Course Evaluation, FYTN04 Theoretical Particle Physics, Fall 09, Department of Theoretical Physics

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Summary	
Total number of answers	10
Filter	no
Group by question	no

Part 1. General opinions

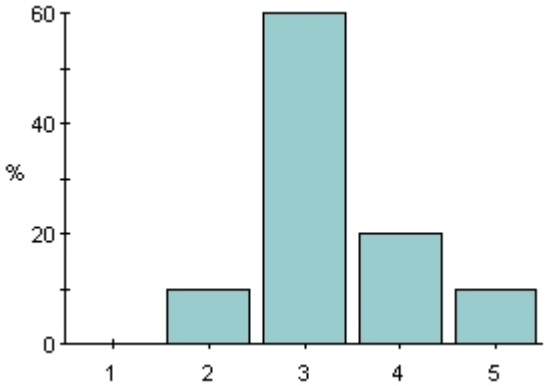
Give your opinion in the scale 1-5.

1 = very negative; 2 = negative; 3 = neutral; 4 = positive; 5 = very positive

Personal comments will be appreciated!

A. General

What is your general opinion of the course?



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2	10%	1
3	60%	6
4	20%	2
5	10%	1
Total	100%	10
Mean		3.3

Comment

5 have commented on this question

Grade = 2 (one comment)

— Contents interesting but presented at a strange level. Formalism got in the way of understanding. Try to meet students where they are and give more easy examples etc at first before

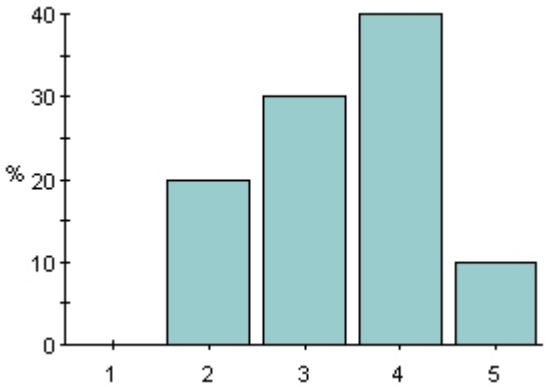
coming to the relevant level for the course. I believe spending a little more time here is a good investment.

Grade = 3 (3 comments)
— too much confusing
— Treating the underlying theory about the lagrangian and Feynmann rules in more detail would provide a much better understanding of the whole course.
— Very interesting but a bit harder than what I expected.

Grade = 4 (one comment)
— Very interesting subject. Very difficult to get an authentic feel for with the knowledge on this level, but still interesting.

B. Literature

What is your general opinion of the "Modern Elementary Particle Physics" book by Gordon Kane?



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3	30%	3
4	40%	4
5	10%	1
Total	100%	10
Mean		3.4

Comment

4 have commented on this question
Grade = 2 (one comment)
— old, many things not understandable, formulas falling from the sky, often not good motivation why thing are done in a special way, no reasons are given, why the approximations are good, often not logical

Grade = 3 (one comment)
— Especially in the first third of the book, Kane is a really good book. Would have been nice with a more clear view of the groups, had to go to other books that explained it in more detail, since all of the maths that are analogous with QM were not included in previous courses. The latter parts are fine, but easy to get confused. There are many different examples of things to look for,

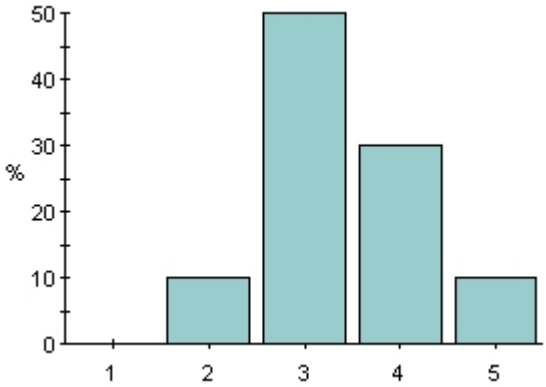
and since many of us haven't studied this much before it easily becomes confusing to have that many different kind of experiments and feynmanndiagrams to memorize.

Grade = 4 (one comment)
— Good, especially at explaining things short. But one downside is that very often he just gives an equation without really explaining where it is from.

Grade = 5 (one comment)
— High readability, almost exciting at times.

C. Lectures

What is your general opinion of the lectures with Johan Bijnens?



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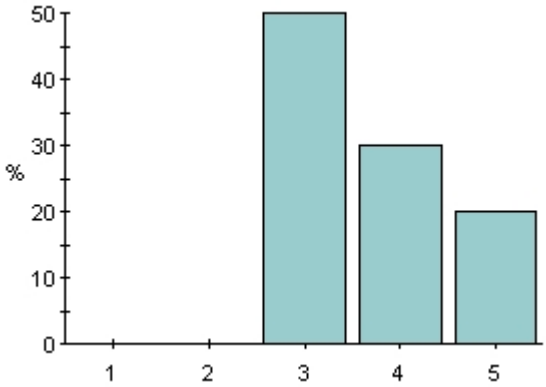
2	10%	1
3	50%	5
4	30%	3
5	10%	1
Total	100%	10
Mean		3.4

Comment

3 have commented on this question
Grade = 2 (one comment)
— A bit unstructured, a bit like the book. But with the book you could read the same part over and over, not really an option on a lecture.

Grade = 3 (2 comments)
— It was difficult to follow a lot of the lectures in the beginning. This would have been fine, but the problem was that they were referred to in all or in parts in the later parts of the lectures. This became difficult, since we didn't know it that well then. It would have been useful to just take a few steps back some more times, and repeating things instead of just saying them once.
— Increase understanding by writing down interpretations, instead of just saying them, en passant.

What is your general opinion of the lectures with Torbjörn Sjöstrand?



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3	50%	5
4	30%	3
5	20%	2
Total	100%	10
Mean		3.7

Kommentar

3 have commented on this question

Grade = 3 (3 comments)

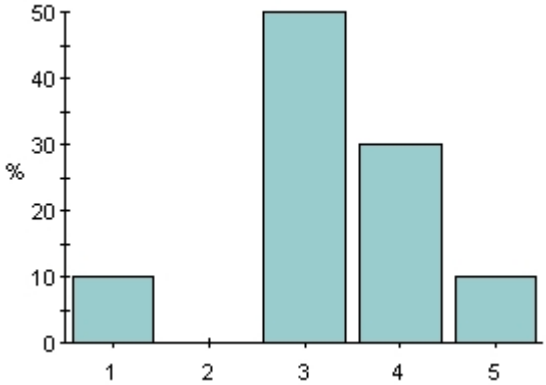
— The content of Torbjörn's lectures was a bit easier to understand, not as complex as the other.

— Lectures could be more complementary to the literature. Instead of repeating much of what is written in the book, try and explain the difficult parts and give the big picture.

— Many parts of what was covered was in some parts pretty dependent on calculations to get a final result. It would have been good to be more clear on what cross section calculation is applicable where, because (when they are new) it gets confusing that there are many different calculations for it. For example a quick review in the end, with all of them in one place to see the differences between, say a decay, a collision, etc. Also, when doing longer calculations, what one easily remembers is what is written on the blackboard, but not what is said during the calculations. In this course a lot of approximations are made, there it would have been useful to be meticulous and writing down the approximations, instead of talking freely about them. It would not take so much more time, and when one looked through the notes, one would understand them much better.

D. Problem sessions

What is your general opinion of the problem sessions?



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1	10%	1
2	0%	0
3	50%	5
4	30%	3
5	10%	1
Total	100%	10
Mean		3.3

Comment

4 have commented on this question

Grade = 1 (one comment)

— This form is bad. Having the exercise sessions at the same time where one problem should be handed in is not very helpful. (Neither is the fact that you don't get any exam bonus points if you don't volunteer to present a solution. You should be encouraged to try, right? A good ansatz should count for something even if it feels ridiculous to show it to people who have done complete solutions.) There should be a session where you can get help and hints to do more of the problem, instead of being asked to present a final solution. The way it was, I could do less of the exercises than if there was one session for help and one for presentation of problems. The problem was not that I didn't try, I just had a hard time understanding how to interpret the questions, even though I read the course material thouroughly. Time for two sessions is available, considering that we often used the last hour for lectures. But these occasions should be split on different days so you have time to do the calculations at home. Also, Torbjörn should (like Johan did) present a correct solution to the exercise chosen for hand-in. Another thing is to try harder to schedule all exercises in a set to be given _after_ the topics have been covered, and also have more easy exercises when new formalisms etc are introduced - these could be given outside the exercise sets, and even with solutions (so no extra time is needed on the schedule). These things require practice!

Grade = 3 (2 comments)

— I always like problems to solve, it is the best way to learn. But for this course the exercises didn't really test the things from the lectures.

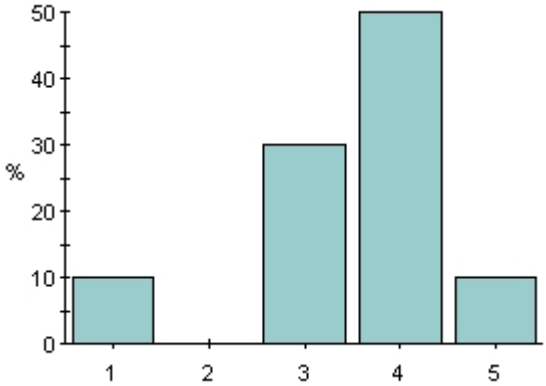
— The formulations were sometimes very fussy, and difficult to understand what was actually to be done. Then, in the later half especially, the excercises were often too many and could include aspects not mentioned in the book, or to be found in notes. This was difficult, and took much extra time. Also some were timeconsuming. When they were so timeconsuming, one lost a lot of the time that would have been needed to read the book

properly, and one had to hasten through the chapters to answer the excercises, not learning as fully as would have been possible.

Grade = 4 (one comment)
— The problem sessions were often to soon after the topic of the problems were lectured.

E. Written exam

What is your general opinion of the written exam?



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3	30%	3
4	50%	5
5	10%	1
Total	100%	10
Mean		3.5

Comment

4 have commented on this question

Grade = 1 (one comment)
— exam should make clear WHICH METHOD ONE SHOULD NOT FOLLOW, I have changed my correct answers to wrong ones just because somewhere in later chapters like higgs there were new story. and i didnt know what examiner want to look for. SOLVED EXAMPLES SHOULD BE GIVEN IN COURCE. IT WAS NOT 20 HOUR EXAM. I HAVE SOME LIFE.

Grade = 3 (one comment)
— I don't fully understand the argument that there is a need for both a written and an oral exam, just because you can't be certain that the students won't cooperate. Then why have a written exam like this? Perhaps you should instead have a smaller written class room exam, where you can bring course material, but which it's possible to complete within hours (instead of days - I needed the entire week). I think oral exams give a better picture of what the students have understood anyway, so you could just check the ability to do calculations in a few short problems.

Grade = 4 (2 comments)
— Good. Maybe a bit too big.

— The chapters involving structurefunctions were confusing in handouts and book, and this was an issue for the exam. Also, some excercises were tricky to understand what should be done, and what part of the book that was applicable.

Part 2. Intended Learning Outcomes.

In this section you should go through all the different parts of the course and think about how well you have you have accomplished the learning goals.

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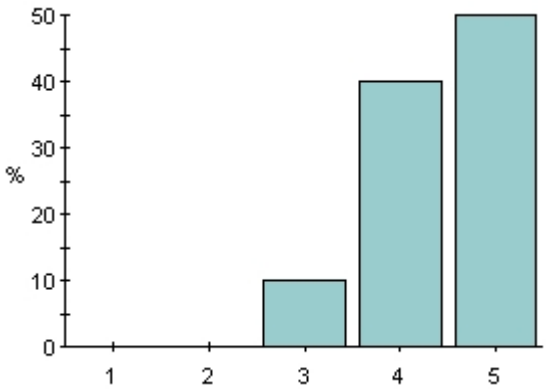
1 = You have not at all acquired the knowledge intended

3 = You have adequately acquired the knowledge intended

5 = You have acquired much more knowledge than intended

A. The building blocks of the standard model

The student knows about all the quarks, leptons and gauge bosons in the standard model.



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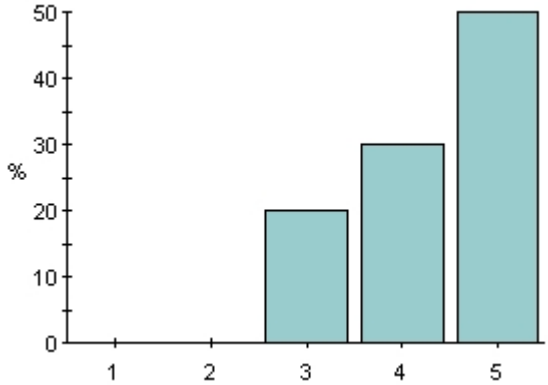
5	50%	5
Total	100%	10
Mean		4.4

The student knows about the most common hadrons.



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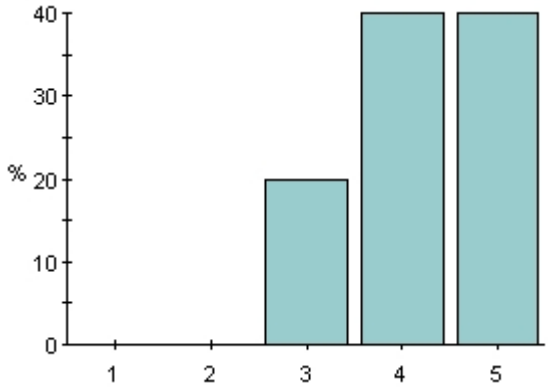
4	30%	3
5	50%	5
Total	100%	10
Mean		4.3

The student is able to describe the ordering in mass between the different particles.



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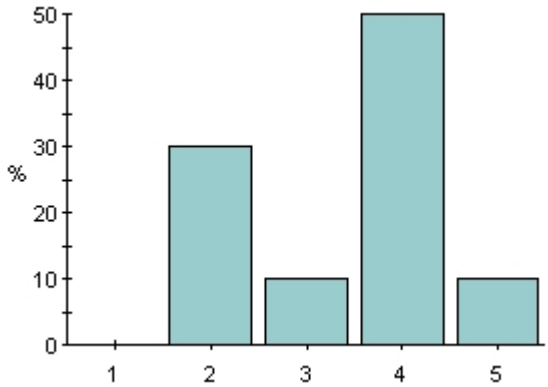
3	20%	2
4	40%	4
5	40%	4
Total	100%	10
Mean		4.2

Comments

One has answered this question
— these things I already knew before

B. Group theory

The student understand the basics of group theory and understands how groups can be used to describe symmetries.



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3	10%	1
4	50%	5
5	10%	1
Total	100%	10
Mean		3.4

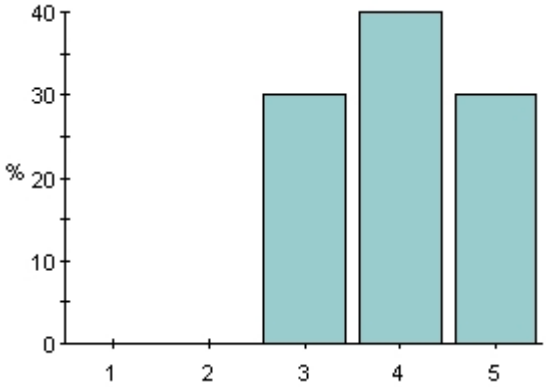
Comments

3 have answered this question
— but not due to this course

— I haven't studied any group theory before and I hope that the course isn't intended to teach it to newbies such as myself.
— Material on groups was too sparse. It didn't seem like we were supposed to learn much on the topic, it was in the lectures treated more like a curiosity for those who had already encountered group theory. You should extend the material next time. More examples, more of them at a very basic level as well - it's not tedious, it's necessary!

C. Lagrange functions

The student understands how local gauge symmetries and covariant derivatives give rise to interaction terms in the Lagrange density.



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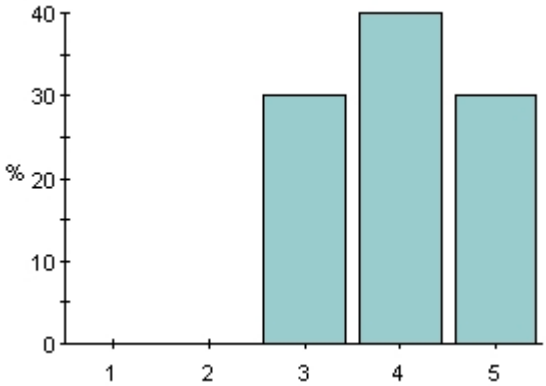
3	30%	3
4	40%	4
5	30%	3
Total	100%	10
Mean		4

Comments

Nobody has answered this question

D. The standard model

The student can describe the different terms in the standard model Lagrange density and which processes these lead to.



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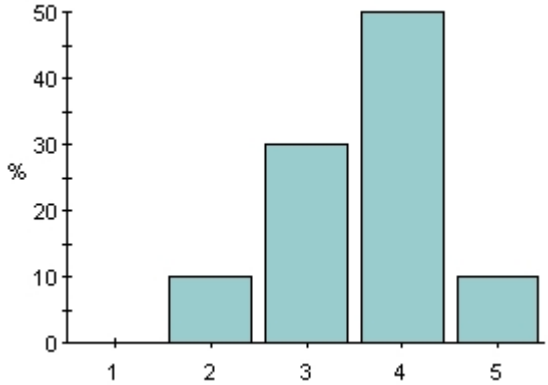
4	40%	4
5	30%	3
Total	100%	10
Mean		4

The student understands the Higgs mechanism and how particle masses are introduced.



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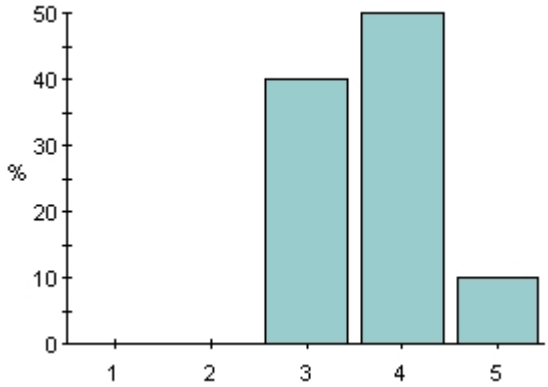
2	10%	1
3	30%	3
4	50%	5
5	10%	1
Total	100%	10
Mean		3.6

Comments

3 have answered this question
— Could elaborate more on the Higgs lagrangian, explain more in detail what traces of symmetries are visible, what the remaining parameters "are".
— The Higgs-mechanism was quite cool
— yes i understand it once, why i have to reproduce everything in oral exam?

E. Cross sections

The student understands how to interpret interaction terms in the Lagrange density in terms of Feynman diagrams.



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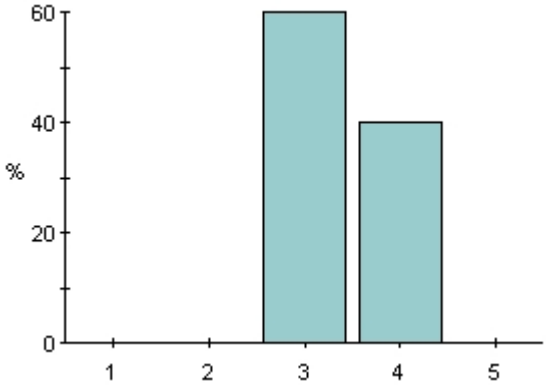
3	40%	4
4	50%	5
5	10%	1
Total	100%	10
Mean		3.7

The student can use the resulting Feynman rules to estimate the cross sections for production, decay and scattering processes.



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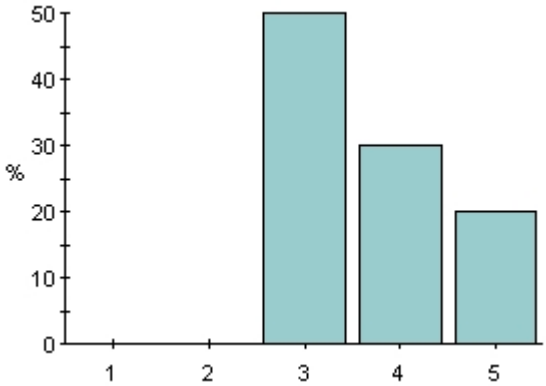
2	0%	0
3	60%	6
4	40%	4
5	0%	0
Total	100%	10
Mean		3.4

Comments

Nobody has answered this question

F. Strong interactions

The student understands the concept of asymptotic freedom and how that is related to the confinement of quarks and gluons.



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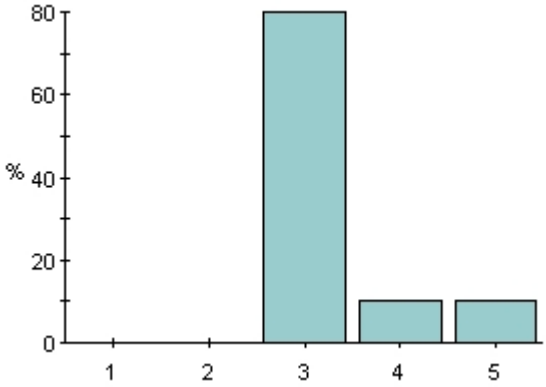
3	50%	5
4	30%	3
5	20%	2
Total	100%	10
Mean		3.7

The student understands how parton densities are measured and how they are used to calculate cross sections in hadron collisions.



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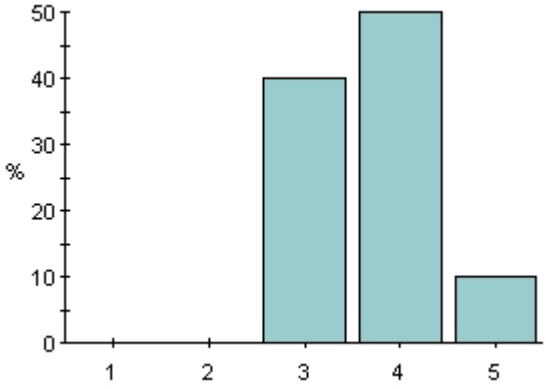
2	0%	0
3	80%	8
4	10%	1
5	10%	1
Total	100%	10
Mean		3.3

Comments

Nobody has answered this question

G. Electro-weak interactions

The student is able to calculate decay widths and lifetimes of the gauge bosons.



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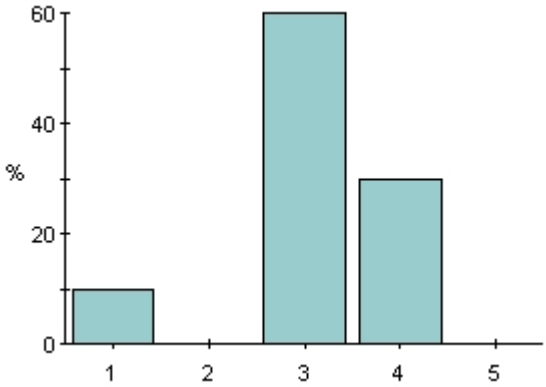
3	40%	4
4	50%	5
5	10%	1
Total	100%	10
Mean		3.7

The student is able to calculate the decay widths of the Higgs boson.



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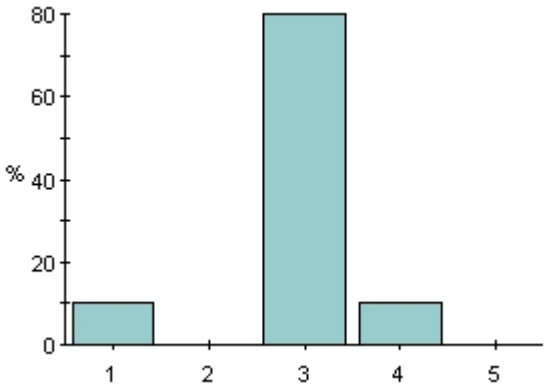
3	60%	6
4	30%	3
5	0%	0
Total	100%	10
Mean		3.1

The student is able to approximately calculate the production cross sections for the gauge bosons and the Higgs.



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3	80%	8
4	10%	1
5	0%	0
Total	100%	10
Mean		2.9

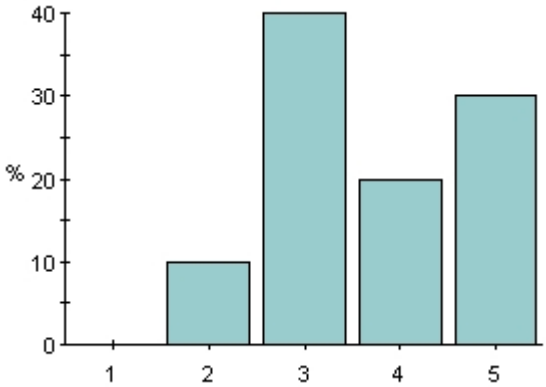
Comments

2 have answered this question
— chapter 21 confuses everything, I lost a lot of confidence just by reading that chapter

— better: the student is able to look for the necessary formulas in the book.

H. Scaling violations.

The student can explain why the coupling constants can vary depending on the energies involved in a process.



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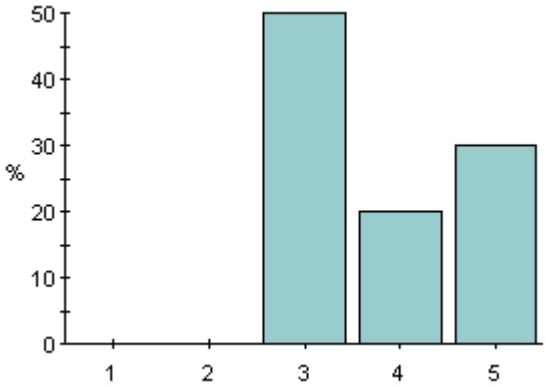
2	10%	1
3	40%	4
4	20%	2
5	30%	3
Total	100%	10
Mean		3.7

The student is able to explain why the strong coupling decreases with increasing energy, while the electro-magnetic coupling increases.



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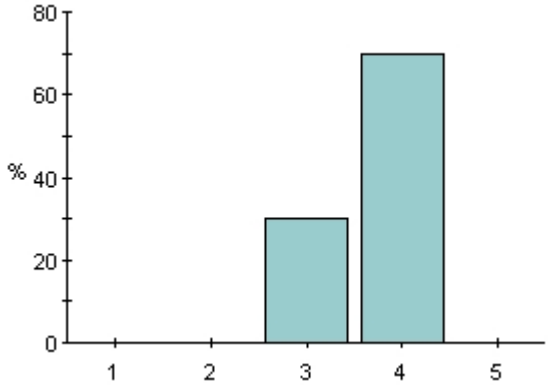
2	0%	0
3	50%	5
4	20%	2
5	30%	3
Total	100%	10
Mean		3.8

Comments

One has answered this question
— this was cool, too

I. CP violation

The student can derive how the mixing between quark families is included in the Lagrange density.



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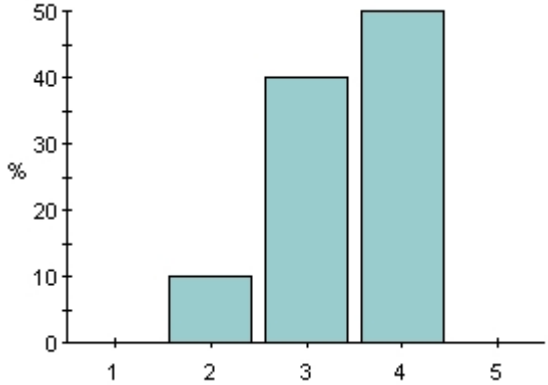
2	0%	0
3	30%	3
4	70%	7
5	0%	0
Total	100%	10
Mean		3.7

The student can explain why mixing between all three families causes violation of CP.



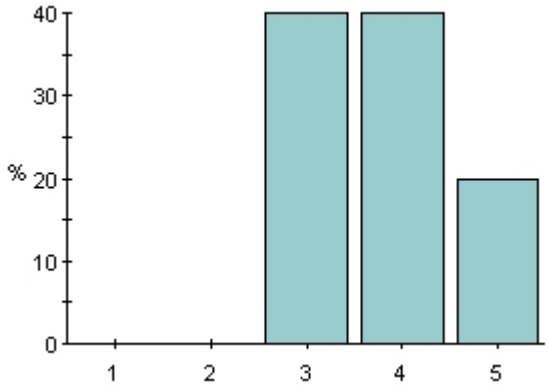
	%	#
1	0%	0
2	10%	1
3	40%	4
4	50%	5
5	0%	0
Total	100%	10
Mean		3.4

Comments

Nobody has answered this question

J. Neutrino masses and oscillations

The student understands how the existence of neutrino masses may lead to oscillations.



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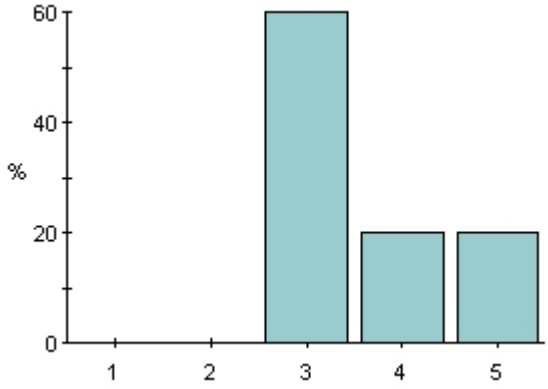
2	0%	0
3	40%	4
4	40%	4
5	20%	2
Total	100%	10
Mean		3.8

Comments

One has answered this question
— It is not quite clear why there is a difference between charge and mass-eigenstates, and why particles propagate as a mass-eigenstates and not as charge eigenstates

K. Grand unification and super symmetry

The student understands the basic assumptions behind grand unification models and super symmetry.



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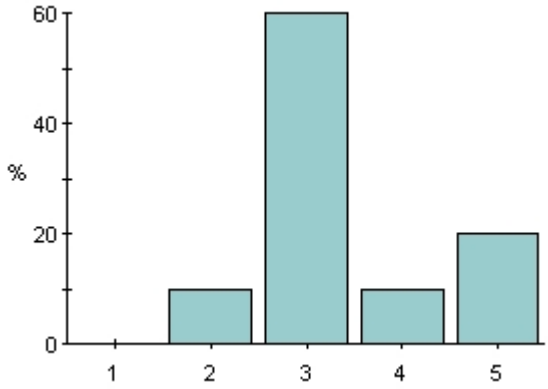
2	0%	0
3	60%	6
4	20%	2
5	20%	2
Total	100%	10
Mean		3.6

Comments

One has answered this question
— I like the GUT

L. Connection to cosmology and astro-physics

The student can give examples of astro-physical observations which may limit possible extensions of the standard model.



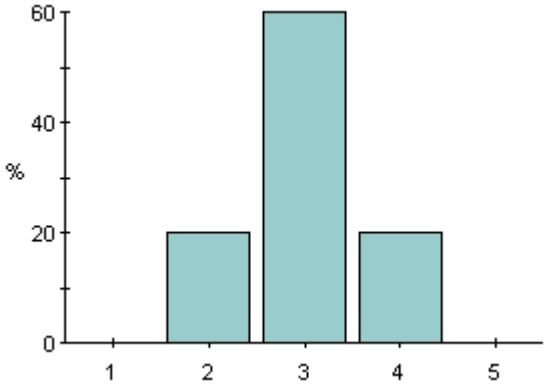
	%	#
1	0%	0
2	10%	1
3	60%	6
4	10%	1
5	20%	2
Total	100%	10
Mean		3.4

Comments

Nobody has answered this question

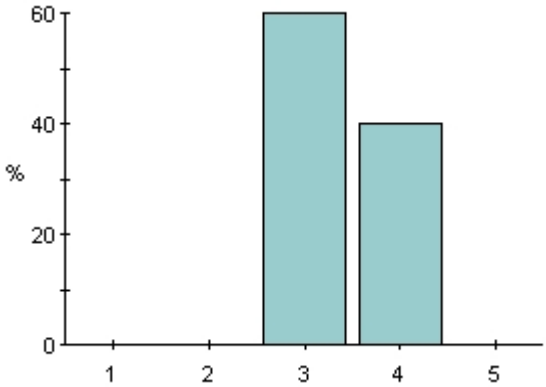
M. Specific outcomes

Given a standard model process at a given collision experiment, the student can use the standard model Lagrange density to estimate the corresponding cross section and how many such events may be observed with a given integrated luminosity.



	%	#
1	0%	0
2	20%	2
3	60%	6
4	20%	2
5	0%	0
Total	100%	10
Mean		3

The student is able to describe all parameters in the standard model and give examples of how these can be measured.



	%	#
1	0%	0
2	0%	0
3	60%	6
4	40%	4
5	0%	0
Total	100%	10
Mean		3.4

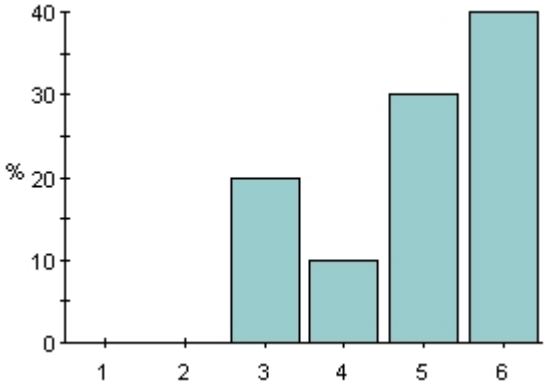
Comments

One has answered this question
— Could give more perspectives on cross sections - what is a small/large cross section, given what considerations?

Part 3. Your efforts.

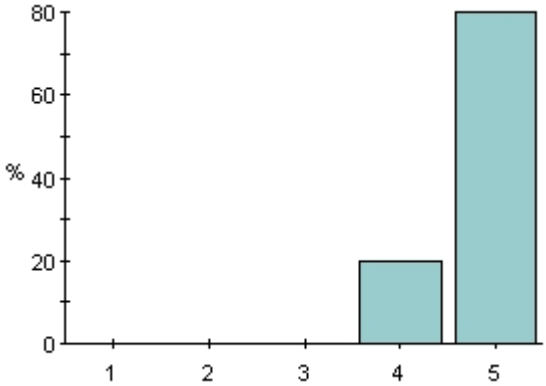
In this part you are asked to estimate how much work you have committed to this course. In each case you should estimate a percentage with **1** meaning 0-20% up to **5** meaning 80-100%. If applicable, **6** means more than 100%.

How much time have you spent on this course (for a 7.5 hp course 100% means ten weeks with 20 hours per week)?



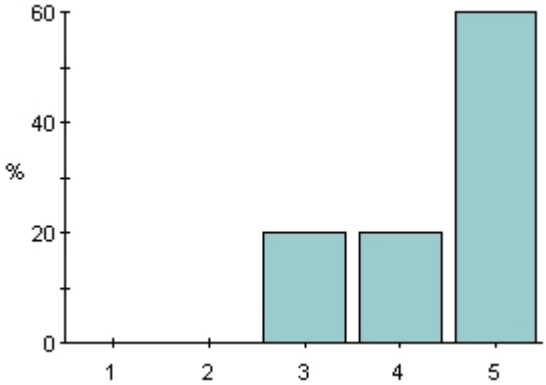
	%	#
1	0%	0
2	0%	0
3	20%	2
4	10%	1
5	30%	3
6	40%	4
Total	100%	10
Mean		4.9

How many of the lectures did you attend?



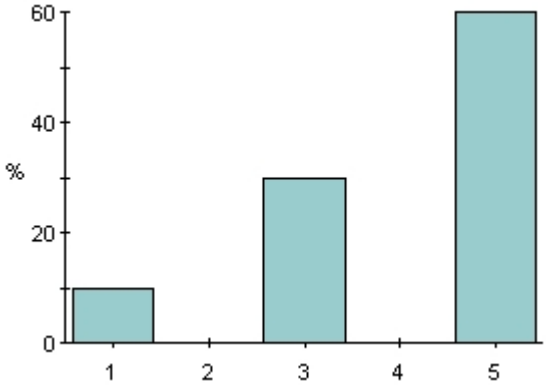
	%	#
1	0%	0
2	0%	0
3	0%	0
4	20%	2
5	80%	8
Total	100%	10
Mean		4.8

How many of the exercise sessions did you attend?



	%	#
1	0%	0
2	0%	0
3	20%	2
4	20%	2
5	60%	6
Total	100%	10
Mean		4.4

How many of the exercises did you try to solve yourself before the exercise sessions?



	%	#
1	10%	1
2	0%	0
3	30%	3
4	0%	0
5	60%	6
Total	100%	10
Mean		4

Thank you for your input!

Contact person: Johan Bijnens, bijnens@thep.lu.se
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