

Course Analysis for FYSA12, VT 2021

Course responsible: Elizabeth Blackburn

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Number of students registered: 58 (of which 37 are new students)

Number of replies to survey: 11

Course representatives: Umashi Fernando, Sherwan Jamo Abdi

This report was discussed with the course representatives on 2021-06-11.

Module 1 – Introduction to being a physicist (2 hp)

For Module 1, the comments were generally very positive, particularly focussing on a strong appreciation of the content and the teachers, and that a clear effort had been made to make the intro labs fun and engaging. The only consistent complaint with respect to the material was that error handling and propagation should have been covered in more detail.

We plan to develop an approach to provide more information on this, perhaps through dedicating some more of the existing lecture time to this subject, and by considering exactly how it is introduced in the laboratories. We also need to check with the later physics courses for consistency, particularly FYSC13.

Module 2 – Mechanics (6.5 hp)

Students taking the exam in March 2021: 39

Grades: U – 10, G – 21, VG – 8

Students taking the exam in April 2021: 4 (of which 3 were retakes)

Grades: U – 1, G – 2, VG - 1

A) Summary of Course Evaluations

The summary of the survey report is attached to this document. This consisted of a set of standard questions on the course, as well as some freetext questions specific to this particular course and Module 1. There were only 11 respondents, and as such this only represents a fifth of the class.

Overall, 8 students were satisfied with the course as a whole, and 3 dissatisfied. The participation level indicated that the average attendance level for activities was ~75%. When asked if the course inspired the students to do their best, 7 respondents agreed and 4 disagreed.

Most responses were generally positive, although they could be improved. In terms of skills acquired, the students felt that their problem-solving skills had improved (82% agree), their analytical skills had improved (91% agree), and that their written skills had improved (73% agree). In terms of tackling new and unfamiliar problems, 8 students agreed somewhat, and 3 disagreed strongly, indicating a clear split in student experiences.

The course content was judged to be important for the future education plan (10/11 responses; the exception provides a detailed discussion of why this is not the case in their freetext comments) and was found to not require too much memorisation of facts (91% of responses). It was also noted that the assessment methods required in-depth understanding, with all respondents agreeing on this. The laboratory exercises were considered to be an essential component of the course (92% agreement).

In terms of course workload and time available, three questions addressed this. One asks specifically if the workload is too heavy; 82% of respondents agreed with this. When asked if the volume of work was too high to comprehend everything thoroughly, 50% of the respondents agreed and 50% disagreed, with 1 respondent saying that the question was 'not relevant'. When asked if there was enough time to understand the things that had to be learned, 6 respondents agreed and 5 disagreed, so the response to these two questions are basically in agreement. This indicates that the workload is not drastically skewed in either direction, but that there is a lot to do. In the written comments, the lab report deadlines were raised specifically as an issue, namely that the time available is too short.

In terms of organisation, the general opinion was that it was not clear what was expected at the beginning (7 respondents found it unclear, and 4 clear), particularly with respect to the examination. This will be improved for next time. There were a number of complaints about the Canvas structure used, although it was acknowledged that this had been improved over time. The online lectures were found to be satisfactory (all respondents agreed on this), with particular comments on the interactivity being helpful and on the use of breakout rooms for discussion and to meet other classmates. However, one respondent found that the course as a whole was not online friendly, and another would have preferred more use of the lectures as a replacement for the course book. Regarding the book, there were no consistently strong opinions one way or the other. The primary criticism was that the book was too wordy.

For the mechanics teaching, the lectures were delivered by Elizabeth Blackburn, and the exercise classes were delivered by six different people. 92% of respondents agreed that the teaching staff tried to understand student difficulties, and tried to make the material and course interesting. 90% of respondents found that the teaching staff were good at explaining the subject. The level and quality of contact with the teaching staff was either Good or Excellent for all respondents. In the written comments, 5 respondents specifically noted that it was easy to ask questions to the teacher and get a helpful response.

The main feedback on the laboratory exercises was that the deadlines for the report writing were too short, causing a lot of stress, and that the criteria applied for the report grading were not consistently applied between labs/supervisors. However, this latter point seems to have been improved upon compared to last year. As most students taking this course have now taken one semester of Mathematics, previous issue with writing reports in LaTeX have not been a problem. I also note that the students plainly put more effort into preparing for the labs in advance than in previous versions of the course.

There were a few specific queries or comments on particular aspects of content, detailed in the attached evaluation reports. The most commonly reported one was a lack of comfort with the handling of errors and error propagation; this will be discussed below.

B) Comments/reflections from teachers

A number of changes were instituted this time due to the requirement to shift to predominantly online teaching. Aspects specific to that are reflected on in Part C.

The student representatives gathered feedback early in the course, and this was very helpful in making some changes to the lectures and Canvas pages to make them more accessible to the students. Overall, many students were well engaged in the course. Approximately half of the students regularly attended the lectures. For the exercise classes again, around half of the students participated on a regular basis. It would be good to improve attendance numbers.

Problem sheets

The problem sheets introduced in VI2020 continued this year, and were well received by the students. As with last year, submissions were consistent for the first four, but then dropped off for the last one, presumably due to other requirements on time. In particular, it was remarked that the problem sheet schedule helped to set markers for where the students should be in their personal study. Solutions were submitted via Canvas without any difficulties arising.

C) Evaluation of changes since the course was given last

The overall structure of the course kept the changes introduced in VI2020, although the course this year was mostly delivered on-line, due to the coronavirus regulations in place. This led to certain changes:

Lectures

The lectures were all delivered online. This dramatically reduced the number of practical demonstrations; some were shown in person or by pre-recorded video, but the impact was not as strong as in-person demonstrations. The lectures were switched to a persistently more interactive style, involving more peer instruction questions. One advantage of using Zoom here was that the students were randomly assigned to their groups, and these groups could be reformed if the discussion stalled across the class as a whole, whereas in person this is set by the seating arrangements. The use of breakout rooms to help promote discussion also appeared to be successful. These changes were generally appreciated, although clearly some students would have preferred a more traditional transmission of information.

Laboratories

For Mechanics, one of the labs was held on campus (M4), and the other (M1) was rewritten to be carried out at home – this required an extensive rewrite. The feedback on the labs was generally positive. The main criticisms of the labs fell on the feedback being inconsistent. From EB's point of view, the M1 lab changes worked well as a home experiment, with students successfully setting up their own experiments and obtaining results. However, the intended focus on improving individual measurements was not achieved.

The time available for writing lab reports was altered to 1 day after the lab, to match up with the schedule in HT2020. This received numerous complaints from the students that this imposed too high a workload, and significant stress.

Exercise classes

The delivery of the exercise classes was changed, in part to mitigate some of the online-only issues. In the evaluation survey, the feedback on these exercise classes was mixed, with 4 written comments indicating that they were very helpful, and then several negative comments that relate to specific problems with the way individual supervisors ran the classes (e.g. continually side-tracked by one talkative students, issues with timing, etc). The query raised over the timing

indicates that for the students in that class, there were issues with talking to the supervisor, as the supervisors were asked to reach an agreement with the members of their class on the time, within the blocks timetabled in the course schedule. Broadly speaking, similar feedback was obtained from the online Course Evaluation and Reflection session, noting that it really depended on the supervisor. From the feedback, particular problems with two of the supervisors have been identified. If this method is continued, further training will be needed for the supervisors to improve quality.

Some students were not keen on participating in the exercise classes due to the expectation of active participation. However, we consider that this is an important part of the learning process, and that these classes constitute a good practice environment for this.

D) Suggestions for modifications and measures until next time the course is given (VT2022)

We need to revisit the schedule for submitting lab reports. The best solution for this is not yet clear, but this is being discussed between the EM and Mechanics parts of this course for both the HT and VT variants. It was eventually decided that four reports have to be maintained for consistency between the different variants of the course.

If the course is again to be delivered predominantly remotely, some time will be dedicated at the beginning of each type of activity (e.g. lecture, exercise class, laboratory) to allow the group to set conduct rules that they are happy with, for example regarding methods of interaction, the use of cameras, etc.

Module 3 – Electromagnetism (6.5 hp)

Students taking the exam in March 2021:	31
Grades:	U – 10, G – 16, VG – 5
Students taking the exam in May 2021:	8 (of which 4 were retakes)
Grades:	U – 6, G – 1, VG - 1

A) Summary of Course Evaluations

The summary of the survey report is attached to this document. This consisted of a set of standard questions on the course, as well as some grading and free-text questions specific to the Electromagnetism course, Module 3. There were 11 respondents, which represents a fifth of the class.

Overall, 8 respondents were satisfied with the course while 3 were dissatisfied. The participation level indicated that the average attendance level for activities was ~60%. When asked if the course inspired the students to do their best, 7 respondents agreed and 4 disagreed.

Most responses were generally positive, although the outcomes could be improved. In terms of skills acquired, the students felt that their problem-solving skills had improved (82% agree), their analytical skills had improved (73% agree), and that their written skills had improved (90% agree). In terms of tackling new and unfamiliar problems, 8 students agreed somewhat, 1 disagreed somewhat, and 3 disagreed strongly, indicating differences in student experiences.

The course content was judged to be important for the future education plan (10/11 responses; the exception provides a detailed discussion of why this is not the case in the free-text comments) and was found to not require too much memorisation of facts (according to 82% of

responses). It was also noted that most students (82%) found that the assessment methods required in-depth understanding. The laboratory exercises were found to be an essential component of the course (92% agreement).

Three questions addressed course workload and time available. On a question whether the workload is too heavy, 73% of respondents agreed (46% strongly, 27% somewhat), while 27% somewhat disagreed with this. When asked if the volume of work was too high to comprehend everything thoroughly, 54% of the respondents agreed and 46% disagreed. When asked if there was enough time to understand the things that had to be learned, only 2 respondents agreed while 8 disagreed (5 somewhat and 3 strongly). The replies to these questions thus differ and the workload probably has to be assessed when revising the course. In the free-text comments, the lab report deadlines were raised specifically as an issue, namely that the time available is too short.

In terms of organisation, most students (64%) found that it was clear what was expected at the beginning of the course, while 36% somewhat disagreed with this. This can nevertheless be improved by better communication for next time the course is given. There were a number of complaints about the structure of the Canvas page used, although it was acknowledged that this had been improved over time.

For the teaching in electromagnetism, the lectures were given by Christian Brackmann, Jan Knudsen and Hanno Perrey while the exercise classes were given by two other tutors. The online lectures were assessed “good” by 9 respondents while 2 found graded them “not so good”. The online exercise classes were rated “good”, “not so good”, and “poor” by 4, 2, and 1 respondent, respectively. Four students replied “not relevant”, probably because they did not attend the exercise classes.

All respondents agreed (73% somewhat, and 27% strongly) that the teaching staff tried to understand student difficulties. Ten out of eleven respondents found that the teachers tried to make the material and course interesting. Nine respondents found that the teaching staff were good at explaining the subject while two to some extent disagreed. The level and quality of contact with the teaching staff was either Good or Excellent for all respondents. In the written comments the students appreciate the response of the teacher to adapt the format of the lectures.

The main feedback on the laboratory exercises was that the deadlines for the report writing were too short, causing a lot of stress, and that the criteria applied for the report grading were not consistently applied between labs/supervisors.

There were a few specific queries or comments on particular aspects of content, detailed in the attached evaluation reports.

B) Comments/reflections from teachers

A number of changes were introduced due to the requirement to shift to predominantly online teaching. Aspects specific to that are reflected on in Part C.

The student representatives gathered feedback early in the course, and this was very helpful in making some changes to the lectures and Canvas pages to make them more accessible to the students. On average, about 40 % of the students regularly attended the lectures in electromagnetism. The free-text answers, input from the tutors and my (C.B.) own experience

indicates that the exercise classes were not well attended. Mostly they were used as question and answer sessions. Perhaps the attendance also declined if students started to lag in solving problems when the work load with lab exercises and other activities became higher. It would be good to improve attendance numbers.

Problem sheets

The Mechanics course, Module 2, used assignments with problems to hand in for assessment that also could give bonus points on the exam. This activity was well received by the students and requested also for the EM course. We agree that this is a good suggestion as it could help the students to keep the pace of the course. It was discussed at the start of the course, but the change in the teacher team due to an unexpected sick leave led to that it was not implemented. However, this will be taken up for next year.

C) Evaluation of changes since the course was given last

This year was the first year the main lecturer (C.B.) participated in the course and the original plan was that it should have been shared with the teacher that has been responsible for the course in previous years. However, an unexpected sick leave for that teacher led to increased teaching for C.B. and it was also necessary to bring in two other teachers for the latter parts of the course. This completely new team of teachers and adaptations to on-line teaching due to the coronavirus regulations in place makes it difficult to compare with the format from previous year. The required on-line teaching led to certain changes:

Lectures

The lectures were all delivered online, which dramatically reduced the possibilities for practical demonstrations. Although some were shown by pre-recorded videos, the impact was not as strong as in-person demonstrations. Following input from the students via the representatives after about 1 week, the lecture format was adapted to a more interactive style, involving more peer discussions. The use of breakout rooms to help promote discussion also appeared to be successful. The changes and response of the teacher to the student's input were generally appreciated, as mentioned in the free-text comments. The necessary arrangement with three teachers in the latter part of the course, introduced at relatively short notice for all of us, naturally led to some differences in teaching style. One free-text comment mentions this, and suggests that the consistency must be improved. We agree on this and it will of course be much easier to achieve having the same team of teachers from the beginning and through the entire course.

Laboratory exercises

One of the labs in electromagnetism was held on campus (E3) arranged in a shorter form than previous years, while the other (E2) was adapted to be carried out at home. The modification of lab E2 included the addition of one assignment where the students carried out an experiment of their own using the electronic kit provided for the introductory lab. The experiments normally carried out in lab E2 were demonstrated on movies and the students were provided with data to carry out the analysis. The intention with the additional assignment was that a lab exercise should contain some experimental work and having only the movie demonstrations with calculations and analysis does not fulfil this requirement. Moreover, with this arrangement the students also got individual data sets to present. Some free-text comments mention that this increased the work load of the students. While the experimental work was clearly reduced (the current balance experiment can take some hours) the lab report became more extensive with the additional assignment. With some hindsight, this should have been accounted for in the instructions and requirements for the lab report. The main criticisms of the labs fell on the feedback being

inconsistent and that the time available for writing lab reports, with hand-in deadline at the end of the day after the lab, imposed too high a workload, and significant stress.

Exercise classes

The exercise classes were also given in Zoom session and unfortunately not well attended. They were often used as question and answer sessions with students logging in during a short time for guidance. At the end of the course all lecturers encouraged participation in the exercise classes for the students to get help with the course revision and any questions they might have. I (C.B.) also attended the classes to be available for questions. However, even close to the exam they were unfortunately not well attended at all.

The exam

Similar to previous years and according to the course plan, there was a written exam at the end of the course. The exam should reflect the teaching, and therefore the balance between problems with numerical solutions and derivations of relations was shifted towards the former compared with exams from earlier years that were handed out for practice. This adjustment was informed on prior to the exam.

D) [Suggestions for modifications and measures until next time the course is given \(VT2022\)](#)

The CANVAS page can be modified for a clearer structure.

We need to reassess the schedule for submitting lab reports. The short deadlines have been implemented after discussion with the student Student Health Centre, which advised that long deadlines for having in lab reports results in long-term stress as assignments to be handed in tend to accumulate. A short deadline, even though stressful during a short time, is then a better option than a longer one. That said, one single day might be too short and having more than one lab with tight deadline during a week might be too high a workload in total. The best solution for this is not yet clear, but this is being discussed between the EM and Mechanics modules for both the HT and VT variants of the course. It was eventually decided that four reports have to be maintained for consistency between the different variants of the course.

While the lab tutors had been provided common instructions for report assessment to help giving consistent feedback, this can still be improved for the future and will be addressed for the next time the course is given.

While most respondents say that their knowledge from previous studies are sufficient to follow the course, the background in mathematics apparently differs between the students. All respondents agreed that some introductory teaching in mathematics could help to follow the course and this will be included for next year. One of the free-text answers comments on the discrepancy between the level of maths on the lectures and in the course book. Probably this can be helped with some introductory teaching in mathematics covered by the course, which is also suggested. The same respondent has further comments on the mathematics in the teaching, from which we note that the teacher could be a bit more precise on stating what is defined and what is derived from them.

If the course is again to be delivered predominantly remotely, time will be dedicated at the beginning of each type of activity (e.g. lecture, exercise class, laboratory) to allow the group to set conduct rules that they are happy with, for example regarding methods of interaction, the use of cameras, etc.