Evaluation report Design Principles for Precision Mechanisms 2

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The evaluation committee has evaluated the course Design Principles for Precision Mechanisms 2 by sending an online questionnaire to 110 students. 34 students filled in the questionnaire, which gives a response of 31%.

The course Design Principles for Precision Mechanisms 2 scores an average mark of 3.9 which is sufficient for a master course. The statements 'The study material (written and electronic) covered the subjects sufficiently' and 'The exam was well related to the major subjects in the course' score the best with both a 4.1. The statements 'The use of black- or whiteboard, sheets or PowerPoint was good' and 'The assignments/questions were clear' score the lowest with respectively a 3.6 and 3.7 which is still sufficient.

These relatively low grades are supported by the students' commentaries. The students mention that the lecture sheets were too disordered. Students think the sheets are also unclear due to the fact that they contained questions without answers. Students think it is possible and desirable to rewrite the reader in a more compact form and in accordance with the lectures.

With regard to the exam, students mention that it contained several errors or vague questions, students rather see some open questions. Also the assignment was very broadly described and therefore the scope was not clear.

These are the main conclusions of the evaluation. The interpretation is based on the remarks of the respondents. For an overview of the results, see the graph at the end of this report.

Recommendations of previous evaluation

No previous report was found. It is therefore not possible to state the recommendations of the last evaluation.

Recommendations by the committee

The quality of the course can be improved. Based on the results of the questionnaire, some recommendations for improvement are provided. The most important recommendations are:

- Revise the lecture sheets. Make the lecture sheets briefly and publish the answers of the questions asked in the sheets.
- Rewrite the reader. Students thinks the reader could be more compact and in better accordance with the lecture sheets.
- Eliminate and prevent vague questions in the exam. This could also be done by adding some open questions, so students can substantiate their answer and therefor their interpretation of the question.

Response from the lecturer

1) The students mention that the lecture sheets were too disordered.
I agree this can be improved. We had several lecturers (including Just Herder from Delft) and sometimes this leads to some form of repetition which should be avoided. It has to be mentioned that the large number of slides is in art due to the design process which requires students to see many existing designs and solutions.

2) Students think the sheets are also unclear due to the fact that they contained questions without answers.
I use a knowledge transfer method called peer instruction by Eric Mazur from Harvard. This requires me to pose questions to the audience. They are at first not allowed to discuss. A poll held after a few moments. Next the students are allowed to discuss with somebody with a different answer. Then a second poll is held. Usually you see the scores improving. Now I give the correct answer and my explanation. With this method the students spend time on a limited number of very relevant topics. They need to discuss with others and they get my (a second) explanation. This concept works well but relies on the fact the students do not have the answers yet. On blackboard I first upload a set of slides without the answers. After the associated lecture I always add the answers in a separate pdf. So I don't fully understand the remark.

3) Students think it is possible and desirable to rewrite the reader in a more compact form and in accordance with the lectures.
The book is quite unique. In fact it contains very valuable material originating from Philips and now ASML (our mechatronics national pride) that is being used for lecturing all over the world (by several others besides me) at the moment. I'm not the author of the book that is my predecessor Herman Soemers. With him, Prof Just Herder (Delft) and Prof Hans Vermeulen (Tue, ASML) we are planning a new book based on the current one. However, in our experience this will take some 5 years. For now this is the best available.

4) With regard to the exam, students mention that it contained several errors or vague questions, students rather see some open questions.
With respect to the large number of students and the small capacity of lecturers we chose to use multiple choice questions. I agree that there was an error in the re-exam. However, I was with the resit exam, so solved the issue on the spot. I'll try to make more clear questions in the coming year.

5) Also the assignment was very broadly described and therefore the scope was not clear.
This is a typical remark which always pops up when actual designing is involved. Part of the design process is translating user specifications to technical specs. Also the solution space is endless by definition. So choices need to be made, but there are several feedback moments at which students can discuss with me or others (peer review).

6) Project
In the project we'll engage the industry more. This year we have asked Demcon (spinnoff of the lab and booming) to come up with a problem description. We'll visit Demcon and talk to some of their engineers. A senior engineer will be involved in the project and several others will also help with the lectures.

7) Additive Manufacturing
Coming year well give each group the chance to actually print their design on our new 3D printer for flexures. This is so that they can really feel the degrees of freedom etc.

Overview

- All marks are given on a Likert-scale from 1-5. For master courses, a mark of 3.5 or higher is sufficient.
- The height of the bars in the graph represents the mark. The thin line at the top of the bars gives the standard deviation.

	1	2	3	4	5
My overall appreciation of the course is:					
The learning outcome of the course is relevant for my academic development					
The contents of the course are interesting					
The information about the course was adequate					
The teacher was available for questions					
The organization of the lectures was good					
During the lectures, the subject became clear to me					
The use of black- or whiteboard, sheets or powerpoint was good					
The study material (written and electronic) covered the subjects sufficiently					
The quality of the study material (e.g. layout, accessibility, level, index) was good					
The requirements for the exam were clear					
The exam / the assignment(s) was / were well related to the major subjects in the course					
The questions / assignments were clear					