



SFC Physics/APh/Ay

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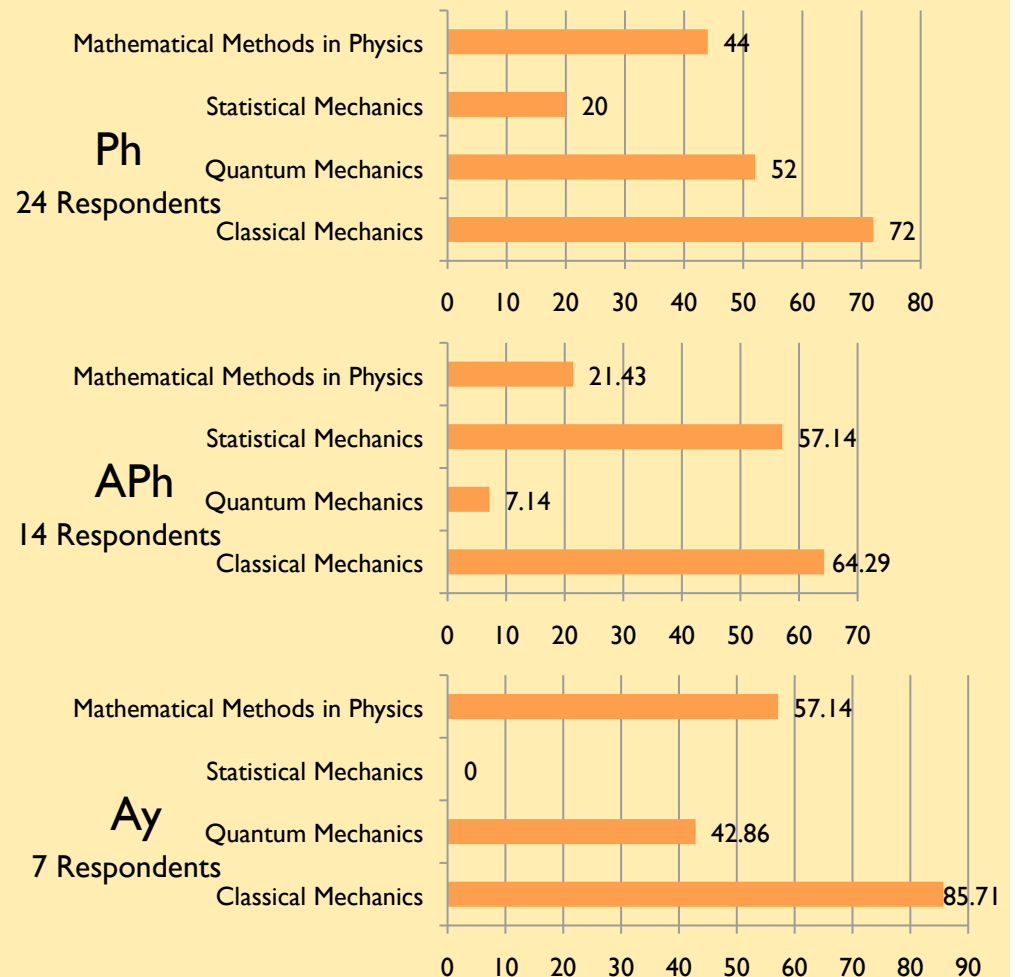
Gil Refael

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Of the following subjects, which do you feel as though you have been adequately prepared for?





Topics

- Physics
 - Material coordination
 - Ph3
 - Ph12/Ph2
 - Ph11 for upperclassmen
 - Grad/undergrad knowledge gap in Ph106/Ph125
- APh
 - APh125/Ph125
 - APh17
- Ay
 - Ay and Ph majors are too similar
 - Experience gap between undergrads and grads
 - Lack of grad/undergrad interaction
 - Senior thesis for Ay
- Physics survival guide



Material Coordination

- Problem: Material in large courses (Ph I 2, Ph I 06, Ph I 25) varies by professor and year.
- Resolution: Create a public “master syllabus”.
 - Define topics that need to be covered.
 - Recommend a timeline for when these topics should be taught.
 - Define the responsibilities of the TA’s.
 - Recommend textbook(s).
 - Update the syllabus yearly based on feedback.



Ph3

- Problem 1: Few students find the material relevant or interesting.
- Suggestions for resolution:
 - Do not include Ph3 as physics major requirement.
 - Switch professors for a new perspective on the class.
 - Consider new experiments such as former Ph6 and Ph7 experiments.



Ph3

- Problem 2: TA's are not well-trained and lab equipment (e.g., programs) is outdated.
- Resolution:
 - Implementation of Ph6 and Ph7 TA training techniques.
 - Rewrite Ph3 data analysis programs, or correct the bugs in current software.



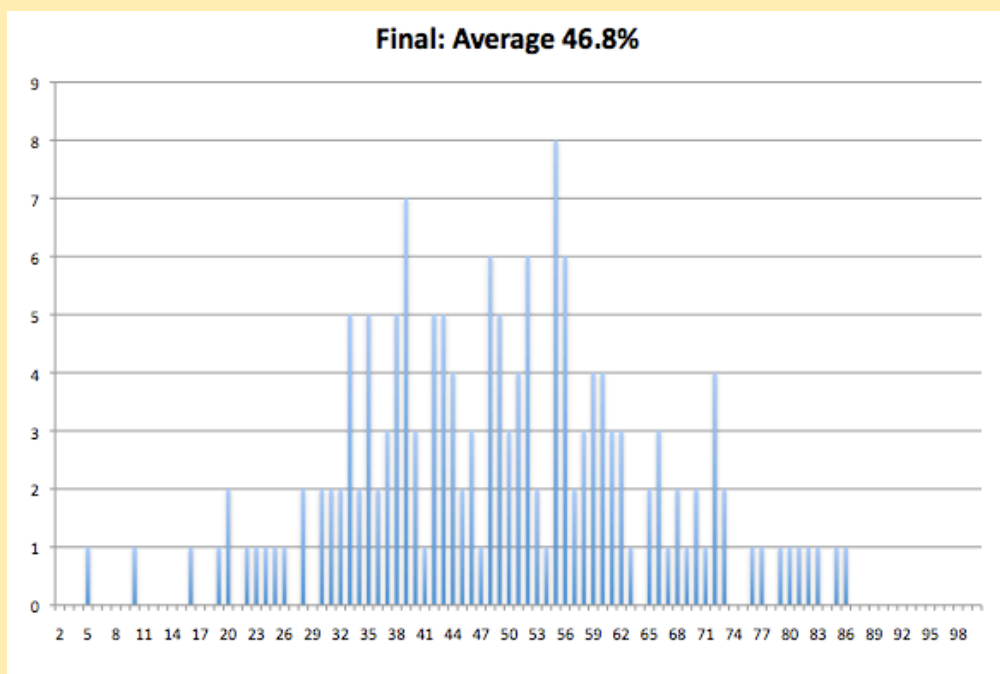
Ph I 2/Ph2

- Problem: Few people want to take or teach Ph2– it's a sink on department resources.
 - Ph2 crams Ph I 2 into two terms– students formula search instead of understanding material.



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Ph I 2/Ph2

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 - Ph2 crams Ph I 2 into two terms– students formula search instead of understanding material.
 - Students more motivated to work in well-taught classes more relevant to them or to their major.
- Resolution: Turn undergraduate sophomore physics requirement for non-physics majors into a menu system.



Ph I 2/Ph2 Resolution

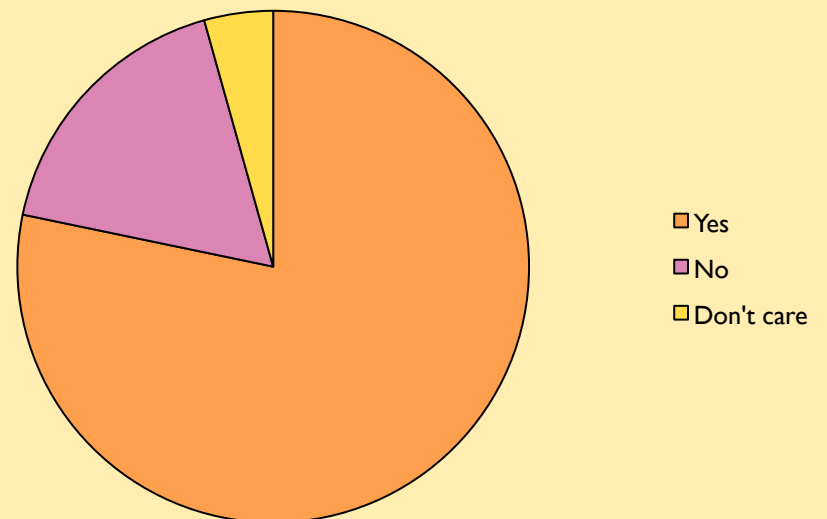
- Alternative requirements (choose two terms of):
 - Ph I 2
 - Statistical mechanics (APh I 7)
 - Optics (APh 23 and APh 24)
 - Physical chemistry (Ch 2 I)
 - Atomic and molecular quantum mechanics, spectroscopy, thermodynamics, statistical mechanics, and chemical kinetics
- You can't double count classes for both your major and core.



Ph I I for Upperclassmen

- Problem: Ph I I is a great course that takes advantage of Caltech's small student to faculty ratio, but only about six students per year can take Ph I I.

Would you take a Ph I I course designed for juniors/seniors? – from survey results





Ph I I for Upperclassmen

- Problem: Ph I I is a great course, but only about six students per year can take it.
- Resolution: We need more small, creative, stimulating physics courses.
 - Professor Gil Refael is already organizing a course built around Physics Olympiad-like contest problems.
 - Take the initiative.



Grad/undergrad knowledge gap in Ph I 06/Ph I 25

- Problem: Graduate students have seen material before, which disadvantages undergraduates.
- Resolution: Put grads on P/F.
 - Courses are not required for grad students



APh 125/Ph 125

- History: APh 125 created in 1980's because Ph 125 was too theoretical.
- Problem: Ph 125 is no longer too theoretical, and APh 125 hasn't been offered since 2003.
- Resolution: APh 125 will be taken out of the course catalog. Focus on perfecting Ph 125 as a thorough quantum mechanics course.



APh I 7

- Problem :Aph I 7 designed to teach both classical thermo and statistical mechanics, and teaches statistical mechanics first.
- Resolution: Either teach only statistical mechanics, or teach classical thermo before teaching statistical mechanics.



Ay and Ph majors are too similar

- Problem: Astrophysics majors spend too much time in the physics department.
- Resolution: Remove Ph I 25c as an Ay major requirement.



Experience Gap between grads and undergrads

- Problem: Upper-level Ay courses are not accessible to undergraduates.
- Resolution:
 - Split Ay102 into an undergraduate and graduate course, similar to Ay101.
 - Introduce an intermediate level cosmology course and galactic dynamics.



Lack of grad-undergrad interaction

- Problem: Ay graduate TA's show favoritism towards graduate students.
- Resolution: There should be more events within Ay department to bring together grads and undergrads.
 - Publicize Ay seminars.
 - Host Ay social events with free food.



Senior Thesis for Ay

- Problem: Ay majors don't usually do a senior thesis.
- Resolution: Publicize that you can get class credit for doing a thesis, and maybe consider requiring a senior thesis.



Physics Survival Guide

- **Problem:** Students don't have enough information to make informed decisions or take advantage of resources within physics majors.
- **Resolution:** A Physics Survival Guide, written by physics majors for physics majors, and published in the little t.
- **Guide currently being written!**

<http://www.ugcs.caltech.edu/~littlet/wiki/index.php?title=Physics>