

## **DS4007 (Principles and Techniques for Data Science, HT 2025, Halmstad, H3015, X3015)**

Number of possible respondents: 43

Answers: 21

Response rate: 48,84 %

Study pace: 50 %

---

### **Examiner's course analysis**

#### **Based on the course evaluation result - which are the strengths of the course?**

Laboratory sessions

Breadth of covered topics

Student-led seminars (mixed feedback: approximately half positive, half negative)

Overview session

Clarity of exam instructions

Flexibility in adjusting teaching methods and deadlines based on student feedback

Communication with teachers

Quality of recorded videos (some students criticized this aspect)

#### **Based on the course evaluation result - which are the weaknesses of the course?**

Some students expressed dissatisfaction with the new format combining recorded lectures and weekly student-led seminars.

Several students found the workload and preparation time for seminars to be high and described the seminars as stressful.

Concerns were raised about the quality of recorded videos (e.g., muted sound for 10 minutes in one video and absence of a laser pointer in another lecture).

A few students were uncomfortable with the critical feedback provided during seminar sessions.

Some reported a lack of clear structure during the initial seminar sessions.

A number of students objected to the requirement of citing course literature in their seminar tasks.

Several students noted the absence of immediate feedback following the seminars.

#### **Comments about the collaboration with the course ambassadors**

-

#### **Conclusion and suggestions for course development or already made decisions**

The course received a low evaluation score last year. One contributing factor I identified was the low attendance rate. It appeared that many students postponed their studies until the exam week, which resulted in considerable stress and pressure during that period. This course is one of the

most essential and foundational components of the entire program—students learn the core concepts of data science and machine learning here. The content is closely inspired by a similar course offered at MIT under the same title, and the number of topics covered is even smaller than in that course. Despite this, students have repeatedly expressed concerns about the perceived breadth and workload. For example, one student stated that “the number of topics covered here is 50–100% more than other similar courses,” which is inaccurate when the syllabi are compared directly. The topics included represent the minimal set of fundamental knowledge every data scientist should master; removing even one would weaken the overall integrity of the program.

This year, I replaced traditional in-person lectures with weekly student-led seminars, supported by recorded lectures from the previous year. My decision had two primary objectives:

To promote student-centered learning, which, according to modern educational research (e.g., Hattie, 2012; Freeman et al., PNAS, 2014), results in higher learning gains and lower failure rates than purely teacher-centered instruction—especially in higher education and STEM fields.

To encourage continuous engagement throughout the course, by challenging students weekly with pre-defined problem sets. Students were expected to use course materials as their first resource, and only resort to AI tools or external sources if necessary. This approach aimed to prevent procrastination and ensure a more evenly distributed study effort over the course period.

Throughout the course, I maintained an active dialogue with the course ambassador and responded to student feedback when possible. Some of the structural changes mentioned by students were direct results of this ongoing feedback process—though some may not have been aware of that. However, I could not accommodate every request, such as adding live lectures, since doing so would have doubled teaching hours and required additional resources.

Several students criticized the quality of the recorded videos. In reality, only about ten minutes of the time series lecture were affected by muted audio—an introductory section that was not essential. In the neural networks lecture, the mouse pointer was missing, making it somewhat harder to follow. To mitigate these issues, I informed students that they could book 1:1 meetings with me for clarification. No one took this opportunity. I also scheduled a live Q&A session for general questions, but only two students expressed interest; I answered their questions in writing and canceled the session.

I understand that some students prefer live lectures, and I will take this into account in future course iterations. Still, a combination of recorded lectures and Q&A sessions can reproduce approximately 70–80% of the learning experience of live instruction while offering greater flexibility for students who cannot attend in person. Moreover, the student-led seminars provided valuable opportunities for deeper learning through practice, problem-solving, communication, and critical thinking. Students were also able to learn from one another's mistakes under the examiner's real-time supervision, which enhanced the social and interactive aspects of learning. While live lectures may be 20–30% more enjoyable, the seminar-based approach offers significant educational benefits and efficiency.

Many students recognized these advantages:

Student 1: “I also enjoyed the emphasis on seminars, as I believe communication is an important skill in data science. The seminars also helped me foster my critical thinking.”

Student 2: “We have seminars to do presentations, which is a great way to learn compared to only lectures. The content of each seminar covered many useful topics.”

Student 3: “The course design helped me understand many difficult concepts I previously struggled with, like neural networks and linear regression. The seminars were an excellent opportunity to learn interactively.”

Student 4: “The setup with seminars and online lectures is a very appreciated and smart way of organizing time.”

Student 5: "The recorded video lectures worked well. They provided flexibility and allowed studying at one's own pace. The seminar format was also good, encouraging in, depth study and equal contribution."

Student 6: "Good feedback on the seminars at the end of the course."

However, some students expressed opposite views:

Student 1: "The student, led seminars with pre, recorded lectures are not a good combination."

Student 2: "Have real lectures, not only student, led seminars."

Student 3: "Seminars were, at best, a waste of time."

Student 4: "Seminars took much more time than allocated, leaving no room to study for math assignments and causing burnout."

Student 5: "Seminars were quite unstructured, especially at the beginning."

Student 6: "I haven't learned anything from the student, led seminars. I'm very disappointed."

Student 7: "The seminars were stressful and time, consuming, making it hard to understand the concepts."

Overall, I believe the main source of dissatisfaction arose from the shift to a new instructional format, weekly student-led seminars replacing traditional lectures, which was an intentional experiment designed to address low attendance and passive learning patterns. Based on the feedback received, a reasonable adjustment for future iterations would be to reduce the number of seminars to three larger sessions and reintroduce live lectures to achieve a better balance between structure, engagement, and flexibility.

I will also provide immediate feedback after each seminar, as this was a concern raised by many students. In the current run, I intentionally withheld detailed feedback until the end to maintain motivation and attendance throughout the course. My intention was to ensure that students continued to participate in the later seminars, particularly those covering crucial topics.

Given the negative experiences with recorded videos in both this and the previous course run, I have decided to remove them entirely. The next offering will rely exclusively on live lectures and lecture slides, no recorded videos will be provided.

To address the issue of workload, which several students identified as a source of stress, I plan to introduce a mid-term examination. This will distribute the assessment load more evenly and reduce the pressure associated with final exam preparation.

Finally, I will ensure that students receive a clear and transparent course structure from the very beginning. However, as I plan to test the revised system next year based on the latest feedback from the course ambassador, some degree of adjustment during the course may still be unavoidable until the structure stabilizes.

## **Other comments**

-

---

## I am overall satisfied with the course.

|                               | Number of responses | Distribution (%) | Index (%) I am overall satisfied with the course | 34 |
|-------------------------------|---------------------|------------------|--------------------------------------------------|----|
| 0 = I definitely do not agree | 7                   | 33%              |                                                  |    |
| 1                             | 6                   | 29%              |                                                  |    |
| 2                             | 1                   | 5%               |                                                  |    |
| 3                             | 0                   | 0%               |                                                  |    |
| 4                             | 4                   | 19%              |                                                  |    |
| 5 = I definitely agree        | 2                   | 10%              |                                                  |    |
| No opinion                    | 1                   | 5%               |                                                  |    |
| <b>Total</b>                  | <b>21</b>           | <b>100%</b>      |                                                  |    |

## How much time have you spent on the course in relation to the course's study pace?

|                                        | Number of responses | Distribution (%) |
|----------------------------------------|---------------------|------------------|
| Less time than the course study pace   | 0                   | 0%               |
| Corresponding to the course study pace | 8                   | 38%              |
| More time than the course study pace   | 13                  | 62%              |
| <b>Total</b>                           | <b>21</b>           | <b>100%</b>      |

**The design of the course (teaching methods, literature, pedagogy, etc.) has been well adjusted to help me achieve the learning outcomes in the syllabus.**

|                               | Number of responses | Distribution (%) |
|-------------------------------|---------------------|------------------|
| 0 = I definitely do not agree | 9                   | 43%              |
| 1                             | 4                   | 19%              |
| 2                             | 2                   | 10%              |
| 3                             | 0                   | 0%               |
| 4                             | 3                   | 14%              |
| 5 = I definitely agree        | 3                   | 14%              |
| No opinion                    | 0                   | 0%               |
| <b>Total</b>                  | <b>21</b>           | <b>100%</b>      |

Index (%) The design of the course (teaching methods, literature, pedagogy, etc.) has been well adjusted to help me achieve the learning outcomes in the syllabus.

33

**During the course examinations, I have had the opportunity to show that I have achieved the learning outcomes in the syllabus.**

|                               | Number of responses | Distribution (%) |
|-------------------------------|---------------------|------------------|
| 0 = I definitely do not agree | 1                   | 5%               |
| 1                             | 4                   | 19%              |
| 2                             | 3                   | 14%              |
| 3                             | 4                   | 19%              |
| 4                             | 6                   | 29%              |
| 5 = I definitely agree        | 2                   | 10%              |
| No opinion                    | 1                   | 5%               |
| <b>Total</b>                  | <b>21</b>           | <b>100%</b>      |

Index (%) During the course examinations, I have had the opportunity to show that I have achieved the learning outcomes in the syllabus.

56

## I have experienced the social study environment as good during the course.

|                               | Number of responses | Distribution (%) | Index (%) I have experienced the social study environment as good during the course. |           |
|-------------------------------|---------------------|------------------|--------------------------------------------------------------------------------------|-----------|
| 0 = I definitely do not agree | 4                   | 19%              |                                                                                      |           |
| 1                             | 5                   | 24%              |                                                                                      |           |
| 2                             | 5                   | 24%              |                                                                                      |           |
| 3                             | 1                   | 5%               |                                                                                      |           |
| 4                             | 2                   | 10%              |                                                                                      |           |
| 5 = I definitely agree        | 4                   | 19%              |                                                                                      |           |
| No opinion                    | 0                   | 0%               |                                                                                      |           |
| <b>Total</b>                  | <b>21</b>           | <b>100%</b>      |                                                                                      | <b>44</b> |

## Course satisfaction index

|                                                  |    |
|--------------------------------------------------|----|
| Satisfaction index % (summary of all statements) | 42 |
|--------------------------------------------------|----|