Georgia Institute of Technology

Spring 2016, PHYS 7143 Group Theory&Quantum Mec Section A Instructor: Cvitanovic, Predrag (Primary)



Text Responses
Question: Course best aspect
The course teaches a big missing concept in physics and especially in quantum mechanics. Apparently group theory and symmetries not only play a significant role in quantum mechanics, particle physics and condensed matter physics, but symmetry also is the very reason behind the unusual notation we adopted in physics in the last century. Conventional physics teaching skips teaching of Group theory, but gt might be an essential course for people who doesn't feel attached to the subject unless it makes sense to them.
The best aspect of the course was being introduced to a wildly different way of thinking about mathematical structures than I had been accustomed to.
New subject explained in a novel way
Question: Course improvements
For this specific course, there are so many resources. It covers the best parts of many books most probably, but from the student's perspective every time they open the middle of a new book they can find themselves looking at the very first page at that book by following previous equations. Also the mathematical aspect of the course can screen the physics side of the picture. As an experimentalist I got lost in the second half of the course. It was mostly due to my lack of attendance and lack of studying, but I found it easier to follow when Dresselhaus or Tinkham book were being followed. Tinkham's book was hard for me at some point as well but these tow books were easier to read for me than other resources.

The course could be dramatically improved with a stronger emphasis on fundamentals of group structure and constructive examples throughout, accompanied by a much more deliberate focus on a smaller set of topics. As an example of a fundamental topic which I think has been inadequately covered: I am still unsure what distinguishes irreducible representations from any representation of a group on an intuitive level. It is, as far as I can tell, something I should simply know by now, but can not have adequately explained to me.

Question: Other overall comments

This is the first time this course was offered in many years. I feel lucky that I was able to attend. I gained a perspective even though mine probably is still a very incomplete perspective of the field.

This course has been bewildering for the latter half of the semester. I am an active participant in class, and frequently ask questions when the lectures become confusing. On several occasions I have co-opted class time to have concepts from homework and previous lectures explained carefully, which has been consistently unhelpful. Overall, this course is by far the most stressful, confusing, and frustrating course I have taken at Georgia Tech and on more than one occasion has given me nightmares.

Question: Instructor greatest strength

Cvitanovic The greatest strength of Prof. Cvitanovic is his clear mastery of the subject matter and his enthusiasm for both the topic at hand and the historical significance of the development of the field. These insights added an often humorous, if not humanizing, setting to what is otherwise a somewhat dry mathematical topic.

Cvitanovic Very clear orator and explained concepts well

Question: Instructor improvements

Cvitanovic The most needed improvement in the lectures is a stronger focus on examples (especially those reinforcing fundamental concepts) which reflect the expectations for the rest of the course.