

Course analysis (course evaluation)

Course code 5MT010	Course title Molecular Genetics and Genomics	Credits 5
Semester (VT/HT-yr) HT24	Dates 2024-09-23 -2024-10-17	

Course Director Fulya Taylan	Examiner Fulya Taylan
Teachers in charge of different parts of the course Fulya Taylan	Other participating teachers Jesper Eisfeldt, Isabel Tapia Paez, Zahra Haider, Khurram Maqbool

Number of registered students at the 3-week check 34	Number passed at final course day 34	Response frequency course valuation survey 24/34 (70.59%)
Other methods for student influence (in addition to the final course valuation/survey) Class council during the course		
Feedback reporting of the course evaluation results to the students 2024-11-04		

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: 2024-11-04
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1. Description of any changes implemented since the previous course occasion based on the views of former students

The course 5MT010 Molecular Genetics and Genomics (MGG) remained largely unchanged from last year in terms of content, main structure, teaching and learning activities, and examinations. The primary modification occurred at the course's beginning. Based on student feedback from the previous year, the first week was integrated with the Applied Communication course. The total number of days allocated for teaching and examinations remained the same.

As in the previous year, the course structure included aligned flipped classroom sessions, lectures, student presentations, and topic-based hands-on workshops. Morning hours were dedicated to classroom activities, with afternoons reserved for individual studies.

The Canvas page remained unchanged, as its highly effective structure was well-received by students. Organized chronologically, it allows students to easily locate all relevant information on dedicated pages as needed.

The assessment method—a single-best-answer digital examination in the examination hall—was retained from the previous year. However, all course teachers collaborated with the course director to prepare exam questions, ensuring that the topics covered in lectures and presentations were reflected in the assessment. In response to feedback that last year's exam was overly challenging, this year's questions were simplified.

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

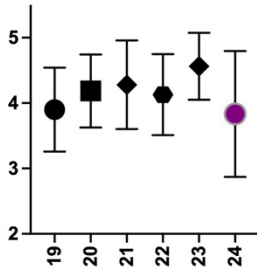
(Based on the students' quantitative responses to the course valuation and key views from free text responses. Quantitative summary and any graphs are attached.)

- To a large extent, the students believe that they have developed valuable expertise/skills during the course (mean=3.8, median=4.0 and standard deviation=1).
- To a large extent, the students think they have achieved the intended learning outcomes of the course to a large extent (mean=4.0, median=4.0 and standard deviation=0.6).
- To a large extent, the students think there was a common theme running throughout the course – from learning outcomes to examinations to a large extent (mean=4.4, median=4.0 and standard deviation=0.6).
- To a large extent, the students think the course has promoted a scientific way of thinking and reasoning to a large extent (mean=4.2, median=4.0 and standard deviation=0.6)
- To a large extent, the students think the teachers have been open to ideas and opinions about the course's structure and content to a very large extent (mean=4.4, median=4.0 and standard deviation=0.6).
- Many students feel that the workload during the course was reasonable in relation to the extent of the course/number of credits awarded (mean=3.1, median=3.0 and standard deviation=1.1).
- To a large extent, the students think the course structure and methods used (e.g. lectures, exercises, seminars, assignments etc.) were relevant in relation to the learning outcomes to a large extent (mean=4.2, median=4.0 and standard deviation=0.8).
- Many students think the course built upon their knowledge from previous courses in the programme. (mean=3.7, median=4.0 and standard deviation=1.0).
- To a large extent, the students think the examination was relevant in relation to the learning outcomes to a large extent (mean=4.2, median=4.0 and standard deviation=0.7).
- Majority of the students think they took responsibility for their own learning during this course to a very large extent (mean=4.4, median=4.5 and standard deviation=0.7)
- Majority of the students felt that he/she could turn to the teacher for guidance when/if he/she had questions or problems with the course content to a very large extent (mean=4.5, median=5.0 and standard deviation=0.6).
- The students appreciated the feedback they have received and some of them found it important for their development and learning (mean=3.9, median=4.0 and standard deviation=1.0).

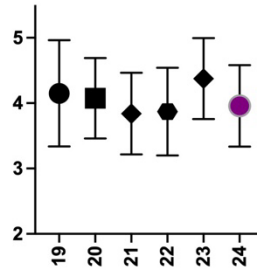
- Majority of the students think this is a very good course (mean=4.2, median=4.0 and standard deviation=0.7)

In Figure 1, a comparison of student responses to 12 standard questions that are surveyed to evaluate the quality of the courses (5MT009 and 5MT010) between 2019-2024 is presented. The plots show the mean value with the standard deviation for each survey question in each year. Six-year evaluation of the course shows a consistent high-quality delivery of the 5MT009/5MT010 MGG course to the MTLs students.

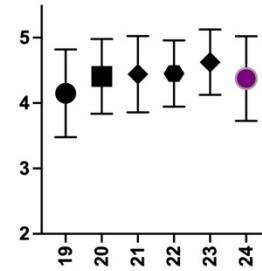
In my view, I have developed valuable expertise/skills during the course



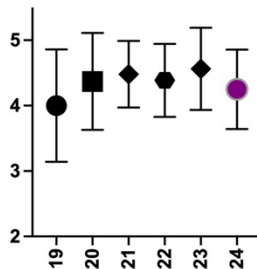
In my view, I have achieved all the intended learning outcomes of the course.



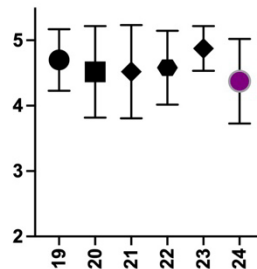
In my view, there was a common theme running throughout the course



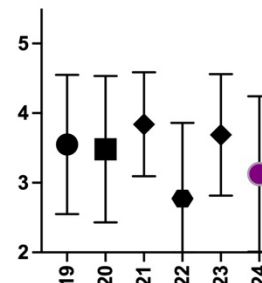
In my view, the course has promoted a scientific way of thinking and reasoning



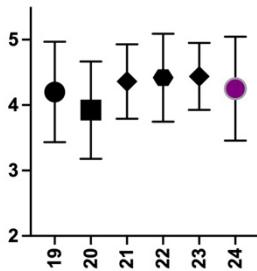
In my view, during the course, the teachers have been open to ideas and opinions



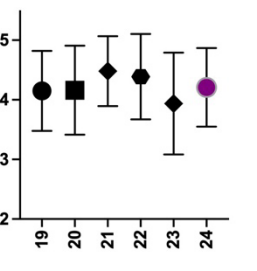
To what extent do you feel that the workload during the course was reasonable in relation to the extent of the course/number of credits awarded?



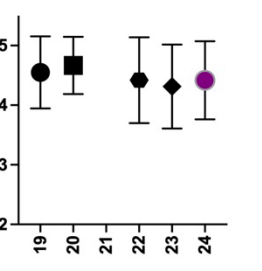
The course structure and methods used (e.g. lectures, exercises, seminars, assignments etc.) were relevant in relation to the learning outcomes.



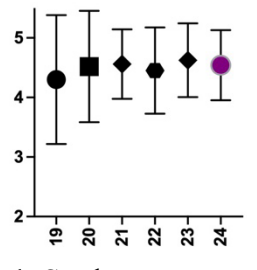
The examination was relevant in relation to the learning outcomes.



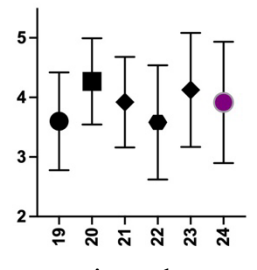
I took responsibility for my own learning during this course.



When/if I had questions or problems with the course content, I felt that I could turn to my teacher/supervisor for guidance.



The feedback that I have received has been important for my development and learning



What is your overall opinion of the course?

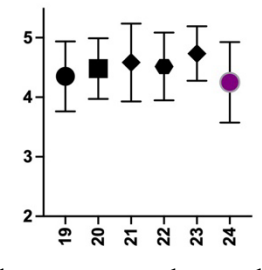


Figure 1. Student responses to twelve questions that are surveyed to measure the quality of the 5MT009/5MT010 courses between 2019-2024. The plots show the mean value with standard deviation. 2024 is shown in purple.

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

Strengths of the course:

Based on the students' responses, here are the recurring strengths of the course:

- **Workshops and practical applications:** Many students highlighted the effectiveness of workshops, which provided hands-on experience with various tools and platforms for genetic analysis.
- **Quality of lectures and teaching:** Students appreciated the well-organized, clear, and up-to-date lectures delivered by knowledgeable and passionate teachers.
- **Relevance to real-world applications:** The course successfully linked theoretical knowledge with practical, real-life applications and current research in genetics and genomics.
- **Group presentations and journal clubs:** Students found the group presentations and journal clubs valuable for integrating their learning and improving their scientific communication skills.
- **Course structure and organization:** The clear structure, well-planned modules, and availability of supporting materials (like pre-lecture videos) were appreciated by many students.
- **Advanced and up-to-date content:** Students valued the course's focus on current topics and cutting-edge knowledge in genetics and genomics.
- **Variety of learning methods:** The course incorporated different forms of learning, including lectures, workshops, and presentations, which students found beneficial.

Overall, I think the course has been appreciated by the students. The course is up-to-date and we want the students understand the current status of the research in this field and the future directions so that they can equip themselves towards those directions during their studies at KI.

Some representative answers:

Workshops were great. Most of the lectures were also good. The presentations at the end were lots of fun, and great to integrate everything we learned.

It taught me how to use multiple genome databases, software, and platforms. In addition, it taught me much knowledge of genetics and genomes at an advanced level.

The content covered is extremely up to date. It links knowledge with real-life practices. It builds on skills from the last course, i.e. presenting a scientific paper.

I like the focus on what we needed to know for a real work environment and the exam. I like being given the information necessary to pass the exam and can be helpful for a job. The workshops were great for real-life experience.

Carefully chosen supporting materials, such as the very relevant papers for journal clubs and group presentations as well as the videos that we could watch before the lectures.

The connection of the theory with real life projects and clinical applications. The content of the workshop and the variety of tools proposed there.

Weaknesses of the course:

Based on the students' feedback, the main recurring suggestions for improving the course are as follows:

- **Increase course duration and credits:** Many students felt the course was too short and compressed for the amount of content covered. They suggested extending the course length and increasing the number of credits to better reflect the workload.
- **More time for workshops:** Students expressed a desire for more time dedicated to workshops, especially for database and tools workshops.
- **Adjust lecture content and depth:** Some students felt the lectures were too simplified or repetitive. They suggested increasing the specificity and difficulty of the content, considering that many students already have a background in genetics.
- **Improve the flipped classroom approach:** Students found the current implementation of the flipped classroom concept ineffective. Suggestions included providing focused questions for pre-class reading and using shorter, more engaging materials like explanatory videos and lab simulations.
- **Revise presentation requirements and feedback:** Students felt the in-class presentations were rushed and had unrealistic expectations. They also requested more balanced feedback, including positive comments.
- **Allow more time for self-study and exam preparation:** Students expressed a need for more time to absorb and consolidate the knowledge, as well as prepare for exams.

Overall, the main theme in the feedback about the course's weaknesses is that it feels rushed and overloaded. Students appreciate the content but feel they need more time to fully engage with and understand the material. This feedback has been consistent for several years. The course has evolved significantly over time, and we've removed many activities to create more space for students. We can continue to streamline activities or content if the course duration or credits can't be increased to balance the workload. I believe we can find a solution to balance the time for workshops and lectures. Although the students perceive the course content as simple and evaluated as a negative side, I consider this a success—our teachers can explain essential and useful details with clarity, precision, and engagement. The course aims to explain complex genetics and genomics terminology in the simplest way possible, ensuring all students grasp the concepts before delving into more advanced topics in the rest of the program.

Some representative answers:

The course deserves more credits because of its hard load, which includes completing many presentations, journal clubs, and flipping classes.

The course is extremely packed and compressed and more time and ECTS should be devoted to it. The amount of scientific content is huge for 3 weeks and students got the feeling that there is no time for anything. Workshops and presentations were done in a rush, leading to stress. The concept of flipped classroom didn't help at all the way it was organised from my perspective. Very few students were willing to watch 1h videos before the class and come prepared. The fact that the scientific content of the lectures was so simplified compared to the textbook and the proposed material to study was another weakness of the course. I would suggest change of the material to study at home if the flipped classroom concept were to be

kept, like short explanatory videos, lab simulations and other online sources of scientific text. I also believe that lectures of teachers should be given in the morning and some afternoon time should be given to workshops separately.

After reading the material at home, attending lectures in person felt unproductive, unnecessary. We only mentioned the concepts, but did not really go deep into anything. I think we could cover the same amount of theory in less time, with way less discussion, and have more time for the workshops. Or cover more theory in the same amount of time.

Extend the length of the course. The material covered was very large and it would be great to have more time to go through it in a more detail. Also, more credits would fit better, 5 points seems not in good proportion to the amount of topics covered and work required.

Extend the workshop part - the database tools are very needed in our future courses. It would be better to go through them in more details. It was a pity we rushed through, especially the last ones.

4. Other views

As I stated in my previous course analyses, I agree with the students that the time allotted for the course content is very limited. The course deserves at least 6 ECTS credits, and the program committee should discuss why it has been given only 5. This course is of great importance and provides the foundation for many subsequent courses in the program. However, I also understand that this change won't happen anytime soon.

To address this issue, I can introduce pre-lecture questions for students to research the topics themselves as part of a flipped classroom approach. This can minimize lecture time and provide more time for workshops, where we can cover the content in depth. As a course director, my years of experience have shown that while students excel in theoretical textbook knowledge, many struggle to apply it in practice during workshop sessions.

Students often find the course book too detailed with lengthy explanations. While I agree with this assessment, it's important to remember that this book wasn't written specifically for our course. Students should develop skills to extract the relevant parts they need to read.

As an alternative, I could remove the course book entirely, allowing students to rely on their own research guided by pre-lecture questions. However, this might not be the ideal solution for everyone.

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

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

Area of improvement	Suggestion for change	Responsible person	Time plan
Flipped classroom	Prepare 5–10 questions related to the topic and key terms that students should research before the lecture. Students	Fulya Taylan, course leader	HT25



	<p>should find the answers, write them on Canvas, and receive scores there. For each chapter, identify the key terms, concepts, and examples, then prepare questions. Students are free to use any resource for their learning, including search engines, various AI tools, textbooks, review articles, or YouTube videos. I (possibly with other teachers) can create short videos (5–10 minutes long) for each lecture as part of a flipped classroom approach. The students can watch them in their own pace.</p>		
<p>Shortened lectures or removal of lectures from the teachers</p>	<p>The lectures can be shortened to less than 40 minutes by focusing on answers to the questions students have already answered. We can quickly review these answers in class, which will allow more time for other planned activities. The teachers should not cover their own research.</p>	<p>Fulya Taylan, course leader</p>	<p>HT25</p>
<p>Improvement of the workshops</p>	<p>The workshops need updating, particularly to reference genome GRCh38. Some questions are repetitive and should be removed. Several workshops are too long and should be split into two or three sessions. Students should complete the workshops at their own pace before class. In-class time should focus on reviewing questions students struggled with, reinforcing pre-class work, and explaining concepts they didn't understand. The workshops should serve as a repetition of the theoretical knowledge using it in practice.</p>	<p>Fulya Taylan, course leader</p>	<p>HT25</p>
<p>Student presentations</p>	<p>Student presentations should cover one specific part of the day's topic. Students should delve into the details of their chosen subtopic. To allow time for preparation, there won't be any student presentations in the first two or three lectures of the course.</p>	<p>Fulya Taylan, course leader</p>	<p>HT25</p>
<p>More credits and extra one week to the course</p>	<p>The course should be allocated a minimum of 6 credits and should have a longer duration. This will be discussed with the program director and the committee.</p>	<p>Fulya Taylan, course leader, and Rachel Fisher, program</p>	<p>HT25</p>



		director together with the program committee	
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Appendices:

1. 5MT010-HT24 Molecular Genetics and Genomics course evaluation report (short) without free text answers (pdf)
2. 5MT010-HT24 Molecular Genetics and Genomics (long) with free text answers (pdf)

Link to course survey report without free text answers:

<https://survey.ki.se/Report/6UxpZ2znaWg>