and its clarifications: https://intra.kth.se/polopoly_fs/1.933205.1600689782!/LEQ_v314_slutversion_en.pdf

Figure 1. Questions asked and their relation to KTH's LEQs and strategy.

In brief, the evaluation queried the atmosphere in the course, learning experiences, student experienced workload, experiences with blended learning, opinions on the PI-talks, best aspects, and suggestions for improvement. The evaluation was carried out on Dec 18th, 2024, as the last seminar of the year. Since the evaluation has been collected outside of KTH's official site, transparency was ensured by i) sharing the results openly for the course participants and the department, and ii) discussing the results during the first seminar of the following year 2025. In this way, every student can ensure that their responses are included in the report. The raw results of the course evaluation are accessible with the following link (see sheet named "Dec2024"): **http://tinyurl.com/DNAclubCourseE**

In total, 14 students answered the evaluation form, which makes the response ratio (14/18*100%) = 78 %. Since the course evaluation has been gathered and analysed collectively for courses FCB3081-4, a single course analysis has been created to cover all these four courses.

2. Description of meetings with students

Describe which meetings that has been arranged with students during the course and after its completion. (The outcomes of these meetings should be reported under 7, below.)

Interactions with the students occurred once-a-week. During the course, students had the opportunity to interact with one another, the course teacher, and other seminar participants. In the course, we aim for open and inclusive atmosphere where everyone can feel safe to be who they are and get support in their unique stage of PhD studies. The main learning outcome of this seminar course is sharing and discussing science in a constructive and forward-looking manner. Feedback for students is given both on a peer-level and by the teacher, primarily *via* discussions after the presentations. After each talk, there is dedicated time for discussions, questions, and reflections to which all the participants are expected to constructively engage in.

3. Course design

Describe briefly the course design, the constructive alignment (intended learning objectives, learning activities, assessment, and how they interact), and the development that has been implemented since last course offering

Each course runs a full academic year and gives three credits. The student can be enrolled into the course early spring or early autumn. To gain credits, the PhD student needs to participate at least 80% of the seminars and present twice; once in the spring, once in the autumn. After completed FCB3081, the student can enroll in FCB3082. After completing FCB3082, the student can enroll to FCB3083, and finally, to FCB3084. Hence, during four years of PhD studies, a student can participate a single (FCB3081) or up to four courses (until FCB3084). The seminar and course events for FCB3081-FCB3084 are the same (link for course schedule, see the sheet for 2024: ***https://tinyurl.com/DNAclubHT24***). The seminar presentations, discussions, and the peer feedback is expected to mature and improve through the courses. The increase in expectations is reflected in the learning outcomes, where basic (FCB3081), broad and specialized (FCB3082), good (FCB3083), and substantial (FCB3084) knowledge, for the subject matters are expected.

3.1. Learning activities

The course comprises approximately 80 full-time study hours and takes the form of weekly science seminars. The seminars address current trends in research focusing on nucleic acids (DNA and RNA) where doctoral students' own results, plans and ideas are presented, critically reviewed, discussed and given feedback. The course literature follows current trends in large-scale DNA sequencing and adjacent fields such as genomics, transcriptomics and bioinformatics. The doctoral students present their own research and provide feedback on each other's presentations.

3.2.Intended learning objectives

After completion of the course the student should be able to:

FCB3081:

- Show basic knowledge, both broad and specialized, in the overall subject area of biotechnology.
- 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.
- Show basic insights of academic authorship and the international scientific publishing landscape with relevance to the scientific subject area of the course.
- 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.

FCB3082:

- Show both broad and specialized knowledge in the overall subject area of biotechnology.
- Show the ability to present pedagogically, critically examine and discuss scientific papers in the subject of biotechnology with emphasis on the scientific subject area of the course.
- Show insight into, and basic ability to apply, academic authorship and the international scientific publishing landscape with relevance to the scientific subject area of the course.
- Show the ability to 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.

FCB3083:

- Show in-depth knowledge, both broad and specialized, in the overall subject area of biotechnology.
- Demonstrate good ability to present pedagogically, critically examine and discuss scientific papers in the subject of biotechnology with emphasis on the scientific subject area of the course.
- Demonstrate good insight into, and the ability to apply, academic authorship and the international scientific publishing landscape with relevance to the scientific subject area of the course.
- Show good ability to 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.

FCB3084:

- Show substantial in-depth knowledge, both broad and specialized, in the overall subject area of biotechnology.
- Demonstrate qualified ability to present pedagogically, critically examine and discuss scientific papers in the subject of biotechnology with emphasis on the scientific subject area of the course.
- Demonstrate deep insight into, and good ability to apply, academic authorship and the international scientific publishing landscape with relevance to the scientific subject area of the course.
- Demonstrate qualified ability to 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.

3.3. Assessment

Throughout the course, active learning is emphasized, and theoretical background combined with student-driven presentations and discussions.

REQUIREMENTS: To pass the course, ***students must attend 80% of the seminars and present their own research twice.*** Students are engaged into active learning *via* presentations, discussions, and seminars by visiting researchers.

3.4. The development implemented from the previous year

No major changes from the previous year were introduced. The course continued the blended-learning and PI-talks. A minor update with the PI-talks was expanding the invitation beyond KTH. The first year of the PI-talks (2023), we had four group leaders from GTE and one from Protein Sciences (PRO). This year (2024), we had one PI from Karolinska Institutet, Platform director of National Genomics Infrastructure (NGI), one from Finland and one from the USA. Active participation in the room and the zoom was emphasized throughout the year.

4. Students' workload

Are the students working to the expected extent in relation to the course credits? If there is a significant difference from the expected, what can be the reason?

According to KTH (and EU), 1.5 ECTS corresponds to one week of fulltime studies, i.e. 40 hours of work per week (*https://www.kth.se/en/studies/exchange/general/courses/courses-for-exchange-students-1.455770*). Hence, a course of 3 ECTS is expected to require 80 h of work.

Based on course participants' answers to the evaluation form, the experience of the workload was within the expectation or to lower part of it. While the highest experience of the workload was 2 h per week (2 h* 40 weeks = 80), the lowest experience was 1 hour (40 h). The average of the answers was 1.5 h / week, which falls somewhat short from the 80 h expectation.

5. Students' results on the course

How have the students succeded in the course? If there is a significant difference compared to previous course of ferings, what can be the reason?

Overall, the students performed very well on the course and most followed the course scheme without delays. The activity and interest of the students remained high throughout the course, manifested by the answers to the course evaluation, as well as attendances beyond the required 80%. The quality of presentations remained high and the discussions were constructive and helpful.

6. Summary of students' opinions

Summarize the outcome of the questionnaire, as well as opinions emerging at meetings with students.

Overall, this course was evaluated very positively, as demonstrated with the 1-5 (low-high) scale of the LEQ6-mimicking questions. The scores obtained ranged between 4.1 and 5.0 (Figure 2).

In this analysis, I did not separate the scores by gender. However, the good scores with low variation indicate similar answers across genders.

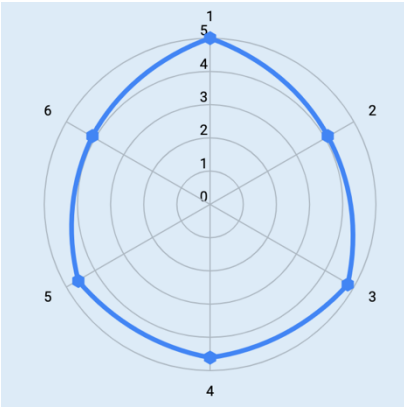

Figure 2. Distribution of the answers to the LEQ6 -mimicking questions. The answers are distributed to scale 1-5, where 1 means totally disagree, 3 is neutral, and 5 totally agree. The question number is shown on the outer rim, the score on the vertical axis (from the origo to the top). The questions are:

1. The atmosphere on the course was open and inclusive (score 5.0)
2. The course was challenging in a stimulative way (score 4.1)
3. I was able to learn by collaborating and discussing with others (4.8)
4. This course supported my PhD work (score 4.6)
5. I received relevant feed-back and suggestions to my projects (4.6)
6. I participated actively in the discussions (score 4.1)

The students seemed to appreciate the open and inclusive atmosphere (score 5 from every single evaluator, now third year in a row), ability to present and learn from others (average score 4.8), and engagement into the discussions and feedback (average score 4.6). Some example answers for "What was the best aspect of the course":

"Hearing the research that everyone is doing. I also really enjoy the possibility to chat with PhD students from different labs once the seminar finishes. Very good atmosphere. "

"Discussions and new ideas "

"beign able to learn about the my collegues projects."

"getting to know what eveyone is doing as they are doing it is vey interesting and provides depatmental community in my opinion, its also good training for giving vey shot talks which is valuable "

"PI talks, discussions"

7. Students' answers to open questions

What do students say in response to the open questions?

Overall, the answers were very positive, reflecting the scores in the radial graph (Figure 2). My assessment is that the positive responses continue to reflect the open and inclusive atmosphere we have at the department and among the PhD students. No clear suggestions for improvements were indicated, rather on the contrary, students expressed the content with the current format:

" I really like the format of this course and do not necessarily see how it could be improved".

"Not much, I think the course is perfect for what it offers. Very safe environment, very good discussions, right allocation of time both in when the seminar stats and the amount of work required to follow the course. "

"I think onsite compulsory might be better than hybrid."

"All is good"

8. Overall impression

Summarize the teachers' overall impressions of the course offering in relation to students' results and their evaluation of the course, as well as in relation to the changes implemented since last course offering.

Overall, I am really happy on how the course is considered as a safe space where to present and discuss science. The PI talks continue to be appreciated and gathered a large audience from the GTE and beyond. The main goal of the seminar and courses continues to be providing a friendly, inclusive, and inspiring platform for the PhD students and staff to share the excitement and challenges of research.

9. Analysis

Is it possible to identify stronger and weaker areas in the learning environment based on the information you have gathered during the evaluation and analysis process? What can the reason for these be? Are there significant difference in experience between: - students identifying as female and male? - international and national students? - students with or without disabilities?

In this analysis, I did not split the query results based on the student background. After obtaining the evaluation results, I went them through and discussed every point with the students (first seminar of the following year 2025).

Beyond the KTH 's standard questions, I queried the zoom experience and impressions on the PI talks. To improve blended-learning, I queried how many participated the seminars via zoom, at site, or both (Figure 3) and how the zoom participation was experiences (Figures 4 and 5). Most students had combined at site and *via* zoom attendance (Figure 3), however, as compared to last years, the attendance in room had increased. Based on the answers and follow-up discussions, the zoom was experienced important and helpful, without disturbing the participation (Figures 4 and 5). As a result, I will maintain the blended learning. The participation *via* zoom was considered feasible, and raising hands, chat functions, and just unmuting were frequently used to communication. The hybrid format has proved to worked well, partially due to the excellent audio-video system in alfa3 seminar room Big.

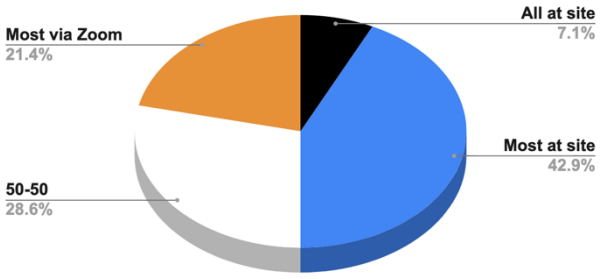

Figure 3. Attendance to the seminars in room (at Campus Solna) versus zoom. Students we asked the following question: "How much of the seminars did you follow in the room (at site) versus Zoom?" The options for answers were as follows: A) All at site, B) Most at site, C) 50-50, D) Most via Zoom, E) All via Zoom.

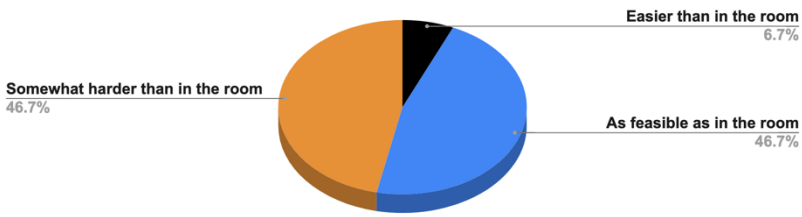

Figure 4. Zoom experience. Students we asked the following question: "I find participating the seminars via Zoom to be: A) Easier than in the room, B) As feasible as in the room, C) Somewhat harder than in the room, D) Difficult, E) Nearly impossible." Answers to A-C were obtained.

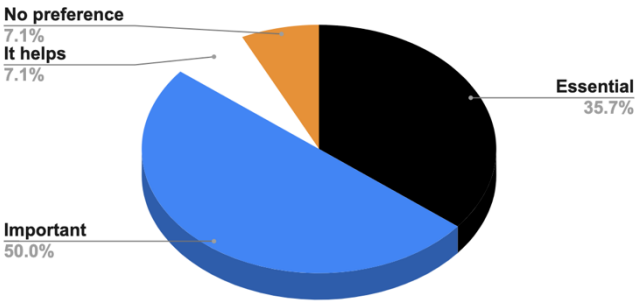

Figure 5. Importance of the zoom option. Students we asked the following question: " To me, the possibility to attend the course via Zoom is:" And the options to choose from were: A) Essential, B) Important, C) It helps, D) No preference, E) Zoom is a distraction. Answers to A-D were obtained.

Regarding the addition of PI-talks, I posed a single question (Figure 6). Almost every respondent reviewed the PI-talks positively, seeing them either stimulating or useful. As per the responses and positive feedback from the course participants and beyond, the PI-talks will continue the following year, with the aim to combine local (KTH and SciLifeLab) and external (visiting) group leaders.

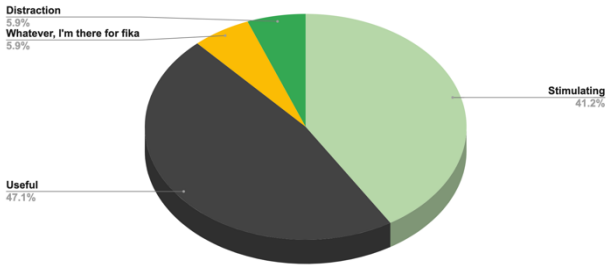

Figure 6. Experience of PI-talks. Students we asked the following question: "I find the PI-talks:" The options for answers were as follows: A) Stimulating, B) Useful, C) Whatever, I'm there for the fika, D) Distraction, E) Waste of time, give the slot to PhD students/postdocs.

10. Prioritized course development

What aspects of the course should be developed primaily? How can these aspects be developed in short and long term?

No major course developments will be added to the next year. The PI-talks and blended-learning will continue. Continued emphasis will be placed on engaging everyone into the discussions.