Semester Documentation

Semester 3 – Class of 2020

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Introduction

This EduCo Semester Documentation consists of the evaluations of the domain courses, the project, and the semester overall, of semester 3, for the Class of 2020. Information was collected through an End of Semester EduCo Semester 3 Survey, which is based on the "EduCo criteria", while normally also a Mid-term Survey is used. The reason for not having the latter survey is that nothing of the semester was at the point that a topic could be surveyed. The survey consisted of a set of statements for each topic. The students were asked to rate them on a scale from 1 to 5; with 1 being the most negative attribution (never, very poor) and 5 the most positive attribution (always, very good). There were a total of 20 respondents for the end of semester questionnaire (out of a possible 39 respondents; some section can be not applicable to some respondents), and the mean averages and standard deviations of these results were used in this evaluation. After the set of statements with the 1 to 5 scale, students had the opportunity to give open feedback, which is evaluated in the *Discussion* section of each evaluation. Aside from these questionnaires, qualitative feedback received throughout the year was implemented into *Discussion* sections, where appropriate.

All the evaluations have a similar structure; they start with a short *Summary* of what occurred in the course/project/semester, followed by the *Semester Survey Results* for the set of statements, and a *Discussion* based on these results, the open feedback, and other feedback from students throughout the semester. In this discussion, strengths and weaknesses are highlighted. Then potential solutions to problems from the EduCo are placed in the *Suggestions* section. The last section on *Agreements* describes the agreements that were made with a the project coordinator (Mieke Boon) and/or semester coordinator (Leonie Krab), during a meeting where the results and suggestions are discussed.

Ethics

Created by: Sofie Verhees, 3rd of February, 2019, Enschede

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Semester, Year, Class: Semester 3, 2018/2019, Class of 2020

Teacher(s): Nolen Gertz

Summary of the Course

The domain of Social Sciences was represented by Ethics this semester. In 7 lectures, mostly given two times a week, the course went over the theories of Aristotle & Virtue ethics, Kant & Deontology, Mill & Utilitarianism, ethics & technology (including design ethics) and research ethics. Because of a lack of time in the lectures to cover all content, one more lecture was planned to answer any questions. Assessment was done with either an assignment of ethics on your project (with your project group) or an individual ethics paper where you applied the theories learnt to a technology of your choice. The paper was assessed by the teacher with a grade on a scale of 1-10, together with brief feedback on the various sections of the paper.

Perception of the Course

n=19, scale=1-5

EduCo Criterion	**Mean**	**SD**
1. This course sufficiently conveyed both theoretical and applied knowledge	3.3	0.9
2. This course featured both group and individual work	2.3	1.1
3. During this course, students were provided with a sufficient level of guidance	2.1	0.8
4. For this course, there was a variety of possibilities to prove your competence	1.5	0.8
5. This course facilitated personalization	3	0.9
6. This course related to the semester project and other courses	3.6	0.8
7. The course material was useful and relevant	3.6	0.8
8. This course allowed for an even distribution of the workload over time	2.6	1.1
9. The communication about learning goals, schedule, deadlines and possibilities for evidence was clear	2.3	0.9

10. Feedback given by the teacher(s) was complete, useful and timely	1.8	1.2
11. The teacher was sufficiently available for questions/feedback about the course	2.2	1.0
12. The teacher seriously took students' feedback about the course into consideration	1.8	0.8
13. Sufficient knowledge input and support was given to reach the learning goals set for this course	2.7	0.8
14. The teacher(s) taught the course in an engaging and effective way	3.2	1.1
15. The format of the course was engaging and conducive to learning the course material	2.9	1.2

Other remarks:

- There was not enough time for interaction and discussion. There was also no room for improvement since there only was one assignment.

Discussion

Lectures:
Overall, ethics was found an interesting and enjoyable field to have a course on. However, several students found that there were not enough lectures to go over all material. There were multiple lectures when Nolen needed to stop at a certain point in his prepared ppt slides due to time constraints. This resulted in the students having to read over the rest of the slides after the lecture, even though they were not fully self-explanatory. The time constraints also resulted in a lack of space for interaction and discussion, pointed out by several students.
Next to that, there was some discussion on the way the lectures were given. We received several complaints about questions of students, asked during the lecture, being shut down, ignored or weren't answered in Nolen's response. This was one of the factors that contributes to the general perception of Nolen acting as if he was right and all other perspectives were wrong. This did not welcome interaction or discussion within class and which is another reason for why several students thought interaction or discussion lacked in the course.
Finally, here was some discussion on the focus of the material used in the course. Some students found that there should be more emphasis on the application of ethics as Virtue ethics is less applicable to the semester project than research and design ethics. Therefore, there should be more focus on the later topics. On the other hand, some students found that it was also interesting to learn about the initial concepts in ethics as in this case you get an understanding of why research and design ethics came to be.

Reading material:
As the assigned reading material consisted of original (or translated) chapters of the philosophers, some students found the reading material too difficult. It was suggested to read summaries by peers for better understanding. However, others found reading original chapters interesting, as summaries do not give you the understanding of how philosophers

think and write, which is also what Nolen pointed out and based his selection of reading material on.
Also, two inconsistencies were found in the reading material. Firstly, the translated versions of German philosophers included inappropriate comments about the German language. Next to that, the text quotes in the powerpoint slides were different than the reading material, causing some confusement.

Assignment:
Overall, the new assignment (individual ethics paper on self chosen technology) was received well. It required students to both understand theories of ethics and apply them to a technology. The old assignment (with your project group assignment on applying ethics to your project) was less well received. Even though, it was doable and required you to understand and apply ethical theories, some of the questions were problematic to apply them to your project. Therefore, it was a welcoming change to give the students another assignment. However, the change in assignment did cause some students to be confused as the requirements and learning goals of both assignments were different and it was unclear which one to follow if you did the old assignment.
Lastly, the word limit of the assignment (1000 for new, 2000 for old) was found too little to prove your learning by several students.
Furthermore, an intermediary assignment would have been helpful, as there now only was one assignment that immediately makes a students grade for the course. Such an intermediary assignment was originally planned, but never actually given.

Suggestions

- It was thought that more interaction and discussion in the lectures would have significantly improved the efficiency of learning the material as well as have resulted in a deeper understanding of the material. Next to that, it seemed there was too much material to cover in a small amount of time. Therefore it is suggested to do one lecture and one discussion per week. As covering the same amount of content, but then with discussion would go over the amount of ECs required, two solutions could be:
    - Reduce the readings
    - Cover less topics
- To include more opportunities for feedback and the chance to improve based on received feedback, we suggest to include an intermediate assignment.
- To include more interaction and opportunities for feedback, a suggestion is to include a prepared debate in which students argue from the perspective of one of the philosophers.

Agreements

No agreements were made.

Probability Theory and Statistics

Created by: Elena Dalova, 3rd of February, 2019, Enschede

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Semester, Year, Class: Semester 3, 2018/2019, Class of 2020

Teacher(s):

Summary of the Course

This course introduced students to probability theory and some fundamental concepts in statistics. The division of material was roughly 80/20 respectively. Every week there was one lecture in which the contents of a chapter were explained, and one tutorial in which students could solve problems and ask the teacher for help. Grading was in form of an assignment on probability theory, arrounting for 10%, and a test on all material, accounting for 90% of the grade.

Perception of the Course

n=17, scale=1-5

EduCo Criterion	**Mean**	**SD**
1. This course sufficiently conveyed both theoretical and applied knowledge	3.6	0.9
2. This course featured both group and individual work	1.9	0.9
3. During this course, students were provided with a sufficient level of guidance	3.8	0.9
4. For this course, there was a variety of possibilities to prove your competence	2.5	0.9
5. This course facilitated personalization	2.0	0.8
6. This course related to the semester project and other courses	3.0	1.2
7. The course material was useful and relevant	3.8	1.2
8. This course allowed for an even distribution of the workload over time	3.9	0.7
9. The communication about learning goals, schedule, deadlines and possibilities for evidence was clear	3.9	1.1
10. Feedback given by the teacher(s) was complete, useful and timely	3.0	1.1
11. The teacher was sufficiently available for questions/feedback	4.2	0.7

about the course		
12. The teacher seriously took students' feedback about the course into consideration	3.6	1.1
13. Sufficient knowledge input and support was given to reach the learning goals set for this course	3.8	0.9
14. The teacher(s) taught the course in an engaging and effective way	3.7	1.0
15. The format of the course was engaging and conducive to learning the course material	3.6	0.7

Discussion

- Very good and clear explanations during the lectures
- No exam for ATLAS domain courses. It goes against their philosophy
- I think the test is worth too much of the final grade considering it is an ATLAS course.
- The reader was absolutely terrible to work with. Solutions to exercises where merely outcomes and not methods, and were also not explained during tutorials

Students found the delivery of the course and the explanations during lectures overall good. The teacher kept a good pace and adapted his lectures and tutorials based on student input e.g. by including more problem walkthroughs and examples.
The main concern about this course was the final exam, which accounted for 90% of the final grade. To some the test resulted in a lot of stress and fear of the course, while others did not have a problem with it. In both cases however, this approach to grading was perceived as going against the ATLAS philosophy.
Several students expressed concerns that the course did not cover sufficient material in **statistics**, which made them unable to apply it in their semester projects.

Suggestions

- Include more example solutions in the lectures and tutorials
- Give the opportunity to have a final assignment instead of a test, or at least give the test less weight.
- Include solutions to the exercises in the reader, not just answers
- Assignment and exam should be graded quicker

Agreements

- The teacher included more example solutions in his lectures and tutorials

Material Science

Created by: Daphne Nelissen

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Semester, Year, Class: Semester 3, 2018/2019, Class of 2020

Teacher(s): Gert-Jan Koster, André ten Elshof

Summary of the Course

The course starts with four sessions that combine plenary lecture & tutorial. In these we dealt with the fundamentals of material science and then got an introduction to semiconductors. In the second part of the course we worked in groups on a mini-project where we looked into a the technical aspects of the material, the possible applications of semiconductors (e.g. solar panels or LED's) and did an experiment. This resulted into a 30 page report (10 about technical aspects, 15 about (social) applications and implications, and 5 about the experiment methodology). This report was supported by a video in which the theory and experiment were shortly shown and discussed (3 to 5 minutes).

Perception of the Course

n=15, scale=1-5

EduCo Criterion	**Mean**	**SD**
1. This course sufficiently conveyed both theoretical and applied knowledge	3.4	0.8
2. This course featured both group and individual work	3	1.0
3. During this course, students were provided with a sufficient level of guidance	3.4	1.0
4. For this course, there was a variety of possibilities to prove your competence	2.6	1.0
5. This course facilitated personalization	3.6	0.9
6. This course related to the semester project and other courses	2.2	0.9
7. The course material was useful and relevant	3.1	1.1
8. This course allowed for an even distribution of the workload over time	2.5	1.3
9. The communication about learning goals, schedule, deadlines and possibilities for evidence was clear	3.5	1.1
10. Feedback given by the teacher(s) was complete, useful and timely	2.6	0.7

11. The teacher was sufficiently available for questions/feedback about the course	4.1	0.9
12. The teacher seriously took students' feedback about the course into consideration	3.8	0.8
13. Sufficient knowledge input and support was given to reach the learning goals set for this course	3.7	0.8
14. The teacher(s) taught the course in an engaging and effective way	3.8	1.1
15. The format of the course was engaging and conducive to learning the course material	3.1	1.1

Discussion

The lectures not very informative. All lectures took place in two weeks, and the lectures themselves were cut short. Within the lectures there was no tutorial aspect, whereas this would have been nice to encourage understanding of the material. Next to that, there was not much time between lectures to take in information and to properly study it. It also did not help that the information provided in the lecture was not essential to the assignment.

The content that was taught was interesting to most people. However, some things were too basic, while others were too fast.
Lastly, the lectures didn't apply to assignment. The assignment was was not an extension of the theory, but more a different side of material science. Most of the students wished that this would be more coherent and that either the lectures or the assignment gets adapted to each other. Some noted that it is interesting look at the social implications and applications, but all found that it is material science and since we are in a technical programme, it should be focussed on that.

All in all, the course might have been too conceptual for a technical course, as there were no calculations or exercises, and no time given for those either. This conceptual part was also reflected in the assignment, and some even remarked that you can pass the course without learning about material science and just by focussing on social applications in the assignment.

The teachers, way of converting the knowledge and the lectures themselves were appreciated by the students. The book was unnecessary to some, this depended on project topic.

Suggestions

- Spread the lectures out over a few weeks to ensure understanding and learning, and introduce tutorials.
- Have shorter (and possibly more) lectures to keep the attention.
- It would be prefered if the course would be more technical. The social aspect in the assignment is okay, but it is still a natural science course. The domain courses should be for content, not for interdisciplinarity. We get that in the project.
- Maybe do a similar, smaller individual assignment. Include experiment, but not the video, except perhaps pictures as proof that you did it.

Agreements

N/A

Circuit Analysis

Created by: Elena Dalova, 3rd of February, 2019, Enschede

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Semester, Year, Class: Semester 3, 2018/2019, Class of 2020

Teacher(s):

Summary of the Course

Circuit Analysis was a course organized by the bachelor programme of electrical engineering and could be joined by ATLAS students as a domain course of 3 EC. ATLAS students participated in half of the course, covering 5 out of 10 chapters, but some could (and did) opt for the full version of the course, which was 6.5 ECs and part of a 15 EC module. There were no labs available to ATLAS students, but the course offered many contact hours: with two lectures, a tutorial, a review meeting a test every week. Grading was done through the weekly tests, an exam and a resit. Students had a chance to attend all and pass or improve their grade.

Perception of the Course

n=6, scale=1-5

EduCo Criterion	**Mean**	**SD**
1. This course sufficiently conveyed both theoretical and applied knowledge	3.6	0.5
2. This course featured both group and individual work	1.2	0.4
3. During this course, students were provided with a sufficient level of guidance	3.0	1.5
4. For this course, there was a variety of possibilities to prove your competence	3.3	1.6
5. This course facilitated personalization	1.7	0.8
6. This course related to the semester project and other courses	2.0	0.9
7. The course material was useful and relevant	3.3	1.5
8. This course allowed for an even distribution of the workload over time	4.0	1.1
9. The communication about learning goals, schedule, deadlines and possibilities for evidence was clear	4.5	0.8
10. Feedback given by the teacher(s) was complete, useful and timely	4.0	1.3

11. The teacher was sufficiently available for questions/feedback about the course	4.0	1.3
12. The teacher seriously took students' feedback about the course into consideration	3.0	0.6
13. Sufficient knowledge input and support was given to reach the learning goals set for this course	4.3	0.5
14. The teacher(s) taught the course in an engaging and effective way	2.8	0.8
15. The format of the course was engaging and conducive to learning the course material	3.7	1.2

Discussion

Students who participated in this course had split opinions on the usefulness of the materials and lectures. Some found the review and tutorial sessions helpful, others found them useless and thought they did not learn much from the TA's. There was overall agreement that the lectures were not useful because they followed the exact material given in the reader. So if one had already read the chapter, the lecture did not add anything new of clarify any questions. The reader itself was clear and well-written and people found it useful.
Many students without prior experience in electronics could not keep up with the weekly tests and the material. Few others who did have prior experience found it reasonably easy and straightforward.
Some students suggested that the inclusion of practicals / observation labs (which were available to EE students) would enhance our understanding of the course. This was generally agreed upon, although it would also result in too many ECs and contact hours.

Suggestions

It was concluded that no suggestions should be made, as this is not an ATLAS course and as it seems to be a good course considering the needs of the EE programme.

Agreements

N/A

Semester Project

Created by: Sofie Verhees, 3rd of February, 2019, Enschede
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Semester, Year, Class: Semester 3, 2018/2019, Class of 2020
Teacher(s): Mieke Boon

Summary of the Course

This project focussed on experiencing the full cycle of doing research in a self-chosen field. There were 10 Milestones/Deliverables that represented the steps of doing research. For example, Milestone 1 was the research question and study of literature and Milestone 2 was on research methodologies. Milestones were optional to hand in, but if handed it in on time, students received feedback. Deliverables were mandatory and part of the assessment. There was a deadline for a milestone/deliverable every week. To support the learning experience, there were several workshops and weekly question hours. Assessment and feedback was given in accordance the the Feedback Rubric, containing 24 subgoals of the relevant semester goals.

Perception of the Course

n=19, scale=1-5

EduCo Criterion	**Mean**	**SD**
1. In the project non-Dutch students were not put at a disadvantage	4.3	1.0
2. All ATLAS domains/courses that were taught in this semester could be integrated in this project	3.1	1.1
3. Tutors/consultants were informed about the project, and had relevant knowledge	3.0	1.0
4. Tutors/consultants were readily available/accessible for students.	2.6	1.0
5. This project had a well-communicated and logical set-up	3.4	1.0
6. The students were provided with relevant information/knowledge that could be readily applied within the project	3.1	1.0
7. The project was based on a problem that includes both social and technical aspects	3.6	1.0
8. This project clearly stated which assumptions may be made by the students	3.1	1.0

9. The procedure for project assessment was clear in advance	4.1	0.9

Other remarks:

- Got better the further we got

Discussion

Milestones and Deliverables:
This setup was generally positively perceived. Firstly, it was good that the milestones were optional as this reduced pressure. Next to that, the milestones were very helpful in knowing how to approach the research process as well as for keeping track of one's progress. However, some students felt that not all milestones were useful. For example, several groups needed to rewrite an introduction to their paper, even though Milestone 1 focused on this, due to a change in topic or lack of knowledge when creating Milestone 1. This caused the final paper (final deliverable) to require more work than expected.
Over the course of the project, it was also recommended to keep a lab journal. Many groups initiated this, but did not keep a consistent journal throughout the project. It is assumed that this happened because there was no focus on the importance or purpose of a lab journal, and it was not part of the assessment. Next to that, students did not directly perceive keeping a journal as useful.

Workshops:
The workshops were not perceived very useful by students. Some students found that the B&K method and modelling overall could have been explained quicker and more efficient than it was done now (with the milk-ink experiment). This is because during the workshops, many students were confused, but when Mieke explained the B&K method personally to groups, their confusion quickly went away. From Mieke's perspective, it seemed that there was resistance during workshops to work with the modelling. This could be because the students judged that the workshops were not applicable to the research topic. For example, it was mentioned that the workshops were mainly aimed at technically oriented students.
Sometimes workshops were not given when they were most needed, e.g. the one on research ethics which came after most groups had conducted their research. However, many students found the speed dating workshop, in which students talked to other research groups and made a presentation on the differences and similarities between research fields, enjoyable and useful for semester goal 5.
In one of the workshops, two technicians were introduced. These two technicians were helpful for the students. Even though several groups went looking for external technicians, the ones that were introduced were helpful for initial questions and an overview of the possibilities.

Feedback/Assessment:
There was a discussion on the usefulness of the feedback rubric. Several students found that the rubric made very clear what the expectations were. Therefore it could be used as a checklist and the assessment of the project was transparent. However, students did not find the rubric useful for all milestones. To improve on most milestones, the written feedback

given by Mieke provided more guidance than the rubric. However, on Milestone 7 the rubric was useful in pointing out what one needed to work on. Additionally, the rubric was very useful as evidence as it was very specific to the semester goals.
Several students found it an issue that there was no feedback on Milestone 4, 5 and 6, even if they were handed in on time. We expect that this was due to a lack of time on Mieke's side. It was generally an issue that the organisation of the project was very time intensive. Students recognize the hard work of Mieke in assessing all milestones, keeping up with feedback from the students and overall managing the entire project. Some students expressed a concern that such an approach can lead to a one-sidedness of the project, with only one way of assessment and teaching. Some suggested that having more teachers actively involved in the project would improve the quality and student's perception as well as reduce the workload for a single teacher.

Suggestions

- To improve the workshops:
    - Have students explicitly mention how they used a workshop in a milestone
    - Have discussion after the workshop that is more field-specific
- Using the rubric for Deliverables and final assessment only and provide written feedback for the other milestones.
- Somewhat less milestones (by doing exercises in workshops)

Agreements

N/A

Semester Overall Evaluation

Created by: Daphne Nelissen

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Semester, Year, Class: Semester 3, 2018/2019, Class of 2020

Teacher(s): Leonie Krab

Summary of the Semester

This semester consisted of 9 ECs of common courses (ethics, probability theory & statistics, and material science or circuit analysis). There was a 9 EC project and 9 EC elective space spread out over the semester. There were biweekly question hours and the semester coordinator was usually present at the project workshops.

Perception of the Semester

n=20, scale=1-5

EduCo Criterion	**Mean**	**SD**
1. The semester planning was clear and changes were communicated on time	2.7	0.9
2. The expectations for this semester were clear	3.5	0.8
3. An evenly spread out workload throughout the semester was possible	3.2	1.2
4. The semester was coherent	3.3	0.7
5. Students were able to make informed and meaningful choices about the combination of courses within the semester	3.8	0.9
6. During the semester students were introduced to various topics that can assist them in narrowing down their interests towards a possible Master's program.	3.4	1.3
7. The semester allowed for personalization	4.3	0.7
8. Each student had an informed mentor that helped the student in his/her academic and personal development	4.2	0.7

Remarks:

- ATLAS is project-based and each semester there are different kinds of project groups (different sizes etc). It would be nice if ATLAS guides us a bit more on this: how do deal with this, how to improve team work, how to have people with different working styles work well together.

Discussion

General:
The semester coordinator was very approachable for questions, which was very helpful. However, most of these questions were asked in person or via email, as most did not attend the question hours. The format could be changed to make them more useful, however, most students felt like the question hours just weren't very necessary, no matter the format.

Courses:
Some of the ATLAS domain courses did not finish before the SER deadline, or the feedback was not in yet. This made it difficult to write a good SER. However it was appreciated that the SER could still be written and be given feedback without appropriate evidence. Lastly, it was interesting that there were ATLAS domain courses, but none of them were taught by ATLAS teachers. Because the external teachers did not teach the courses in a very ATLAS-like way, this could be something to change.

Project related:
There was a suggestion about working together in groups with different group size throughout the ATLAS curriculum, which was to offer a small workshop on this and how to deal with these changes. This could help with learning different ways of working together and finding out what everyone's preferred way of working together is.

Suggestions

- General: The question hour could disappear, but it does not matter that much.
- Courses: Try to get as many ATLAS teachers as possible to teach the courses in a more ATLAS way. However, most students did not mind the non ATLAS set-up and the teachers themselves were fine.
- Project related: A small part of the semester introduction can be spent on dealing with semester project group size

Agreements

The semester coordinator will try to get as many ATLAS teachers as possible and will look into the use of the question hours and how to integrate group size workload into the semester.