Course Evaluation, FYTN04 Theoretical Particle Physics, Fall 11, Department of Astronomy and Theoretical Physics

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Summary	
Total number of answers	5
Filter	no
Group by question	no

Part 1. General opinions

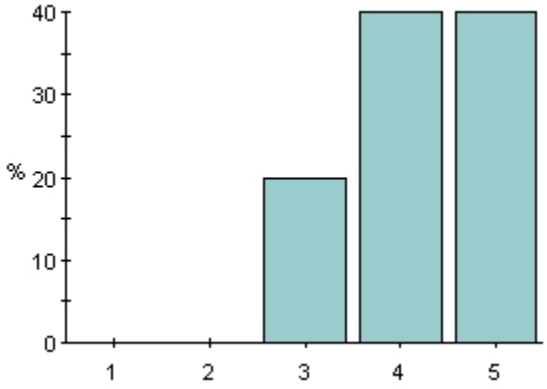
Give your opinion in the scale 1-5.

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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1	0%	0
2	0%	0
3	20%	1
4	40%	2
5	40%	2
Total	100%	5
Mean		4.2

Comment

2 have commented on this question

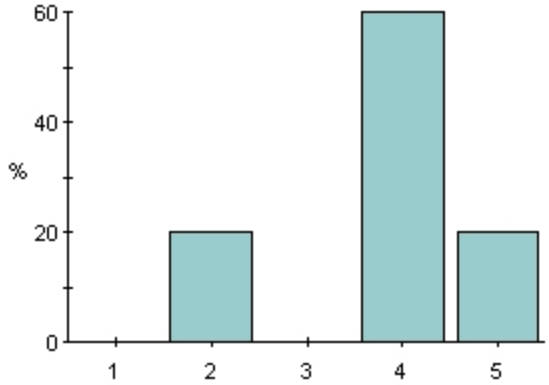
Grade = 4 (one comment)

— VERY interesting content! All of it! Though, it was by far the most difficult course I have taken so far (3rd year student in theoretical physics!), and I would not recommend it as a first course in particle physics, even though only FYTA11 (or similar) is listed as prerequisite. I would probably have learned a lot more if I previously had taken a more basic level course in particle physics.

Grade = 5 (one comment)
— At first, the course seems to be too complicated, but once you start believing in some stuff, everything else just falls into their places.

B. Literature

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



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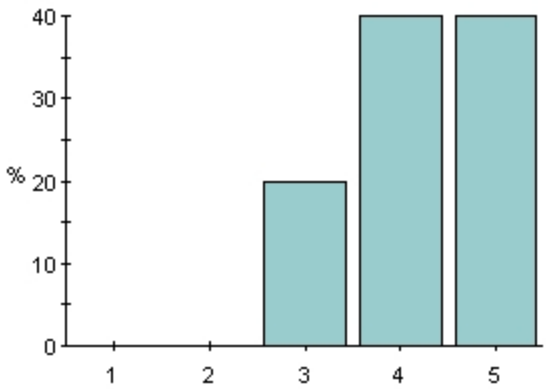
2	20%	1
3	0%	0
4	60%	3
5	20%	1
Total	100%	5
Mean		3.8

Comment

One has commented on this question
Grade = 5 (one comment)
— Easy to read, though at some places not that easy to understand. The worst part is when they start 'summing over final spin states and averaging over initial ones'. Seems trivial, though when one tries to do this procedure, ends up with different numbers. There should be an explicit explanation how to do that.

C. Lectures

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



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3	20%	1
4	40%	2
5	40%	2
Total	100%	5
Mean		4.2

Comment

2 have commented on this question

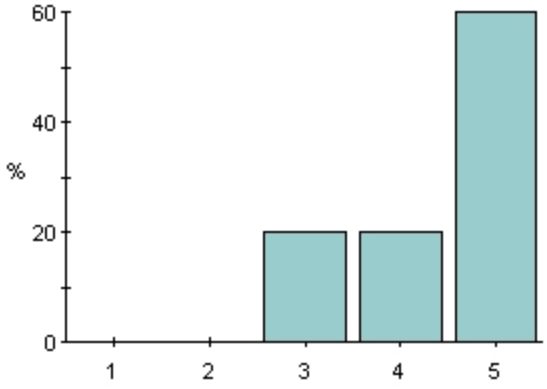
Grade = 3 (one comment)

— If you ask Johan in his office about something that has already been covered in the lectures, he will probably refer you to the lecture notes or the book instead of explaining it again. This is not very pedagocical since messy lecture notes and an insufficient explanation in the book will be the reason for your confusion in the first place.

Grade = 4 (one comment)

— At first it was confusing, but perhaps because it was purely mathematical stuff. Once you start reading the book before the lecture, you can even end up with questions that do make sense. When it turned to more physical stuff, however, the lectures were really nice.

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



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3	20%	1
4	20%	1
5	60%	3
Total	100%	5
Mean		4.4

Kommentar

2 have commented on this question

Grade = 4 (one comment)

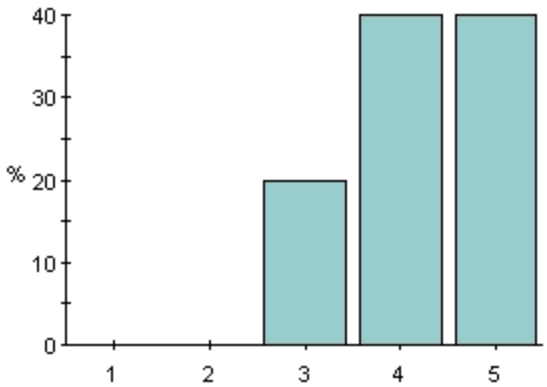
— Torbjörn is very helpfull if there is something that you don't

understand.

Grade = 5 (one comment)
— Despite a few ultra-high dimension integrals that makes your eyes hurt, the lectures were very understandable (note: lectures, not integrals). The physical background was explained in rather a simple manner, not too much focus on long calculations which have already been done and don't need to be repeated.

D. Problem sessions

What is your general opinion of the problem sessions?



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3	20%	1
4	40%	2
5	40%	2
Total	100%	5
Mean		4.2

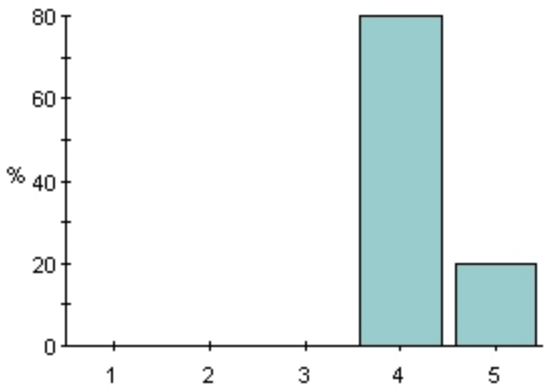
Comment

2 have commented on this question
Grade = 4 (one comment)
— Overall, the problem solving session was a nice thing, as one had a chance to check one's understanding in particular topics. However, there could have been a stronger emphasis on which 'way' to use when, for instance, calculating cross-sections (i.e. the one from Feynman diagrams with vertices and propagators, or the decay widths).

Grade = 5 (one comment)
— Having the hand-ins were really good as motivation to do the exercises.

E. Written exam

What is your general opinion of the written exam?



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2	0%	0
3	0%	0
4	80%	4
5	20%	1
Total	100%	5
Mean		4.2

Comment

One has commented on this question

Grade = 4 (one comment)

— On general, I liked the idea. I guess, though, it was quite hard, as I've definitely spent more than a week for it. Again, I guess it could have been nice to have 'hints' of which way to use for calculations (Feynman diagrams or widths?), at least in some of those.

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.

---

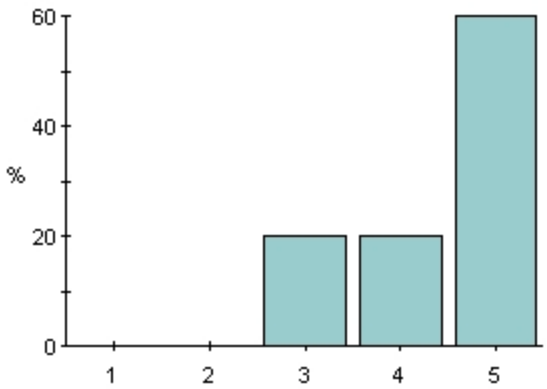
1 = You have not at all acquired the knowledge intended

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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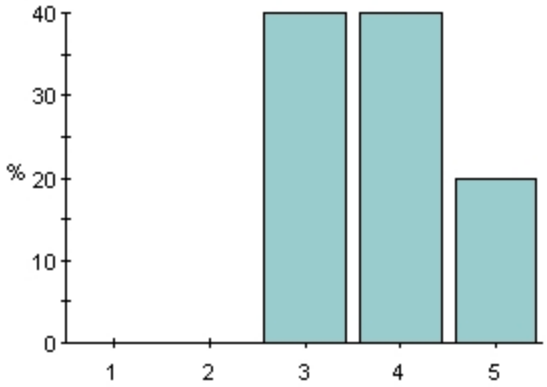
3	20%	1
4	20%	1
5	60%	3
Total	100%	5
Mean		4.4

The student knows about the most common hadrons.



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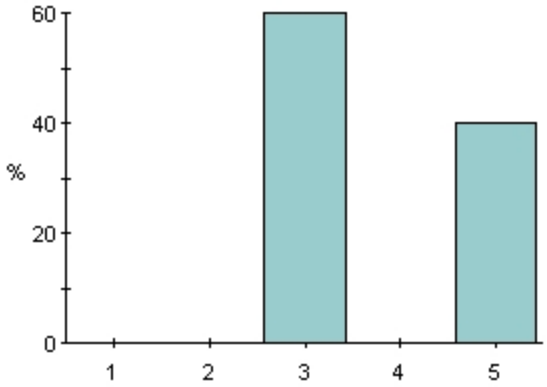
3	40%	2
4	40%	2
5	20%	1
Total	100%	5
Mean		3.8

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



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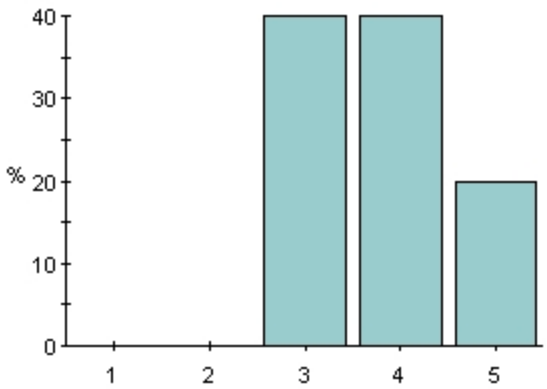
1	0%	0
2	0%	0
3	60%	3
4	0%	0
5	40%	2
Total	100%	5
Mean		3.8

Comments

Nobody has answered this question

B. 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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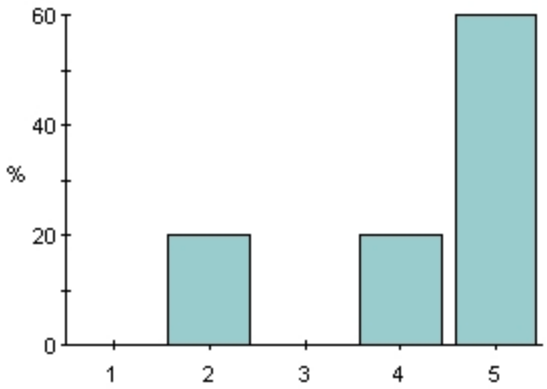
2	0%	0
3	40%	2
4	40%	2
5	20%	1
Total	100%	5
Mean		3.8

Comments

One has answered this question
— I definitely acquired much more knowledge then intended. Before the course, I did not have a single idea about how all these thing give raise to interactions

C. 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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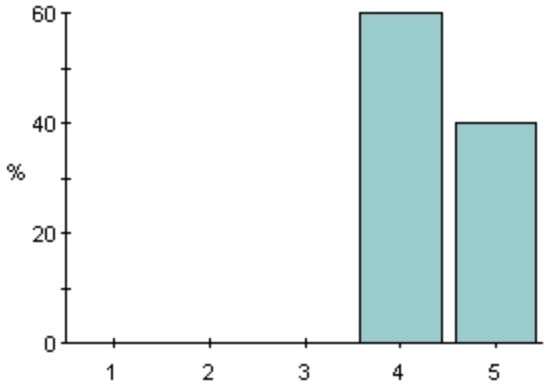
4	20%	1
5	60%	3
Total	100%	5
Mean		4.2

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



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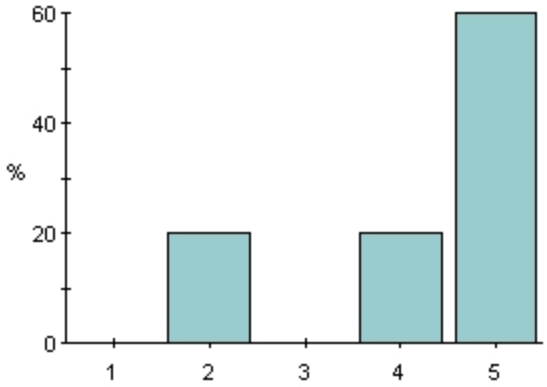
3	0%	0
4	60%	3
5	40%	2
Total	100%	5
Mean		4.4

Comments

One has answered this question
— Higgs mechanism was explained extremely clear both in book and lectures.

D. Cross sections

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



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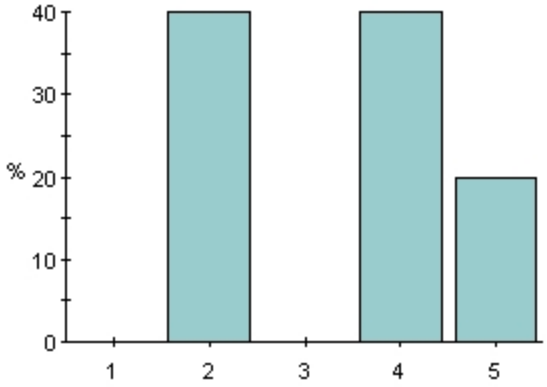
5	60%	3
Total	100%	5
Mean		4.2

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



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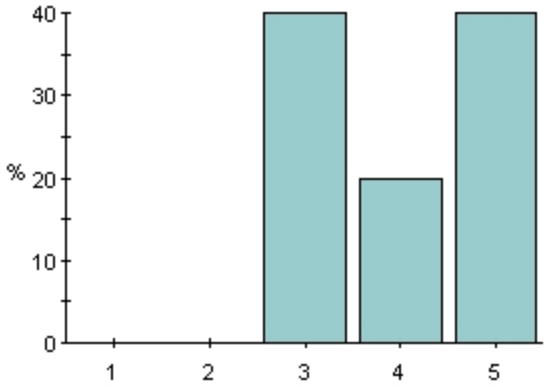
2	40%	2
3	0%	0
4	40%	2
5	20%	1
Total	100%	5
Mean		3.4

Comments

2 have answered this question
— I know the recipes for estimating cross sections and decay widths, but I don't understand why they work.
— All the crazy integrals ruin everything, but once you assume the final expression to be true, life becomes beautiful again.

E. 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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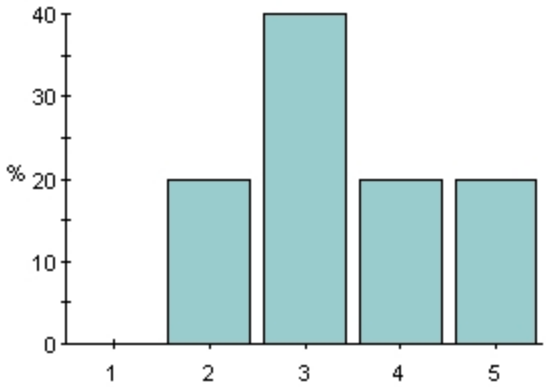
3	40%	2
4	20%	1
5	40%	2
Total	100%	5
Mean		4

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



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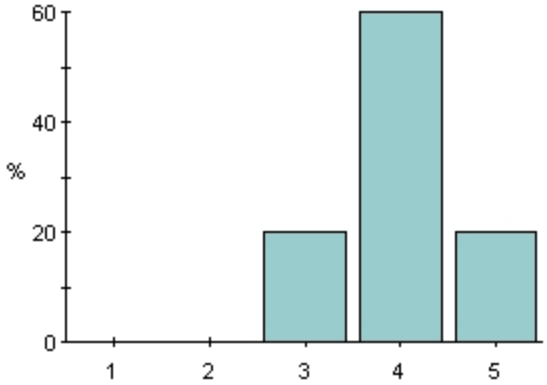
2	20%	1
3	40%	2
4	20%	1
5	20%	1
Total	100%	5
Mean		3.4

Comments

Nobody has answered this question

F. Electro-weak interactions

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



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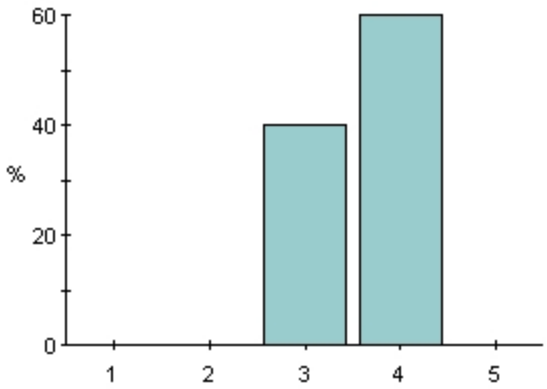
4	60%	3
5	20%	1
Total	100%	5
Mean		4

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



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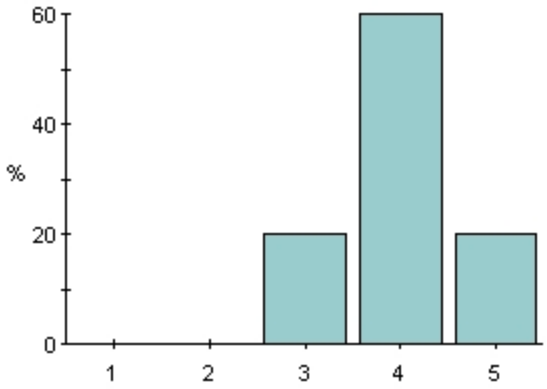
4	60%	3
5	0%	0
Total	100%	5
Mean		3.6

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



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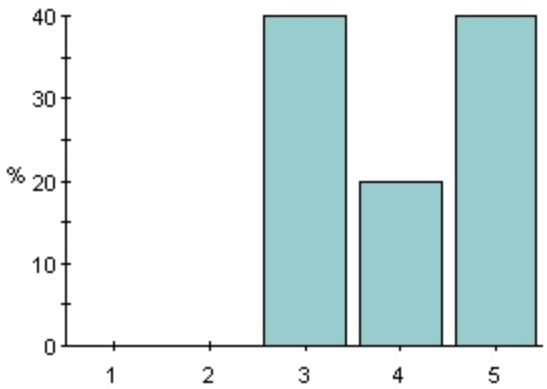
3	20%	1
4	60%	3
5	20%	1
Total	100%	5
Mean		4

Comments

One has answered this question
— Again, once one assumes the final expression of long integrals to be true, it is trivial. The final expressions are somewhat hard to remember. At least the numerical factors.

G. Scaling violations.

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



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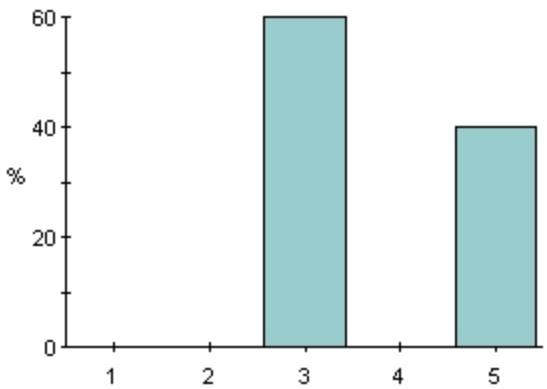
5	40%	2
Total	100%	5
Mean		4

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



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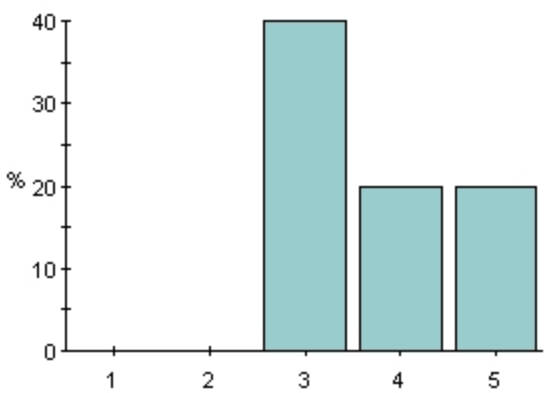
2	0%	0
3	60%	3
4	0%	0
5	40%	2
Total	100%	5
Mean		3.8

Comments

Nobody has answered this question

H. CP violation

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



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4	20%	1
5	20%	1
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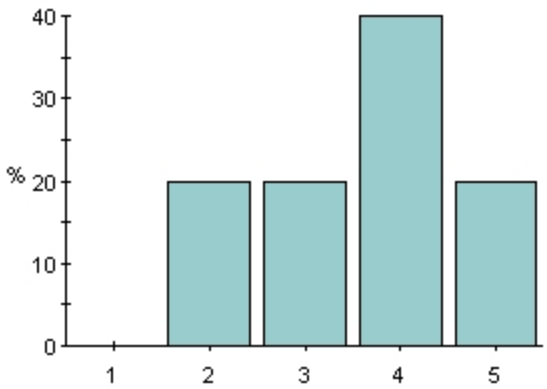
Total	100%	5
Mean		3.8

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



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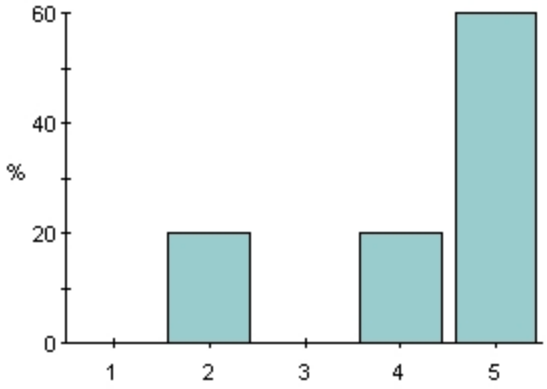
3	20%	1
4	40%	2
5	20%	1
Total	100%	5
Mean		3.6

Comments

One has answered this question
— I wish there was more focus on how the complex terms in matrices cause the CP violation. That, of course, includes C and P eigenvalue calculation and I guess it was just too much for the course.

I. Neutrino masses and oscillations

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



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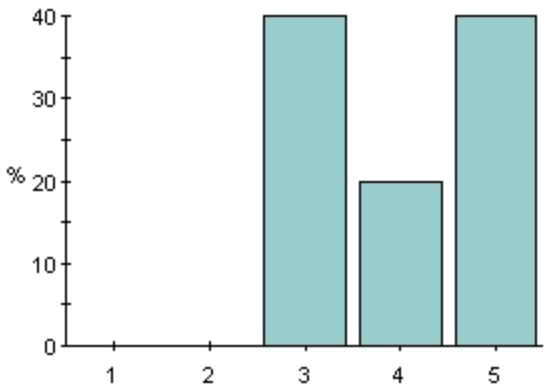
2	20%	1
3	0%	0
4	20%	1
5	60%	3
Total	100%	5
Mean		4.2

Comments

Nobody has answered this question

J. Grand unification and super symmetry

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



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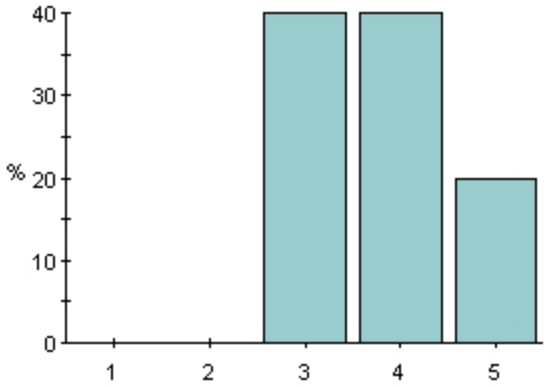
2	0%	0
3	40%	2
4	20%	1
5	40%	2
Total	100%	5
Mean		4

Comments

Nobody has answered this question

K. Connection to cosmology and astro-physics

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



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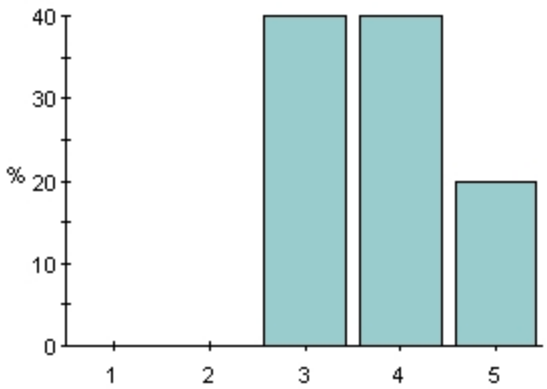
2	0%	0
3	40%	2
4	40%	2
5	20%	1
Total	100%	5
Mean		3.8

Comments

Nobody has answered this question

L. 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.



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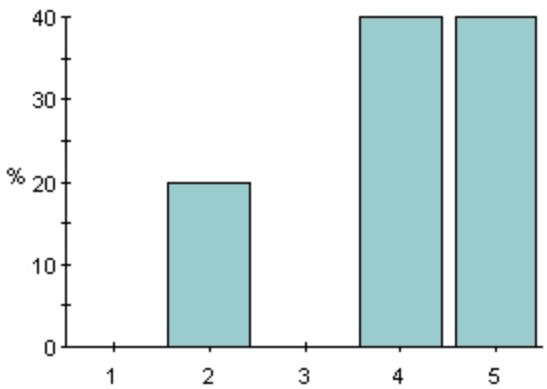
2	0%	0
3	40%	2
4	40%	2
5	20%	1
Total	100%	5
Mean		3.8

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	20%	1
3	0%	0
4	40%	2
5	40%	2
Total	100%	5
Mean		4

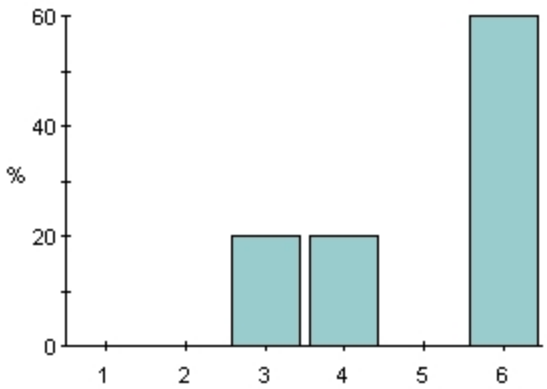
Comments

Nobody has answered this question

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)?



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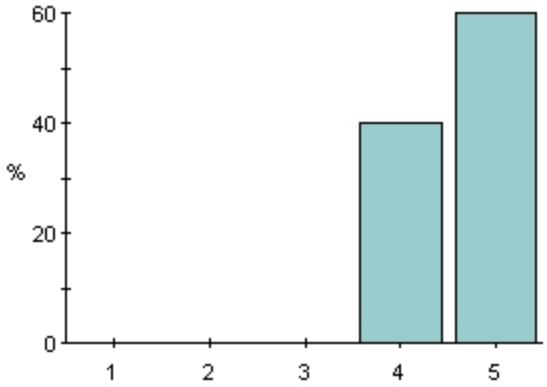
1	0%	0
2	0%	0
3	20%	1
4	20%	1
5	0%	0
6	60%	3
Total	100%	5
Mean		5

How many of the lectures did you attend?



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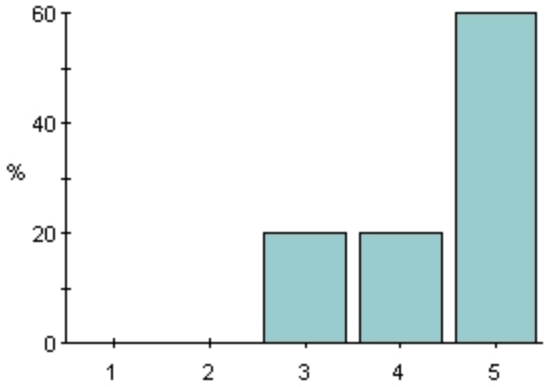
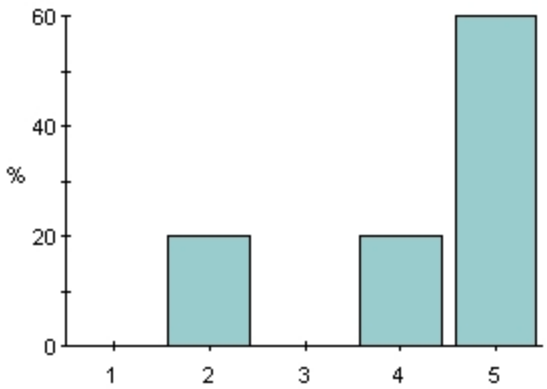
1	0%	0
2	0%	0
3	0%	0
4	40%	2
5	60%	3
Total	100%	5
Mean		4.6

How many of the exercise sessions did you attend?



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

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



	%	#
1	0%	0
2	20%	1
3	0%	0
4	20%	1
5	60%	3
Total	100%	5
Mean		4.2

Thank you for your input!

Contact person: Johan Bijnens, bijnens@thep.lu.se
Last modified: 07/03/12