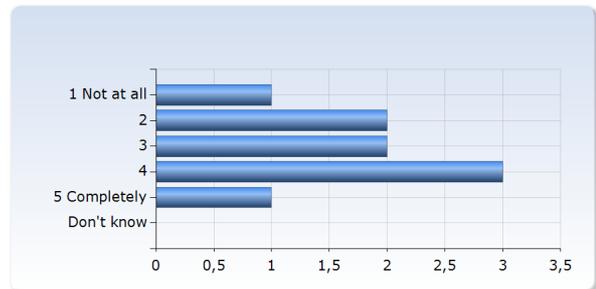


## FK8007 - Quantum meachanics III - HT16

Respondents: 22  
 Answer Count: 11  
 Answer Frequency: 50,00 %

### 5. Overall impression

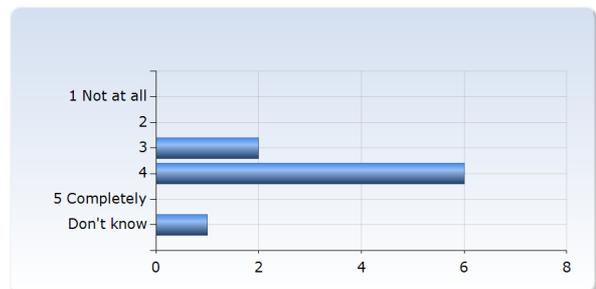
Overall I am satisfied with this course	Number of Responses
1 Not at all	1 (11,1%)
2	2 (22,2%)
3	2 (22,2%)
4	3 (33,3%)
5 Completely	1 (11,1%)
Don't know	0 (0,0%)
Total	9 (100,0%)



### 6. Student contribution

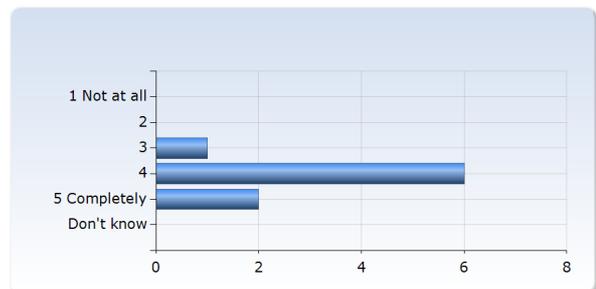
#### I am satisfied with my own effort in the course

I am satisfied with my own effort in the course	Number of Responses
1 Not at all	0 (0,0%)
2	0 (0,0%)
3	2 (22,2%)
4	6 (66,7%)
5 Completely	0 (0,0%)
Don't know	1 (11,1%)
Total	9 (100,0%)



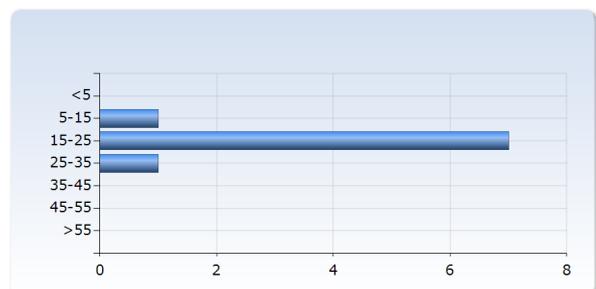
#### I took responsibility for my own learning in the course

I took responsibility for my own learning in the course	Number of Responses
1 Not at all	0 (0,0%)
2	0 (0,0%)
3	1 (11,1%)
4	6 (66,7%)
5 Completely	2 (22,2%)
Don't know	0 (0,0%)
Total	9 (100,0%)



### 7. Work load

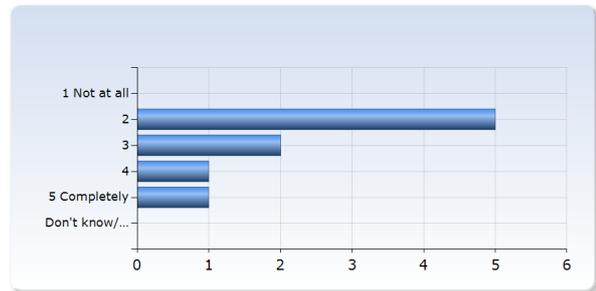
Indicate how many hours per week on average you have spent on the course, including self-studies and scheduled study time	Number of Responses
<5	0 (0,0%)
5-15	1 (11,1%)
15-25	7 (77,8%)
25-35	1 (11,1%)
35-45	0 (0,0%)
45-55	0 (0,0%)
>55	0 (0,0%)
Total	9 (100,0%)



## 8. Clear aims

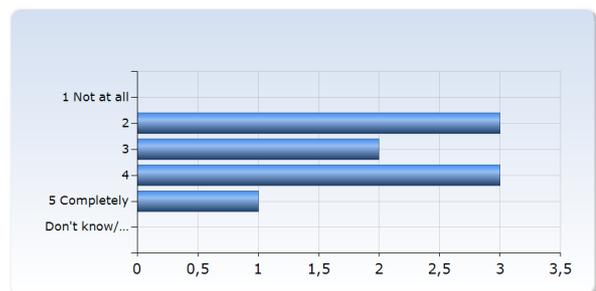
### It was clear to me what I was expected to learn

It was clear to me what I was expected to learn	Number of Responses
1 Not at all	0 (0,0%)
2	5 (55,6%)
3	2 (22,2%)
4	1 (11,1%)
5 Completely	1 (11,1%)
Don't know/ Not relevant	0 (0,0%)
Total	9 (100,0%)



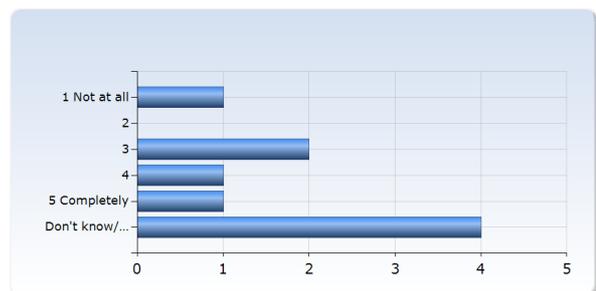
### I felt that the course content and teaching methods were relevant to the learning outcomes

I felt that the course content and teaching methods were relevant to the learning outcomes	Number of Responses
1 Not at all	0 (0,0%)
2	3 (33,3%)
3	2 (22,2%)
4	3 (33,3%)
5 Completely	1 (11,1%)
Don't know/ Not relevant	0 (0,0%)
Total	9 (100,0%)



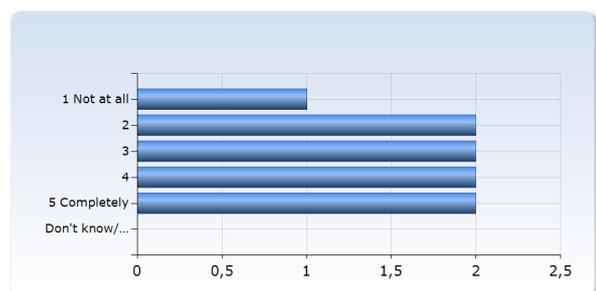
### The examination tested how well I had achieved the learning outcomes

The examination tested how well I had achieved the learning outcomes	Number of Responses
1 Not at all	1 (11,1%)
2	0 (0,0%)
3	2 (22,2%)
4	1 (11,1%)
5 Completely	1 (11,1%)
Don't know/ Not relevant	4 (44,4%)
Total	9 (100,0%)



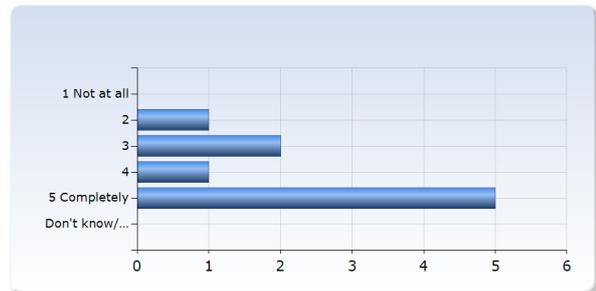
### The course corresponded to my expectations

The course corresponded to my expectations	Number of Responses
1 Not at all	1 (11,1%)
2	2 (22,2%)
3	2 (22,2%)
4	2 (22,2%)
5 Completely	2 (22,2%)
Don't know/ Not relevant	0 (0,0%)
Total	9 (100,0%)



## I feel that I will have use of what I have learnt after my studies

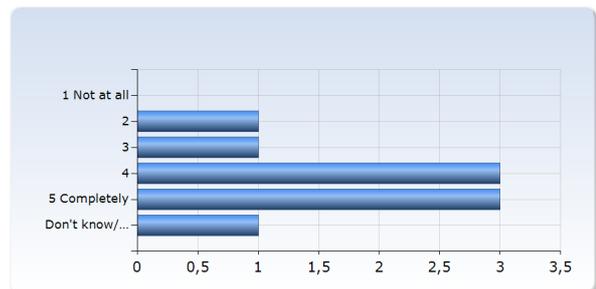
I feel that I will have use of what I have learnt after my studies	Number of Responses
1 Not at all	0 (0,0%)
2	1 (11,1%)
3	2 (22,2%)
4	1 (11,1%)
5 Completely	5 (55,6%)
Don't know/ Not relevant	0 (0,0%)
Total	9 (100,0%)



## 9. Good teaching

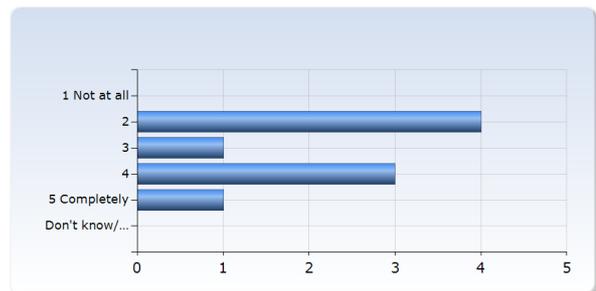
### The course prerequisites were sufficient to follow the course

The course prerequisites were sufficient to follow the course	Number of Responses
1 Not at all	0 (0,0%)
2	1 (11,1%)
3	1 (11,1%)
4	3 (33,3%)
5 Completely	3 (33,3%)
Don't know/ Not relevant	1 (11,1%)
Total	9 (100,0%)



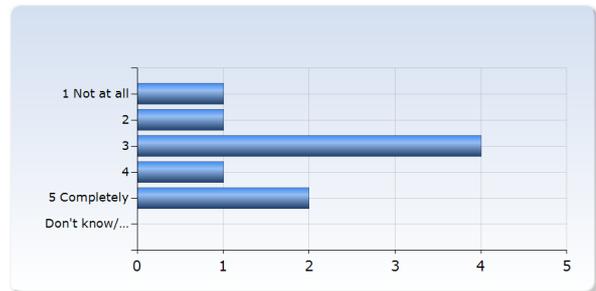
### I felt that the course was well structured

I felt that the course was well structured	Number of Responses
1 Not at all	0 (0,0%)
2	4 (44,4%)
3	1 (11,1%)
4	3 (33,3%)
5 Completely	1 (11,1%)
Don't know/ Not relevant	0 (0,0%)
Total	9 (100,0%)



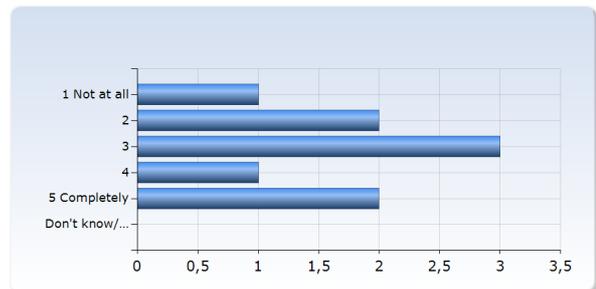
## I felt that the teachers have helped me to reach the learning outcomes

I felt that the teachers have helped me to reach the learning outcomes	Number of Responses
1 Not at all	1 (11,1%)
2	1 (11,1%)
3	4 (44,4%)
4	1 (11,1%)
5 Completely	2 (22,2%)
Don't know/ Not relevant	0 (0,0%)
Total	9 (100,0%)



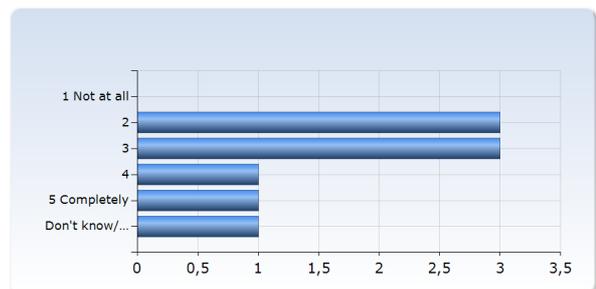
## I could understand what was being taught

I could understand what was being taught	Number of Responses
1 Not at all	1 (11,1%)
2	2 (22,2%)
3	3 (33,3%)
4	1 (11,1%)
5 Completely	2 (22,2%)
Don't know/ Not relevant	0 (0,0%)
Total	9 (100,0%)



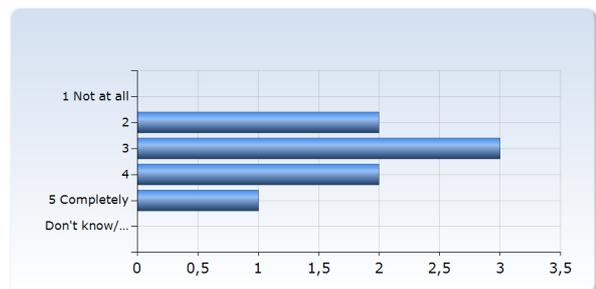
## I have received constructive feedback on my performance

I have received constructive feedback on my performance	Number of Responses
1 Not at all	0 (0,0%)
2	3 (33,3%)
3	3 (33,3%)
4	1 (11,1%)
5 Completely	1 (11,1%)
Don't know/ Not relevant	1 (11,1%)
Total	9 (100,0%)



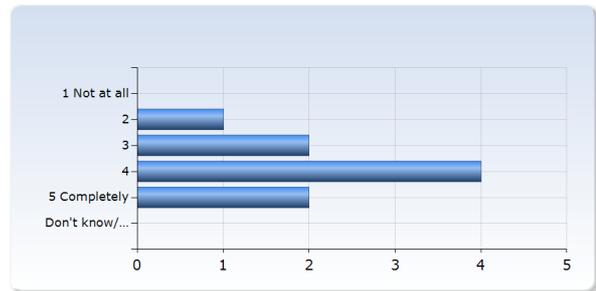
## I was encouraged to reflect on my learning during the course

I was encouraged to reflect on my learning during the course	Number of Responses
1 Not at all	0 (0,0%)
2	2 (25,0%)
3	3 (37,5%)
4	2 (25,0%)
5 Completely	1 (12,5%)
Don't know/ Not relevant	0 (0,0%)
Total	8 (100,0%)



## The course material helped me in my work to achieve the learning outcomes (literature, e-resources etc.)

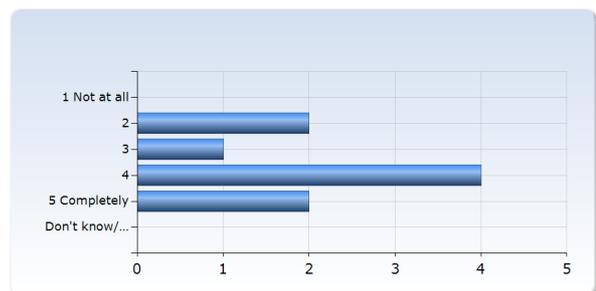
The course material helped me in my work to achieve the learning outcomes (literature, e-resources etc.)	Number of Responses
1 Not at all	0 (0,0%)
2	1 (11,1%)
3	2 (22,2%)
4	4 (44,4%)
5 Completely	2 (22,2%)
Don't know/ Not relevant	0 (0,0%)
Total	9 (100,0%)



## 10. Administration and study environment

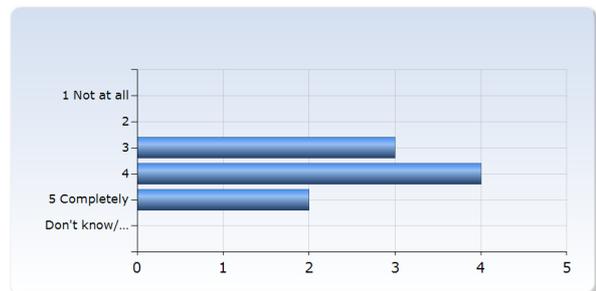
### I felt that the course was well organized

I felt that the course was well organized	Number of Responses
1 Not at all	0 (0,0%)
2	2 (22,2%)
3	1 (11,1%)
4	4 (44,4%)
5 Completely	2 (22,2%)
Don't know/ Not relevant	0 (0,0%)
Total	9 (100,0%)



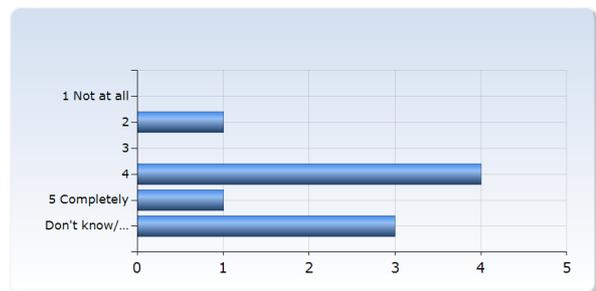
### I have been able to find the information I felt I needed before and during the course

I have been able to find the information I felt I needed before and during the course	Number of Responses
1 Not at all	0 (0,0%)
2	0 (0,0%)
3	3 (33,3%)
4	4 (44,4%)
5 Completely	2 (22,2%)
Don't know/ Not relevant	0 (0,0%)
Total	9 (100,0%)



### I was able to get support when I needed it

I was able to get support when I needed it	Number of Responses
1 Not at all	0 (0,0%)
2	1 (11,1%)
3	0 (0,0%)
4	4 (44,4%)
5 Completely	1 (11,1%)
Don't know/ Not relevant	3 (33,3%)
Total	9 (100,0%)



# Course reflections

FK8007 - Quantum mechanics III - HT16

Respondents: 22

Answer Count: 11

Answer Frequency: 50,00 %

## Preamble

I wish to apologise to all students for my late reflections. It was the first time I used this new kind of evaluation and I had expected more information about it from the Department administration, which was in transition.

Because of the large current change in the course programme it is unlikely that this course is going to be given again, but I do all parts of my reflections except the Conclusions disregarding this fact. The evaluation will still influence my approach to other courses.

## Introduction

The Quantum Mechanics III course is mainly a master level course, although it is offered also on other levels. Typically, it is taken by 15-25 students each year, 5-10 of which are exchange students. A particular challenge has been to give the course on the right level. At Fysikum, this is the third quantum mechanics course, and even students who have passed previous Fysikum courses have a large spread in their qualifications. Some students have missed essential ingredients of Quantum Mechanics, and are not always aware of it.

To counteract the lack of background (which sometimes is present even for very competent students)

I have tried to stress introductory and basic formal material in the beginning of the course. The formalism is necessary for understanding the physics of quantum mechanics. This time the course evaluation indicates that I failed to explain my intentions to the students. Previous years I have spent more effort on explaining the idea of the course and its structure, both in the lectures and in repeatedly pointing to the course web page which has been much appreciated.

One takeaway message for me is that the effort spent in repeating the messages about the structure and pointing to the idea of the course previous years was important. Even if I spent more time on content this time, it was wasted to a substantial fraction of the students, since they did not get the framework.

## Summary of the evaluation

I inevitably have to simplify in summarising the evaluation. My simplification consists in ignoring outliers of 1-2 students. I am very glad that a couple of students seem very happy with the course and my lectures, and I am very concerned that a couple of other students are equally discontent, and I think about all their comments. I however think it is particularly significant if there is a trend in the bulk of the answers.

## Quantitative aspects

Thus 6 of the 11 replies from the 22 students indicate satisfaction with their own performance by a grade 4. The work load is around 20 hours. As mentioned in the introduction it seems to have been very unclear to many students what the aim of the course was. The large spread in the perception of relevancy of the course content and the teaching methods is consequently not surprising. The evaluation of the examination seems to fare better on average, but it looks like half of the replies were blind to the exam. Somewhat unexpectedly (with unclear aims as a background) about half of the replies are very confident (5) that they will have use of what they learnt after their studies.

A huge student majority thinks that the course prerequisites were sufficient. Many students thought

that the course was badly structured. The distribution was more positive about teachers helping and being able to understand what was taught, but still not satisfactory. Students also seem to lack constructive feedback, and to a lesser extent encouragement to reflect on their learning. They seem content with the course material. Students are also content with the administration and study environment.

The evaluations of Babak are glowing, while my lectures are not so well liked. In contrast, my hand-in exercises are given a 4 on average.

## Qualitative aspects

There are several positive remarks about the hand-in part of the course, and about Babak's exercise classes. There are wishes about higher pace in lectures and in covering content especially in the beginning, as well as better formulations of problems.

This year's students recommend future course participants on starting work early on the course and reading the book (in advance of lectures), and encourage them to do many problems.

## Discussion

There may be dependencies between the various parts of the evaluation that may be important for drawing conclusions. I have already mentioned the effect of spending more time on content and less on structure this year. It was apparently misguided, and leads to complaints about the structure which also coincides with less favourable comments about my lectures. I imagine that there is a connection. Another perspective would be that my emphasis on structure previous years masked shortcomings of the lectures.

On the whole, the evaluation is positive about the course material, the administration and the study environment. Hand-ins and, in particular, Babak's exercise classes were well appreciated parts of the course. It is however apparent that I have not succeeded in transferring my ideas about the aim and the structure of the course sufficiently well to Babak. Students clearly listened to him, but when they lacked guidance, I had not provided him with

the structural ideas that previous classes had digested, even if he also conducted the exercise classes before.

Students explicitly recommend more reading in advance and more problem solving. These recommendations coincide with mine, and I should have stressed them.

## Conclusions

Were I to give the course once more I would give a diagnostic test in the first lecture. This is warranted at third exposure to a subject. It would serve as an alert to those whose background was insufficient. I would offer extra support (corresponding to the introductory lectures) to these students, giving them a chance to succeed if they were willing to put in the extra effort. In any case, other students would not be over-exposed and the rest of the course could be on a higher level consistent with the evaluation that the course prerequisites were quite sufficient.

I would be tempted to try flipped class room or another format that more explicitly emphasises student activity. It would force me to structure my remaining presentations in more detail, probably to the benefit of some students. I think my "traditional" lectures misleadingly encourages a purely absorptive approach for the students, when it instead requires a lot of work by the students before the lectures, as one comment acknowledges.

I would also go back to a format where I more explicitly gave guidance about the aims and the structure of the course. I would have more time, with introductory material relegated to extra support instead of regular lectures. I would also spend more time on coordination with the course assistant so that (s)he is on the same track.