Report - MH2039 - 2022-01-06

Respondents: 1
Answer Count: 1
Answer Frequency: 100,00 %

Please note that there is only one respondent to this form: the person that performs the course analysis.

Course analysis carried out by (name, e-mail):

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DESCRIPTION OF THE COURSE EVALUATION PROCESS

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

Following the publication of final course grades, an LEQ-12 evaluation form was distributed to all students. Five responses were received, from a total of 19 students.

During the course, the students were given the opportunity to elect representatives without any teacher present, but decided to not do so. Instead, they were happy to approach me (the examiner and course leader) directly with any comments or suggestions for improvement.

In the LEQ, students are able to select their gender and identify as disabled. This information is used to generate a breakdown of answers by identification (male/female, disabled/not disabled), providing at least three students form any grouping supply answers. This limitation is to preserve anonymity of the respondents.

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.)

Students were welcome to meet with me after the course was completed, but none decided to do so.

COURSE DESIGN

Briefly describe the course design (learning activities, examinations) and any changes that have been implemented since the last course offering.

The course consists of two lectures that provide an overview of metals extraction processes, followed by five sessions that cover heat and mass balance calculations, including two assessed exercises. One session on gender equality in the metals industry and one on research toolsavailable at KTH are also given amongst the lectures on the calculations.

In parallel with these activities, students undertake a research project in groups that covers the extraction of a particular metal. All groups prepare a written report and deliver an oral presentation at a course seminar at the end of the course.

Students are examined by their project, a home exam and an individual (self-)assessment of their group work. Gender equality, sustainable development and circular economy are examined in the research project, both via written report and oral presentation.

THE STUDENTS' WORKLOAD
Does the students' workload correspond to the expected level (40 hours/1.5 credits)? If these is a significant deviation from the expected, what can be the reason?

The course consists of two lectures that provide an overview of metals extraction processes, followed by five sessions that cover heat and mass balance calculations, including two assessed exercises. One session on gender equality in the metals industry and one on research toolsavailable at KTH are also given amongst the lectures on the calculations. In parallel with these activities, students undertake a research project in groups that covers the extraction of a particular metal. All groups prepare a written report and deliver an oral presentation at a course seminar at the end of the course. Students are examined by their project, a home exam and an individual (self-)assessment of their group work.

The course lasts for a total of seven weeks. This implies a workload of 20 hours per week. In the evaluation, the students reported working much less than this. One student reported working only 3-5 hours per week, another reported 14-14 hours work per week and the remaining three responses were 9-11 hours per week. This is consistent with previous years, which is expected, since the course design has not changed significantly. The timetabled sessions were attended by almost all students, and the home exam was completed to a good standard by most students, so it seems as though self study and the project are the areas where workload is below that expected. Part of the reason is likely to be the fact that some of the material is already familiar to students who come from the KTH bachelor's programme, so the course is less demanding for them than the average student. This course is the first one in the master's program for many students and those students who move to KTH form other institutions may not have a background in process metallurgy. Therefore, this course aims to bring those students to the level of KTH students, while also advancing the knowledge of students who come form the KTH bachelor's programme, but the workload is likely to be higher for students from other institutions, who have to learn more content to reach the level required for other courses in the programme. Unfortunately, the course evaluation did not provide a breakdown of workload by the background of the students (although such a breakdown was available for other questions).

THE STUDENTS' RESULTS
How well have the students succeeded on the course? If there are significant differences compared to previous course offerings, what can be the reason?

In 2020, 5 students got grade A, four grade B, seven got grade C and two got grade D.
In 2021, 9 students got grade A, six students got grade B and two got grade C. No other grades were awarded. This represents a significant increase in grades over 2020, especially in the number of students awarded grade A.

In 2020, two out of five groups achieved grade A for the project, while two achieved grade B and one grade C (although one student was awarded grade D as they contributed less to the final output of the group). In 2021, the equivalent results were one group with grade A and six groups with grade B, so this does not seem to account for much of the improvement in overall grades between the two years.

For the exam, in 2020 9 students achieved grade A, four students achieved grade C, two got grade D and three got grade E (none of the students achieved grade B). In 2021, fourteen students achieved grade A, one got grade B, three students got grade C and one achieved grade D. This seems to be the source of the improvement. It is unclear why this is, since the exam questions in both years were randomly generated according to the same template, which was not revealed to the students. Nevertheless, in 2021, students were able to answer the questions better. This may be because I have made more practice questions available throughout the course, which allows them to understand the material better, so they are ale to answer the final exam better. It may also be because I am more comfortable teaching the material, since 2020 was the first year in which I led the course.

STUDENTS´ANSWERS TO OPEN QUESTIONS
What does students say in response to the open questions?

There were no requests for extra practice questions, which were requesting in 2019 and 2020, so it seems that this point has been addressed to the satisfaction of the students.

As in previous years, the general advice students would give next year's cohort is to begin the project work earlier than the students did this year. this was also the case in 2020 and I presented those answers in the first lecture, but it seems to have not had the effect tl wished. I will add this year's answers to the lecture for 2022. I will also consider adding a short report, such as a plan of the final report with some brief information, early in the course to require some work to be completed early.

SUMMARY OF STUDENTS' OPINIONS
Summarize the outcome of the questionnaire, as well as opinions emerging at meetings with students.

The thorough integration of general issues and sustainability throughout the course was very warmly received by the students. It was a point of major emphasis for this year's development of the course, so I am very pleased that it has been a success.

There were some minor complaints, such as the difficulty of following calculations in a lecture, but that is the nature of the course and the same student appreciated the alternative ways to learn that were provided. Since only one student made this comment, it is possible that other students learned most effectively in the lectures, so I do not feel that any change would be beneficial for 2022.

The home exam was also appreciated as being more representative of "real life", which is on elf the motivations for having it - to prepare students for working life.

I decided to change the group allocations this year so that instead of choosing their own groups, students were randomly assigned groups. This was to avoid students from the KTH bachelor's programme grouping together and students who have come from the same country /institution also grouping together, which happened in 2020. Anecdotal evidence from students in informal conversations after the lectures revealed that the students did not really like this, but that it was not a major problem. I believe this serves a valuable purpose to improve the homogeneity of the cohort, which is very heterogeneous at the start of this course (since it is the firs Toft the master's programme). Therefore, I plan to keep random group assignments in 2022.

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.

I believe the course is now stable after the major changes made in 2020 and the majority of the problems have been resolved. The overall strong performance of the students may be concerning, as it does not allow the excellent students to differentiate themselves form the good students. I will discuss this with colleagues and I may change the rubrics and grading schemes to provide more separation in the top grades. However, this course is easier than others by its nature, as it serves to bring all students to a sufficient level to tackle more advanced courses.

One student suggested that the assessed exercises should have included some "partial/diagnostic" test were included. I shall consider this for 2022, perhaps as a short question to be answered in class and must be answered well enough to pass the exercise. Another response on these lines was that the exercise was too long for the timeslot. I will consider shortening the question so that everyone has a good chance to answer it completely during the session and be graded on it.

The personal reflect not the group project was highlighted as useful by one student, which is reassuring, since I have only seen it in pedagogical training and not used in other courses.

One student suggested adding a computer lab of the steel, slag, etc. for visual learners. However, this is a complex problem which is covered in later courses and is it not possible to simply add in sessions - something would need to be removed. Also, I am not aware of such a program being available graphical interface, so one would need to be created, which is a large undertaking (numerical models exist, but this is not what is suggested in the feedback).

Overall, the students seem to like the course, especially the online information that is available in the Canvas room for the course and the lectures. It is good to hear the positive feedback on the lectures, which were completely overhauled in 2020 and improved even further in 2021. Therefore, I believe the current course format works well.

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?

The weakest areas of the course, according to the responses to the LEQ were:

The intended learning outcomes helped me to understand what I was expected to achieve (4.8 / 7)
I could practice and receive feedback without being graded (5.2 / 7)
The course activities enabled me to learn in different ways (5.2/7)

Compared to 2020, the issues about reflecting on personal learning and exploring the subject on their own were not given the 2021 feedback, which indicates that not enough students provides answers with identifiable groupings, so no analysis is possible. However, the lack of negative answers is very encouraging.

The slight lack of clarity around the intended learning outcomes remains (4.8 / 7 in 2021, vs. 4.7 / 7 in 2020). This is not a very negative answer, as 4 / 7 indicates a completely neutral response, so almost 4.8 / 7 implies slight agreement. One student disagreed that the intended learning outcomes were useful, as they said it was unclear that all of them were covered. No detail was provided about what intended learning outcomes are unclear, but I will consider revising all of them to improve the clarity and certainly rewrite the part fo the lecture where I explain the intended learning outcomes to try to address this issue.

Strong areas of the course were most of the other questions, especially "I was able to learn from concrete examples that I could relate to" (6.6 / 7) and My background knowledge was sufficient to follow the course (7 / 7). The second point implies that the course could be made more challenging, which would also help differentiate between good and excellent students. However, the intended learning outcomes are chosen to fulfil a functionalists within the wider programme to ensure a sufficient background for more advanced courses, so it is not entirely straightforward to change them.

When female students could be identified, the following questions were scored slightly lower than the overall average:
I could practice and receive feedback without being graded (4.3 vs 5.2)
The course activities enabled me to learn in different ways (5.0 vs 5.2)
I was able to learn by collaborating and discussing with others (5.0 vs 5.4)

It is confusing why there is a gender difference for the first of these points, as the information was simply provided online and this fact was mentioned in lectures. The other two pints are only slightly different and the sample size is small, so it is difficult to draw conclusions form the difference. The final point of these three (collaborative learning) is concerning and I will track how this evolves in future years. The response is a positive one, but less so than the average (and so much less than non-female respondents, although no "male" response was given as there must have been fewer than three respondents who identified as male). This may be because female students do not feel able or comfortable collaborating with their male colleagues, and the class was majority male. I will consider if it is feasible to ensure no females are alone in research groups, to ensure that each female student has another female to talk to about their research topic. This may be beneficial, but this will depend on the number of students and gender breakdown in 2022.

One female respondent gave a positive comment about the gender equality issues, as did another student who did not provide a gender.

There was a "Swedish student" group, but no international group. The "Swedish student" group gave scores that were more than 0.2 points below the overall average for the following questions:
The intended learning outcomes helped me to understand what I was expected to achieve (4.3 vs 4.8)
The course activities enabled me to learn in different ways (4.7 vs 5.2)
I was able to learn by collaborating and discussing with others (4.7 vs 5.4)

The first of these is covered above, but was also commented on explicitly by a Swedish student, . The second point is also confusing, since the Swedish students should know more about how Canvas works, but perhaps other courses do not use Canvas as much, so the students who have come from the KTH bachelor's programme are used to not using it, while new students are ready to try the new platform and use it more fully. The final png is confusing, as the Swedish students (who overwhelmingly come from the KTH bachelor's programme) generally know each other, so should be comfortable discussing issues with each other, at least mores than the international students who do not know each other and have more different backgrounds. A international student commented that they were comfortable at all times in the class, which is great to hear.

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

For 2022:

The intended learning outcomes should be explained better in the course (and possibly rewritten to be more clear) and they must be clearly covered in examinations.

The assessed exercises should be made shorter so people can complete them within two hours and they should be graded to ensure a sufficient standard to pass.

I will consider adding a short report early in the project to ensure early progress, possibly with a short meeting with a teaching to ensure groups are working well.

In the longer term, the course must be adapted to keep up with current technological developments, such as a shift to fossil-free steelmaking, as the contents of the course mostly deal with traditional coke-based metallurgy. The calculations should be adapted to use hydrogen instead of carbon as a reductant, and the descriptive lectures should include more about direct reduced iron production in Sweden (e.g. Hybrid, H2 Green Steel).

OTHER INFORMATION
Is there anything else you would like to add?

I am very happy with the development since 2020 - most of the issues raised have been dealt with and have not been mentioned this year.