FACULTY
OF SCIENCE

Department of Physics
Division of Nuclear Physcis
Prof. Dirk Rudolph

# Course Evaluation FYSC12, VT20

During the introduction of the VT20 lecture series, the need for course representatives was pointed out by the lecturer, and two student course representatives were elected (Adam Asaad and Ieva Puspure). During the laboratory period, an evaluation sheet was agreed upon, practically the same as developed VT18. One additional question concerned the unusual 4h-long lectures and the block scheme of first atomic physics (~10 days) and nuclear physics (~10 days) prior to the laboratory period. (This scheme was triggered by the parallel FYSC11 course).

Students received information via Canvas right after the laboratory period, the evaluation sheet could be downloaded from that point on, and reminders were placed both in lectures, an additional Canvas notification, and by the two course representatives. It was possible to prepare and submit course evaluation sheets both in person (19/3, 13:00, once all oral examinations were conducted) and via e-mail to the course representatives until late March. The fact that handing in course evaluations is in principle mandatory was also mentioned during lectures and by Canvas e-mail to all students. Despite these efforts from our side and reminders from the student representatives, the feedback of sheer numbers of evaluation sheets turned out to disappointing. In turn, a number of students provided thoughtful and extensive and thus valuable comments.

All student replies are attached. The course representatives prepared a brief summary from the student perspective (see attachment, part 1). The statistical and graphical analysis was done by the course responsible teacher (DR). The material is circulated amongst all teachers, i.e. lecturers and laboratory assistants, to allow to take home more specific notes on their part of the course.

## Comments

Only (!!) 14 out of 41 registered FYSC12 students (34%) participated in the course evaluation. The number of student evaluations should be much higher, and one can wonder whether a student feedback on that level can be considered statistically relevant (in all respects), while it is difficult to see a solution on how to ensure that students fulfil their mandatory task in terms of submitting course evaluation form.

Nevertheless, the overall picture is very much compatible with the almost identical evaluations conducted since VT18, with a grand average of a score of slightly above 4 on an evaluation scale 1 to 5, i.e. we teachers are once again happy to see that all in all the course as such is apparently appreciated by the students – with the exception of the 4h-lecture blocks, which scored badly with 2.29. We agree with the students that that ‘experiment’ – not enforced by FYSC12 though – failed.

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### Lectures & Hand Outs

As stated in earlier replies, given that there is a planned major revision of the bachelor programmes at the science faculty, an update of course contents (and alignment with a similar introductory course at LTH) is ongoing and the revised version of the course is due VT21 for the first time. With a title “Nuclear Physics” the more relevant (in Lund) “ESS-neutron” complex as well as lectures on interaction of radiation with matter will gain space on account of some details of the shell model and nuclear astrophysics, which will move into an “Advanced Nuclear Physics” course. The new course plan increases also the weight of societal relevance of nuclear physics.

Hand-outs are meant to provide guidelines and summaries of topics. There are the course books for learning / recovering details. An alternative course book containing more modern societal impact continues to be introduced, while it is planned to have that as the new main course book starting VT21.

There will not be any 4h-block lecture teaching in the future. In fact, that (negative) student feedback is highly appreciated by us as well. A more steady 2h-lecture-per-day scheme prevents too much information in one subject per unit time and also spreads out the three problem sheet hand-ins, thus workload, towards a more reasonable and manageable scheme, which had been the approved way since many years before. We will also follow up on the idea of one each 2-hour lecture before and after lunch, with room for other activities in between. This requires coordination with physics 1 courses due to parallel use of the main lecture hall.

### Problem Sheets / Sessions

Over the years there have been wishes for a more or fewer problem sheets and/or problem sheet sessions. We once again acknowledge the fact that the rate of information and problems was too high this time and take that as an incentive to more thoroughly object block teaching in the future. Other than that, the student feedback indicates that they served their purpose, including pass rate in the final oral examination. From the teacher’s perspective one can note that it was ‘too quiet’ during the problem sheet sessions, i.e. that the ‘average student’ did not (dare to?) discuss the problems that much with the teachers present. Similarly, hardly any student (dared to?) made use of the open-door policy or Canvas for that sake.

### Laboratories

In terms of laboratory exercises, modernisation of primarily the more “classic” alpha, beta, and gamma laboratories is on the to-do list. This year’s evaluation is all in all similar to previous years, i.e. the ‘fresh’ neutron laboratory is well established by now, receives very good feedback marks, and will be taken into the revised course VT21. There are still going to be three full-day laboratories but starting with a more basic one (choice of radioactive decay / radon in the environment, with report), followed by a choice of neutron or (updated) beta, introducing scintillator detectors, assessment during the day as now, and a gamma laboratory focussing on semi-conductors and all in all less ‘heavy’ (with report). Reports will have upper limits of pages. Hopefully, in the future the students will have appropriate analysis and statistics ‘tools’ to be at hand, such that the workload related to such standard tools can be decreased further.

Teachers on all levels, in particular laboratory supervisors, are also researchers, and it is human that one cannot be top-level prepared at all times.

### Course Evaluation

Seemingly, it was not obvious for some students what this point was aiming at. A digital (Canvas) version of the evaluation form is on the to-do list, while those who did fill the form seemed to be happy with it.

### Examination

While the style may or may not be very different, we do look at statistics, both in terms of the examiners and, for instance, gender related. Neither for FYSC12 VT20 nor in previous years we were able to identify any bias in one or the other direction. There is no trend towards on average higher marks towards the end of the examination week either.

### Learning Outcomes

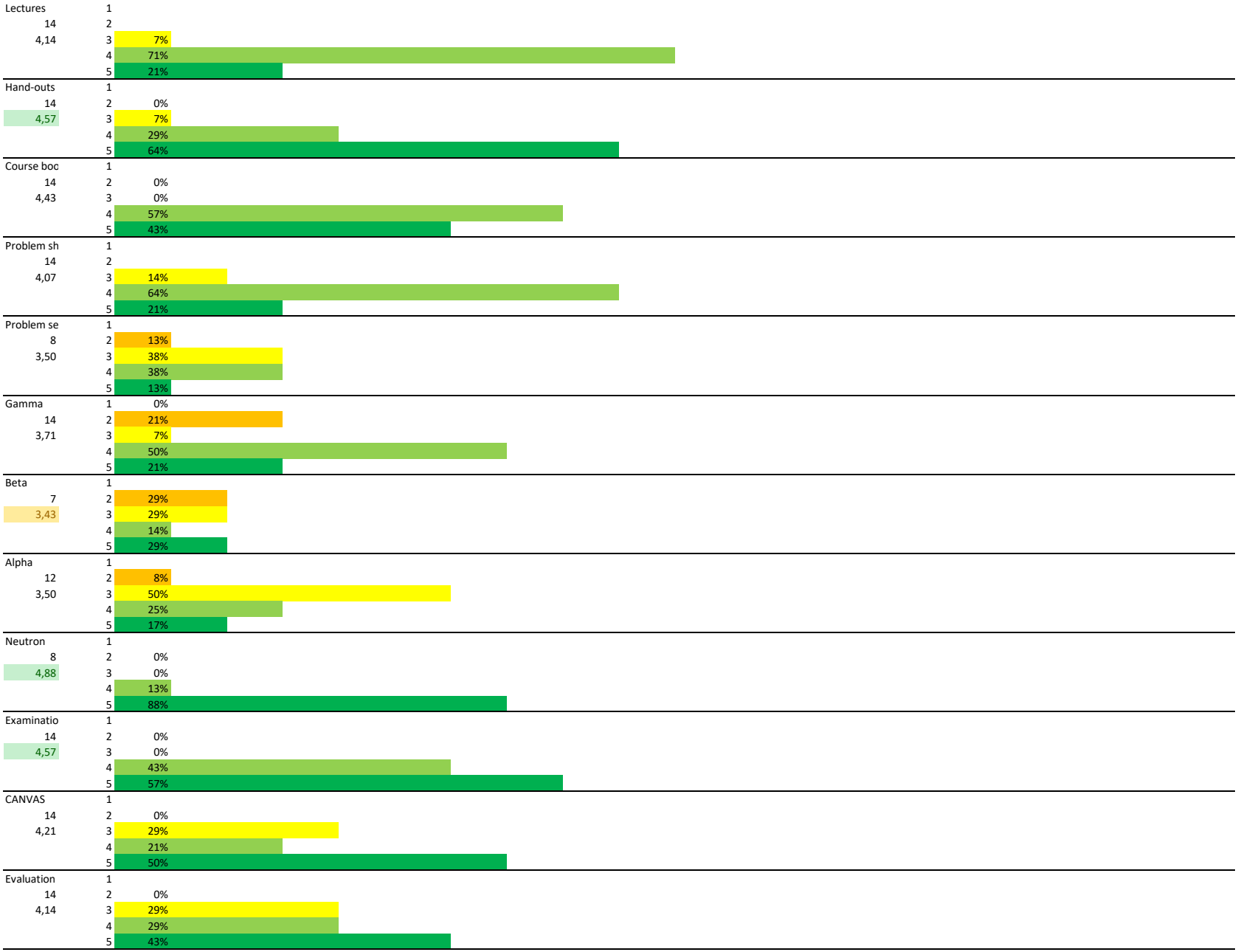
There is not much to say other than we continue to be surprised over the relatively low mark concerning two-nucleon systems, not the least since the deuteron and its overall relevance is dwelled on many times.

| **VT20** | FYSC12 | ÄFYD04 | FKFN20 | separate evaluation (CEQ) |
|---|---|---|---|---|
| Number of participants | 41 | 0 | 0 | |
| of which re-registered | 1 | | | |
| Number of evaluations | 14 | 0 | | |
| | 34% | | | |

| | 1 | 2 | 3 | 4 | 5 | total | average |
|---|---|---|---|---|---|---|---|
| Lectures | | | 1 | 10 | 3 | 14 | 4,14 |
| Hand-outs | | 0 | 1 | 4 | 9 | 14 | 4,57 |
| Course book | | 0 | 0 | 8 | 6 | 14 | 4,43 |
| Problem sheets | | 0 | 2 | 9 | 3 | 14 | 4,07 |
| Problem sessions | | 1 | 3 | 3 | 1 | 8 | 3,50 |
| Gamma lab | 0 | 3 | 1 | 7 | 3 | 14 | 3,71 |
| Beta lab | | 2 | 2 | 1 | 2 | 7 | 3,43 |
| Alpha lab | | 1 | 6 | 3 | 2 | 12 | 3,50 |
| Neutron lab | | 0 | 0 | 1 | 7 | 8 | 4,88 |
| Examination | | 0 | 0 | 6 | 8 | 14 | 4,57 |
| CANVAS pages | | | 4 | 3 | 7 | 14 | 4,21 |
| Evaluation | 0 | 0 | 4 | 4 | 6 | 14 | 4,14 |
| | 0 | 7 | 22 | 37 | 39 | 105 | 4,03 |
| | | | | | | | |
| 4h lecture period | 5 | 4 | 1 | 4 | | 14 | 2,29 |

| | 1 | 2 | 3 | 4 | 5 | total | average |
|---|---|---|---|---|---|---|---|
| Basic properties | | | 0 | 4 | 10 | 14 | 4,71 |
| Two-nucleon systems | | 1 | 9 | 1 | 3 | 14 | 3,43 |
| Decay modes | | | 0 | 2 | 12 | 14 | 4,86 |
| Nuclear structure models | | 0 | 3 | 7 | 4 | 14 | 4,07 |
| Nuclear reactions | | | 0 | 6 | 8 | 14 | 4,57 |
| Applied nuclear physics | | 0 | 2 | 4 | 8 | 14 | 4,43 |
| Fission reactors | 0 | 0 | 0 | 12 | 2 | 14 | 4,14 |
| Reactors as source of energy | 1 | 0 | 7 | 5 | 1 | 14 | 3,36 |
| | 1 | 1 | 21 | 41 | 48 | 112 | 4,20 |

| | yes | | maybe | | no | | sum |
|---|---|---|---|---|---|---|---|
| … describe and use basic modern physics … | 13 | 100% | 0 | 0% | 0 | 0% | 13 |
| … plan, conduct and report experiments? | 13 | 100% | 0 | 0% | 0 | 0% | 13 |
| … assess experimental results? | 13 | 100% | 0 | 0% | 0 | 0% | 13 |
| … judge … limitation of physical models? | 11 | 85% | 1 | 8% | 1 | 8% | 13 |
| … obtain new knowledge and report … | 13 | 100% | 0 | 0% | 0 | 0% | 13 |
| … exemplify and describe … current research ... | 10 | 77% | 2 | 15% | 1 | 8% | 13 |
| … role of nuclear physics in society? | 11 | 85% | 1 | 8% | 1 | 8% | 13 |
| … function and use of nuclear reactors? | 12 | 92% | 1 | 8% | 0 | 0% | 13 |
| | 96 | 92% | 5 | 5% | 3 | 3% | 104 |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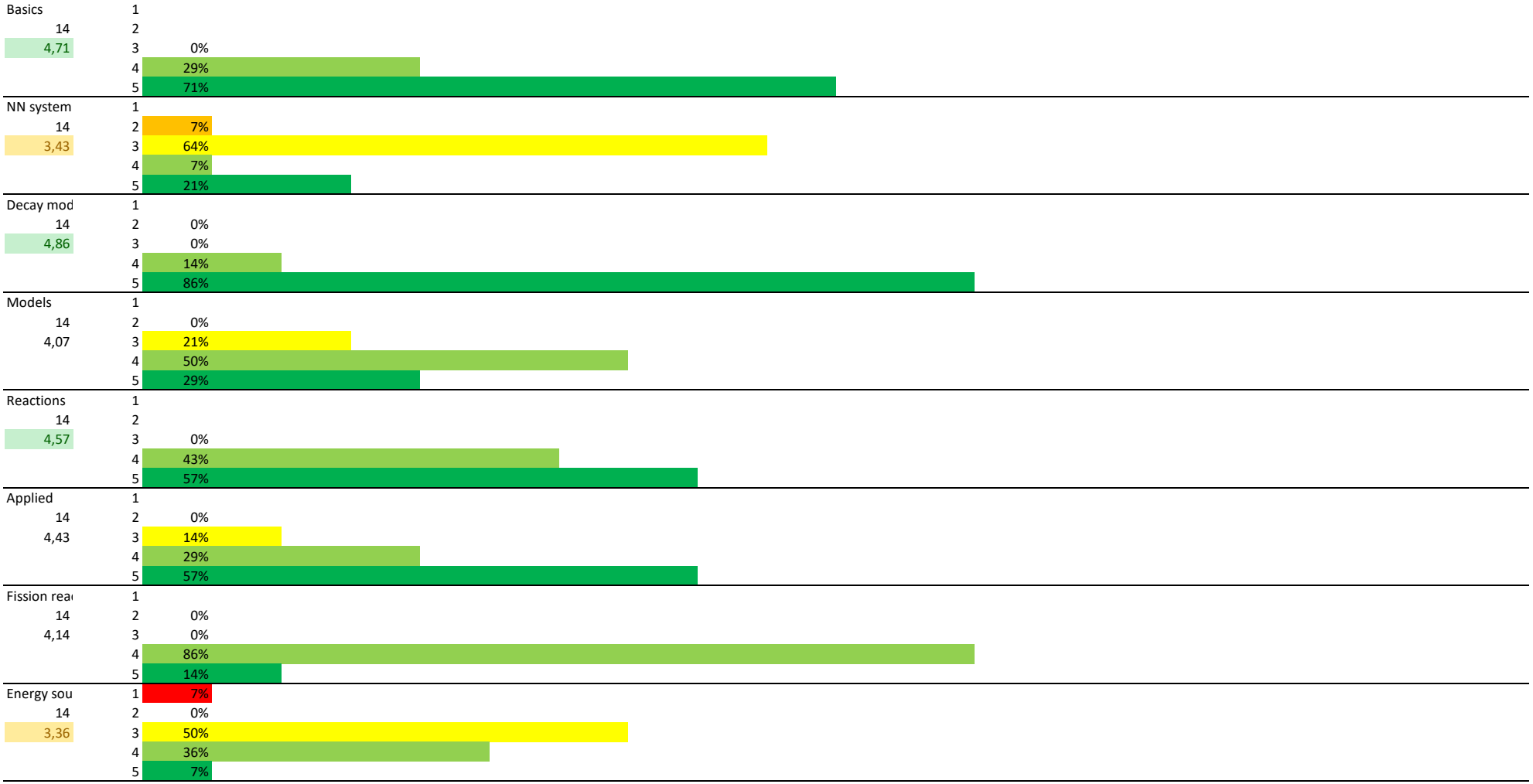
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# Course Evaluation Summary: FYSC12 VT2020

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## Positive

-Many felt that the lecturers (Dirk & Pico) were very passionate about the topics taught, leading to very pedagogical and interesting lectures

- Guest speakers allowed for variety and provided a valuable insight to the various fields of research related to the course

-Overall good structuring with hand-ins, these ensured the course subject was learned more in depth

-Labs provided a good hands-on experience with radiation research

-The structure of the oral exam was good, allowed for gaining a deeper understanding into how the topics work rather than getting too hung up on the maths.

## Negative

- Biggest complaint were 4-hour lecture periods. These were very overwhelming information wise and did not allow for enough time to absorb the topics in depth between lectures. They felt forced and information dense, especially alongside a second course.

- Gamma lab was far too large and felt more like an 8-hour lecture than a lab. It would be better to split into an introduction lecture for the lab or place the information into a lab manual, so more of the time during the lab is spent collecting measurements. The workload in the lab report also did not feel proportional to other labs.

- Few felt that the alpha lab was too similar to the gamma lab, and again felt like more of a lecture than a lab.

- Lab weeks felt very stressful workload wise with the addition of hand-ins, could possibly be spaced better.

- Example exercises in the lectures would be appreciated as it felt like a big jump between what was covered in the lectures and what the hand-ins asked.

- On the oral exam a larger variety of questions should be asked, as those going later had the unfair advantage of knowing what kind of questions were asked to the previous students, allowing to prepare more towards them.

Ieva Puspure & Adam Asaad

# FYSC12: Course evaluation VT20

Please form a group of maximum 4 students, discuss the questions on this sheet, and answer them together or individually. The evaluation is anonymous.

When you are finished, please hand this form to one of your course representatives, in paper or via e-mail. These are (VT20) Ieva Puspure puspureieva@gmail.com and Adam Asaad adam.asaad76@gmail.com

Comments are much appreciated. Thanks for your participation!

**1. Number of students in the group: ___**

2. The course in general. *Please rate the different aspects of the course by circling the number that most represent your groups views. 5 is very good, 3 is adequate, and 1 is very bad.*

| | | | | | | |
|---|---|---|---|---|---|---|
| A. | Lectures | 1 | 2 | 3 | 4 | 5 |
| B. | Hand-outs | 1 | 2 | 3 | 4 | 5 |
| C. | Course book(s) | 1 | 2 | 3 | 4 | 5 |
| D. | Problem sheets | 1 | 2 | 3 | 4 | 5 |
| E. | Problem sessions | 1 | 2 | 3 | 4 | 5 |
| F. | Gamma lab | 1 | 2 | 3 | 4 | 5 |
| G. | Beta lab | 1 | 2 | 3 | 4 | 5 |
| H. | Alpha lab | 1 | 2 | 3 | 4 | 5 |
| I. | Neutron lab | 1 | 2 | 3 | 4 | 5 |
| J. | Examination | 1 | 2 | 3 | 4 | 5 |
| K. | CANVAS pages | 1 | 2 | 3 | 4 | 5 |
| L. | 4h-Lecture periods | 1 | 2 | 3 | 4 | 5 |
| M. | Course evaluation | 1 | 2 | 3 | 4 | 5 |
| N. | _____ | 1 | 2 | 3 | 4 | 5 |

**3. Do you have any suggestions for improvement? This is most relevant in case you have been choosing low marks on any of the above.** In many cases, we can only act on, i.e. improve on, specific notes.

*Indicate what you want to improve with a letter (see 2.) and please comment below.*

*Of course, also positive comments on what you appreciated are most welcome!*

4. Course content: *Please rate how well you think the course has covered these different topics by circling the number that best represents your group's view. 5 is very well covered, 3 is adequately covered, and 1 is not covered at all.*

Basic properties of atomic nuclei

1 2 3 4 5

Deuteron, two-nucleon systems, nucleon-nucleon force

1 2 3 4 5

Nuclear decay modes: alpha decay, beta decay, electromagnetic transitions, fission, etc.

1 2 3 4 5

Nuclear structure models: spherical, deformed and collective model, excitations

1 2 3 4 5

Nuclear reactions: cross section and reaction mechanisms, reactions due to strong and electromagnetic interactions, fusion

1 2 3 4 5

Applied nuclear physics, including accelerators, detectors, and nuclear astrophysics

1 2 3 4 5

Different types of fission reactors, their structure and use

1 2 3 4 5

Reactors as source of energy from environmental and societal perspectives

1 2 3 4 5

5. Learning outcomes: *Please answer yes or no if all members of the group feel that they are able to...*

… describe and use basic modern physics, especially in the field of nuclear physics?

… plan, conduct and report experiments?

… assess experimental results?

… judge the applicability and limitations of physical models?

… obtain new knowledge and report it in speech and writing?

… exemplify and describe, in outline, current research and in nuclear physics?

… demonstrate understanding of the role of nuclear physics in society?

… understand the function and use of nuclear reactors?