Course analysis (course evaluation)

Course code	**Course title**	**Credits**
4BI109	Bioinformatics	7.5
Semester (VT/HT-yr)	**Dates**	
HT-2021	2021112-20211213	

Course Director	**Examiner**
Arne Lindqvist	Arne Lindqvist
Teachers in charge of different parts of the course The teachers were assigned in 7 teams. Each team had a joint responsibility for a module in the course. The teams mixed experienced teachers with PhD students/postdocs. The course director communicated with the teams as a group. Although no person was formally in charge of each team, experienced teachers had a special responsibility: Arne Lindqvist, Rickard Sandberg, Anna Kouznetsova, Martin Hällberg, Nico Dantuma, Lena Ström, Vicent Pelechano, Claudia Kutter, Benjamin Murrell.	**Other participating teachers** Team 1, Basic tools 1: Arne Lindqvist, Nico Dantuma, Niels Krämer Team 2, Basic tools 2: Anna Kouznetsova, Martin Hällberg, Jan Grosser, Anais Julien Team 3, TBL DNA seq: Arne Lindqvist, Lena Ström, Abishek Arora Team 4, TBL RNA seq: Rickard Sandberg, Daniel Ramsköld, Cristoph Ziegenhain Team 5, TBL CRISPR: Arne Lindqvist, Vladislav Kuzin, Martin Hällberg Team 6, Genomics: Vicent Pelechano, Claudia Kutter, Benjamin Murrell Team R, Intro to programming: Niels Krämer, Vladislav Kuzin, Jan Grosser, Abishek Arora

Number of registered students at the 3-week check	**Number passed at final course day**	**Response frequency course valuation survey**
44	40 (44 after re-exam)	36%

Other methods for student influence (in addition to the final course valuation/survey)

-Evaluation discussions as part of feedback at end of each TBL. In particular at first and third TBL, structured discussions on feedback for course improvement. Almost all students were present, and participation in discussion was widespread.

-Canvas discussion forum open throughout course for feedback on course improvement. Was not used much.

-Class meeting through zoom after completion of course with students and course director (students elected to be present all in meeting rather than to send representatives).

Feedback reporting of the course evaluation results to the students
CANVAS

Note that...

The analysis should (together with a summarising quantitative summary of the students' course evaluation) be communicated to the education committee at the department responsible for the course and for programme courses also to the programme coordinating committee. The analysis was communicated to the education committee on the following date: 2022-01-26 The analysis was communicated to the programme coordinating committee on the following date:

1. Description of any changes implemented since the previous course occasion based on the views of former students

Not applicable, this was the first course occasion.

2. Brief summary of the students' evaluation of the course

(Based on the students' quantitative responses to the course valuation and key views from free text responses. Quantitative summary and any graphs are attached.)

The student's answers in the course evaluation were spread and mainly centered around an average rating. Even though only 16 students responded, for many answers all five alternatives were selected.

The median value of answers (range 1-5) in the questionnaire is summarized below.

Key aspect in question	Median value
Developed valuable expertise/skills	4
Achieved all intended learning outcomes	3
A common theme running throughout the course	3
Promoted a scientific way of thinking and reasoning	3,5
Teachers have been open to ideas and opinions	5
The workload during the course was reasonable	3
The course structure and methods used were relevant	3
The course built upon my knowledge from previous courses	3
The examination was relevant	3
I took responsibility for my own learning	3,5
When/if I had questions or problems with the course content, I felt that I could turn to my teacher/supervisor for guidance.	4
The feedback that I have received has been important for my development and learning	3,5
Overall opinion of the course	3

One student reported negative discrimination due to gender.

The comments are quite varied. One aspect (practical on RNA seq) was listed both in the strengths and weaknesses section. Generally, the TBL structures and mystery DNA quest were mentioned more than once in the strengths section (and once in weakness section). Approachability of teachers and general openness to feedback are among other aspects mentioned as strengths.

Among the many suggestions for improvement are some trends: streamline, lower workload – or increase time. Although one comment was that workload was adequate, likely a response to that having been discussed at the previous feedback occasions. Too many lectures in a row was also

mentioned more than once, as well as moving the intro to programming section (R) to before or in the preceding biostatistics course. More than one also criticized the single-best-answer format of the written exam.

3. The Course Director's reflections on the implementation and results of the course

Strengths of the course:

Many aspects of the course worked very well. In general, I am content with the overall aims of the course being reached. Strengths include:

-The mix of learning activities
-Interleaving with repetitions separate days (for example witnessed by how genome browser was adapted and utilized and how all students successfully applied it during the mystery DNA assignment)
-TBL structures. They were efficient for learning and allowed discussions between students of different levels.
-Feedback to students, both as separate aspects of each TBL and during practicals. Mix of different practicals simultaneously allowed teachers time for individual feedback to students that would not have been possible in a large group setting.
-Feedback from students, in particular in the structured form at end of TBL1 and TBL3 allowed adaptation of the course while ongoing.
-The teams structure of teachers provided support and enabled discussions, feedback and coordination in planning and executing teaching. It was also very useful as a backup if one teacher could not make it.

Weaknesses of the course:

-The workload was too high for many students.
-The schedule provided few gaps and opportunities to catch up for students that came behind
-Not all material was clear for the students.
-Several teachers had prepared too much material, and went too fast to be able to finish in time.
-Teacher presence was not optimal at all practicals.
-Not all aspects of practicals (both in basic tools modules and TBL) were covered sufficiently before the practicals.
-Intro to R not sufficient. Frustration among students that intro on how to use R came after it was used in preceding course.

3. Other views

The student's notes to the feedback discussion during a class meeting immediately after the course are attached. I think it is relevant to relate to this document in addition to the student's evaluation. I would say that the following comment in the student evaluation confirms the picture I got from several students during discussions: "I agree with all what has been said in the feedback meeting. Overall the idea of the course is very good and I highly appreciated everyones effort - it was really just too much and therefore sometimes really frustrating."

In my opinion, the largest challenge is the wide spread of background knowledge among the students. In this sense, the TBLs were successful in engaging discussions among students of different level. Whereas most teams for the TBLs functioned very well, there were room for improved balance among some teams. The composition of the teams is essential, and an extra focus of allocating group members is needed.

The spread of knowledge was also affecting how different parts were perceived. The two modules of the course engaging in more advanced aspects (TBL RNAseq and Genomics) were appreciated by a subset of students, but less appreciated by the students that were struggling.

One student reported negative discrimination due to gender in the course evaluation. I do not know who/what this refers to. I will bring this to the attention of all teachers/teams for self-reflection.

4. Course Director's conclusions and any suggestions for changes

(If changes are suggested, state who is responsible for implementing them and provide a schedule.)

This was the first course occasion. Overall, I am content with the general direction and framework, but there are several changes to implement:

-Streamlining the content to reduce workload. Several teachers had prepared too much material considering the time frame and in general most teachers had anticipated a higher background level among the students. Rather than a change in learning outcomes or what is covered, this mainly concerns the depth and detail of the content covered – and adhering to the specified content to cover. This also includes how teaching material such as slides could be made clearer. A similar streamline is to be applied for the practical exercises, for which larger parts of the material should be set as a voluntary resource for those that complete the main exercises quickly. The material should also be updated so that each aspect of a practical is clearly present in written material (mainly by adjusting certain lecture slides). The course director is responsible for discussing streamlining and adjusting materials with the teachers/teams.

-Updating and adjusting based on feedback discussion within each teacher team. Such discussions were ongoing during and after the teaching, and many (often small) issues need to be adapted. This includes which teachers should be present at which times during practicals. The course director is responsible for initiating feedback discussions within the teacher teams.

-Provide more space in the schedule by reducing lectures. Provide more time for practicals in module 1 and 2. The course director is responsible.

-Improving the coherence within the TBLs, in particular adjust the theoretical part of TBL1 to better cover all aspects of the practical parts. Adjust TBL1 (DNAseq) to better provide a base for TBL2 (RNAseq). Remove the Ethics discussion from the TBL1+3 and instead put it as a separate module. Course director is responsible.

-Move the Mystery DNA quest to earlier in the schedule. Course director is responsible.

Suggestion for changes to be discussed at education committee/programme coordinating committee

-Change the learning outcome ”Apply and integrate bioinformatics resources and tools in a perspective of basic systems biology“ to ”Apply and integrate bioinformatics resources and tools”. The current learning outcome is simply not feasible within the timeframe of this course. The learning outcome ”Relate bioinformatics analysis to a systems biology approach to biomedical research questions” is sufficient and suitable for systems biology.

-Move the introduction to programming (R) to before or within the biostatistics course. The students brought up this point and were broadly in support of it, not least as R was used in biostatistics. This would allow for a more focused practical orientation using R for bioinformatics in the bioinformatics course, which better would fit the learning outcome “Apply basic programming skills in analysing datasets”.

Appendices:

1. Student’s course evaluation
2. Student’s notes from class meeting (from student representative).