Course analysis (course evaluation)

Course code	Course title	Credits
5MT010	Molecular Genetics and Genomics	5
Semester (VT/HT-yr)	**Dates**	
HT25	2025-09-03 - 2025-10-16	

Course Director	Examiner
Fulya Taylan	Fulya Taylan
Teachers in charge of different parts of the course	**Other participating teachers**
Fulya Taylan	Jesper Eisfeldt

Number of registered students at the 3-week check	Number passed at final course day	Response frequency course valuation survey
34	34	29/34 (85%)
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 2025-12-02		

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: 2025-12-01
The analysis was communicated to the programme coordinating committee on the following date: 2025-12-01

1. Description of changes implemented since the previous course occasion based on the views of former students, and in relation to the Course Director's conclusions and suggestions for change in the previous course analysis. If changes proposed in the previous course analysis have not been implemented, please explain why

The course 5MT010 Molecular Genetics and Genomics (MGG) remained largely unchanged from the previous year in terms of content, structure, teaching and learning activities, and examinations. The course continued to feature flipped classroom sessions, mini-lectures, student presentations, and hands-on workshops, with morning hours dedicated to classroom activities and afternoons reserved for individual study.

The Canvas page also remained unchanged, as its chronological structure was well-received by previous students. This organization allows students to easily locate all relevant information on dedicated pages as needed.

Last year we had five suggestions for change and I review each below:

Flipped classroom: We prepared 5–10 questions related to each topic using various AI tools and identified key terms that they should aim to learn. We provided review articles that students were expected to read before lectures. The questions were related to the given review

articles. Students were also asked to explore specific terminologies and concepts on their own. Although we had planned to create short video lectures for each session, time constraints and other responsibilities prevented us from doing so. However, in response to student requests for video content, we curated and provided video lectures from leading geneticists available on YouTube for nearly all teaching sessions.

Shortened lectures or removal of lectures from the teachers: As planned, we shortened lectures to less than 40 minutes, with most lasting 20-30 minutes. Based on feedback from previous students, we avoided covering our own research and instead focused on core course content.

Improvement of the workshops: We retained the same workshops but divided them into two parts due to their length and to reduce the stress on the students. Although originally intended as self-paced assignments, we moved them to classroom sessions in response to student concerns about workload. The workshops focused on introducing students to various browsers and bioinformatics tools rather than problem-solving. The goal was to familiarize students with available resources so they could later develop relevant skills based on their individual research needs.

Student presentations: Student presentations, as in the previous year, covered one specific aspect of each day's topic. The student groups assigned themselves to the topics. Students prepared their presentations using the provided review articles but had complete freedom in how they organized and delivered their content. Due to the limited number of sessions and the large number of student groups, we had to schedule presentations quite early in the course. This proved stressful for both students and instructors, as our initial goal was to avoid scheduling any student presentations during the first two to three sessions.

More credits and extra one week to the course: This has not happened. But it seems that it was not a demand from the students this year.

Course design philosophy: The key concepts in genetics are well established, and the field is driven primarily by technological advancements. While core concepts remain consistent across bachelor's and master's level genetics courses, we designed this course to ensure students got familiarity to current trends in the field. For this reason, we replaced the textbook used between 2020 and 2024 with review articles from high-impact journals such as Nature Reviews.

To support students in engaging with these articles, we provided AI-generated questions. However, the answers were not the focus of assessment. Students were not expected to read entire articles but rather to develop skills in extracting key information and becoming independent learners. Most importantly, they would familiarize themselves with current trends in genetics and genomics.

Course scheduling: Based on feedback from the previous year, we scheduled MGG to run in parallel with the Applied Communication course, maintaining the same total number of days for teaching and examinations. However, due to work travel commitments that had been

planned before the course began, one teaching week became very intense for both students and course leaders.

Assessment: The assessment method - a single-best-answer digital examination in the examination hall - was retained from the previous year. Students were asked to prepare exam questions, and some exam questions were either selected from their submissions or modified to suit the appropriate difficulty level.

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.)

Response Rate: 85.29% (29 of 34 students)

Quantitative Results

Positive Ratings (Mean > 4.5):

Active learning opportunities (Mean: 4.9/6): 72% rated 5-6, indicating strong satisfaction with workshops, presentations, and group work

Inclusion and respect (Mean: 5.5/6): 86% rated 5-6, showing students felt comfortable and respected in the classroom environment

Student responsibility (Mean: 5.6/6): 93% rated 5-6, demonstrating high levels of self-directed learning

Examination relevance (Mean: 5.0/6): 76% rated 5-6, suggesting the assessments aligned well with learning outcomes

Teacher accessibility (Mean: 4.9/6): 76% rated 5-6, indicating teachers were approachable for questions

Areas of Concern (Mean ≤ 4.5):

Overall course quality (Mean: 4.3/6): 17% rated 1-2, with notable dissatisfaction; 55% rated 5-6.

Course structure relevance (Mean: 4.5/6): Mixed responses, with 7% rating 1-2 and 55% rating 5-6.

Feedback quality (Mean: 4.0/6): 24% rated 1-2 and 48% rated 5-6, indicating significant dissatisfaction with feedback

Workload appropriateness (Mean: 4.5/6): 59% rated 5-6. Generally acceptable but with some concerns.

Key views from free text responses:

Students reported a highly mixed experience of the course. Some expressed strong frustration with the course organisation, perceived lack of depth, and insufficient teacher preparation. Others found the course valuable, engaging, and informative, highlighting a polarized set of views.

Students valued up-to-date and relevant scientific content, especially recent research papers and rare disease-focused material. They also appreciated interactive elements such as workshops, group discussions, peer learning, and practice with genomic databases and tools. They found teaching staff approachable, knowledgeable, supportive and friendly and they also highlighted

that the course had an inclusive learning atmosphere. Hands-on diagnostic case workshop which was held toward the end of the course was seen as the most effective and engaging component.

Key issues raised in free text responses:

1. ***Flipped-classroom design:*** The main criticism concerned the execution of the flipped-classroom model. Preparation time for assigned review papers was perceived as too much relative to in-class learning. Students reported an excessive reliance on peer learning/student presentations and a lack of sufficient teacher-led lectures to explain key concepts in depth or provide a solid foundational knowledge. This resulted in a feeling that the course was surface-level, lacked academic challenge, and was less in-depth than some students' Bachelor-level courses.
2. ***Lecture quality and conceptual framing:*** Mini lectures were viewed as too brief and not at a master's level. Some students reported lacking foundational explanations needed to contextualize the papers and workshops. Many requested more teacher-led conceptual overviews, clearer structuring of the day, and stronger academic framing.
3. ***Feedback quality:*** Feedback on both practice and final oral presentations were described as non-existent, vague and uninformative. There was widespread disappointment with the lack of constructive feedback. The students felt that they were unprepared for the graded presentation, not understanding the expectations or how to improve.
4. ***Workload and structure:*** The students found the volume and complexity of the assigned reading to be disproportionate to the course credits. Many described the articles as long, demanding, and difficult to absorb within the available time. The number and length of the papers were repeatedly highlighted as excessive, contributing to stress and encouraging only superficial preparation. They also noted that the workload intensified toward the end of the course, coinciding with the Applied Communication course, which increased pressure and reduced the depth of their learning.
5. ***Workshops:*** While appreciated for their practical intent, workshops were in general considered too basic, simple, insufficiently structured, or poorly aligned with the learning goals.
6. ***Perceived overuse of AI:*** Students noted that reading lists, questions, and answers to workshop materials appeared AI-generated. This was associated with mismatched difficulty, repetitive content, occasional errors, and a perception of limited teacher preparation.
7. ***Assessment and intended learning objectives:*** Students found it difficult to identify which content was exam-relevant. Unclear learning goals and assessment criteria hindered targeted preparation.

Overall, the feedback indicates that while the course contains strong foundational elements, it requires a significant redesign of delivery, structure, and assessment clarity to meet master's-level expectations.

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

Strengths of the course:

This course has several strengths that help students learn actively and enjoy the subject.

1. **Up-to-date content**: The course material is very current and relevant. We picked the most recent research and review articles from top journals (e.g. Nature Reviews, Nature, Nature Genetics, Nature Medicine, etc) to expose students to the current trends in the human genetics and genomics field. We selected the recent research and the newest scientific literature and replaced the textbook that served for five years.

2. **Active learning:** The course structure is designed to support active learning. We use a mix of workshops, peer discussions, and group presentations. Throughout the course, students had the freedom to explore the areas they needed to learn more about. In this setting, we aimed to create an active and safe learning environment, where teachers and the course leader stepped back to let students take more responsibility. This approach helps students develop essential skills instead of overwhelming them with large amounts of detailed information that can be found elsewhere. Because the course runs in parallel with Applied Communication, students can practise and improve their scientific communication and collaboration skills, which are crucial in today's complex research environment. They also build skills for understanding and working with complex research articles. The workshops were designed to revisit and apply key concepts in practice. Since the MGG course takes place at the same time as Applied Communication, students can immediately use their new communication skills in this course.

3. **Positive learning environment:** The learning environment itself is a key strength. Students felt respected, included, and supported by the teachers and teaching assistants. The course created a space for open scientific discussion and collaborative exploration among students. No lectures or any mandatory activities were planned in half of the assigned course days, giving opportunities to student to study individually or to work as a group.

4. **Fostering independence:** As research requires independence, the design of the course encourages students to take responsibility for their own learning. Flipped classroom method helps students become more independent and self-directed in how they engage with the material. The course content helps students develop an important skill for their Master's studies which is the ability to extract key concepts from advanced scientific literature.

In summary, the MGG course effectively covers core genomics concepts, integrates current research, offers practical opportunities, and maintains a positive and supportive learning environment.

Weaknesses of the course:
Strengths and weaknesses often arise as twin expressions of the same core structure. Everything in this course can be improved, and each year we experiment with new approaches. Although the overall framework remains the same, we consistently adjust and refine elements to observe their impact. These changes naturally give rise to new strengths and new weaknesses with every iteration, reflecting the evolving nature of the course.

The main problem was poor communication between students and teachers about what the course expected, what students should learn, and how they would be assessed. The course had good teaching goals, but these were not clearly and repetitively explained to students during the course.

The flipped-classroom approach did not work well. Students felt they had to learn too much on their own without enough basic lectures or guidance from teachers, especially at the start. The course was designed so students would be active learners and teachers would support them, but this was never clearly explained.

The reading materials caused stress. Students received too many papers for each session and did not know they were not expected to read everything in detail. This was another communication problem.

The workshops had problems too. Students found them poorly organized with unclear instructions and not difficult enough for master's level. Teachers did not explain that workshops were meant to help students learn to use tools, not to find "correct answers."

Students received feedback on presentations that felt too general and unhelpful. They were unsure what was expected for graded assignments. Teachers thought most presentations were very good, but they did not share this clearly or help students understand how to improve.

The students had very different backgrounds. Some already knew a lot and wanted more advanced content. Others found the materials challenging enough. This difference, combined with very high expectations at Karolinska Institutet, led to dissatisfaction.

The course's main weakness was that students and teachers expected different things, made worse by poor communication. The different student backgrounds and high expectations created additional challenges. The basic teaching ideas are good, but the course needs major changes: better communication, clearer structure and support, better quality materials, and more useful feedback. Students often understand the value of this course only a year later, but immediate improvements are needed to meet master's-level standards.

3. Other views

At least 22/29 students found a lot of strengths of this course which is motivating and absolutely nice to see the appreciation.

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.)

Area of improvement	Suggestion for change	Responsible person	Time plan
Strengthen teacher-led instruction and course scaffolding	Introduce short, focused teacher-led lectures at the start of each session (20-30 minutes) to establish core concepts, terminology, and the broader scientific context. • Provide an explicit overview of the learning objectives for each week.	Course director	HT26

	• Summarise key take-home messages at the end of each class to reinforce important concepts.		
Refine and reduce the reading load	• Limit reading assignments to 2-3 well-selected papers per session. • Ensure that assigned papers directly address the discussion questions. • Increase topic diversity by incorporating papers on cancer genomics, complex traits, and non-coding variation to broaden the scope.	Course director	HT26
Rebuild and quality-control workshop materials	• Redesign workshops with clear, step-by-step instructions and defined learning outcomes. • Provide correct answer keys or specific tool instructions. • Introduce a short teacher demonstration of each tool at the beginning of the practical session. • Expand the number of case-based workshops, modelled on the highly rated rare-disease diagnostic exercise.	Course director	HT26
Improve feedback and support for student learning	• Provide structured, individualised feedback for practice presentations, including both strengths and areas for improvement. • Introduce peer-feedback forms to ensure multidimensional evaluation. • Clarify grading criteria for the final presentation and exam early in the course. • Offer optional short feedback meetings for students who want to discuss their performance.	Course director	HT26
Increase clarity and coherence in expectations and assessment	• Clearly differentiate between “background reading,” “presentation material,” and “exam-relevant content.”	Course director	HT26

	• Provide a consolidated list of examinable concepts midway through the course. • Control whether teaching materials (slides, workshop content, reading lists) align closely with the intended learning outcomes and the assessment.		
Rebalance the flipped-classroom model	• Adopt a hybrid model: a brief teacher lecture followed by student presentation and discussion. • Reserve time for whole-class discussions moderated by the teacher to ensure conceptual accuracy. • Offer a short orientation session on how to engage effectively in a flipped-classroom environment.	Course director	HT26
Adjust workload distribution	• Move the graded presentation earlier in the course to distribute workload more evenly. • Coordinate with the programme responsible for Applied Communication to avoid simultaneous major deadlines where possible.	Course director	HT26
Introduce additional enrichment elements	• Explore the possibility of organizing a visit to a Clinical Genetics and Genomics unit at Karolinska University Hospital. • Integrate guest lectures from clinicians or researchers to anchor concepts in real-world applications.	Course director	HT26

Appendices:

1. 5MT010-HT25 Molecular Genetics and Genomics course evaluation report (short) without free text answers (pdf)
2. 5MT010-HT25 Molecular Genetics and Genomics (long) with free text answers (pdf)

Link to course survey report without free text answers: https://survey.ki.se/Report/6grHP5ShYn2