Phys 3317: Syllabus

I. THE BOTTOM LINE

Before we even start, let me say the most important thing. I (that is, Yuval) really hope you will have fun in this course, and I am here to help. So whatever issue you may have, please come and talk to me. While I may not be able to do all that you may ask, I will always have the time to talk to you and try my best to help.

II. GENERAL COURSE INFORMATION

- Course Title: Physics 3317 — Applications of Quantum Mechanics.

- Semester/Year: Fall 2025.

- Meeting Times: Tue and Thu 11:40AM – 12:55PM.

- Locations: Rockefeller Hall 230.

- Course Website: Canvas.

- Prerequisites: Phys 3316 or approval by the instructor.

- Textbook: There is no single textbook that the course follows. The one that I used most is "modern physics" by Krane (3rd or 4th edition). I also use Tipler and Llewellyn, Modern Physics, 6th Edition. As the course goes on, when I use other books I will mention them in class.

- Lecture notes from 2023 and videos from 2020 will be posted on Canvas

III. COURSE PERSONAL

Feel free to contact any of us on any relevant issue. Email is the preferred method of communication.

- Instructor: Yuval Grossman, email: yg73@cornell.edu. Office, PSB 467. Office hours: By chance or by appointment. (by chance means that you can always stop by my office, and if I am alone, I will be happy to chat.)

- TA: Clara Chung, email: ec893@cornell.edu. Office hours by appointment.

- Grader: Alec Duquette, email: ad683@cornell.edu,

IV. HOMEWORK, EXAMS, AND GRADING

Ideally, there would be no grades, and we could just enjoy physics. Yet, I need to give grades. Thus, I spend a lot of time trying to optimize the grading mechanism. The result of this is below. It is a rather long section, but please read it carefully.

A. Homework policy

- Problem Sets (PS) are going to be posted almost every week before Fri. 11PM and are due the next Thu. at 11PM. When possible, I will try to post them earlier. Sometimes corrections to the PS has to be made, as there might be mistakes. If any changes will be made to the PS I will post an announcement on canvas about it.

- All PS are mandatory.

- Not all PS require the same amount of work, and their weight in the final grade may vary.

- You are encouraged to work with others for the PS. Yet, the writing of the solutions must be done independently by you.

- We also going to have "homework parties" to be held at Clark 294A on Wed. ,Thu. from 4:30-7:00. You are welcome to come to them with questions or just to do the PS there. There will always be at least one person from the teaching staff there to help answer questions.

B. Exams

- There will be one prelim and one exam for the course. They will be online via Canvas. The time allowed will be 4 hours. I will plan them such that they should fit into an hour and a half, but I prefer to give more time to reduce time pressure. You will have several days from which you can choose the 4 hour window to do them.

  - The exam date will be set by the university.
  - The prelim will be given to you on Thu. 10/16 at 4pm and you will have until Fri, 10/17. at 11pm to submit it. That is, you will have to find a four hour window within that time period.

- The final and the prelim are open material — that is, you can use any book or website, as well as your notes. Yet, you cannot search for an answer. That is, while you can use the internet, you can only use it for books and material you set in advance. Also, you must do the exam totally alone, that is, you cannot talk about it to anyone.

- Once you submit the prelim and final on Canvas, you will be asked to also immediately submit your notes. You will have half an hour to do the uploading. In case of technical issues with it, you can email them to me and you will be able to upload them later.

- If you have SDS accommodations, please let me know in advance, so we can work out the best solution for you. I will send out emails before the prelim and the exam about it.

- To ensure academic integrity, after the prelim and the exam I may select some students to discuss the exam orally with them. If you are selected, you will have to be able to explain what you did to me, so I know you did it independently.

C. Late submissions

Regarding late submissions: the idea is that you cannot keep being late, but occasionally it is OK. You can have up to **five (5)** late submissions during the semester that you can use without letting us know or asking permission. These "late submission allowances" can be used on PS or on the prelim. A late submission gives you an extra 2 days (so you need to submit the PS by Sat. 11pm, and on the prelim it will let you submit it by Sun. 10/19 at 11pm.

If you have any issue that causes you to need more extensions or a longer one, please contact me (that is, Yuval) and we will work out a solution. However, make sure you contact me promptly, that is, before the deadline, or as soon as you can contact me depending on the situation.

Note that unless you will ask permissions in advance, if you submit after the extended deadline or use more than the five extensions you are allowed to use, your work will not be graded.

D. Grading

- Homework: 36%. Note that each PS could have a different weight in the final grade.

- Prelim: 32%.

- Final: 32%.

The calculation of the final numerical grade will be done by canvas using the Canvas internal rounding algorithm. We denote that grade as x. We denote the final numerical grade after curving as x_f.

In order to pass the course you need all the following conditions to be satisfied:

1. $x > 40$.

2. A grade above 20 in the prelim.

3. A grade above 20 in the final.

4. A grade above 30 in the total homework grade.

If any of the above is not satisfied your letter grade will be F.

The curving will be done as follows. We first cut all the Fs and incomplete grades. Then we calculate the median, M. If there are even number of eligible grades, the median will be the average of the two central grades.

- If $M \geq 85$ there will be no curving, that is, $x_f = x$.

If $M < 85$, curving will be done to all passing grades in the following way: We define the highest grade in class as H.

- If $100 - H \geq 85 - M$ then we just add $85 - M$ to the grade bringing the median into 85, that is, $x_f = x + 85 - M$.

- If $100 - H < 85 - M$ than we first add $100 - H$ to all and curve linearly to bring the median into 85. That is,

$$x_f = x + (100 - H) + \frac{H - x}{15} \times (H - M - 15). \tag{4.1}$$

Note that always $x_f \geq x$.

After we curve, the passing letter grades will be assigned as follows

- $95.01 - 100.00$: $A+$

- $90.01 - 95.00$: A

- $85.01 - 90.00$: $A-$

- $80.01 - 85.00$: $B+$

- $75.01 - 80.00$: B

- $70.01 - 75.00$: $B-$

- $65.01 - 70.00$: $C+$

- $60.01 - 65.00$: C

- $55.01 - 60.00$: $C-$

- $50.01 - 55.00$: $D+$

- $45.01 - 50.00$: D

- $40.01 - 45.00$: $D-$

V. TENTATIVE PLAN

Below is the rough plan of the course. As the course goes on, I will update the list on canvas.

- (1) Intro: "Physics is the art of approximation"

- (2) Review of QM

- (3) Atomic physics

- (4) Molecular physics

- (5) Quantum statistics

- (6) Nuclear physics

- (7) QFT and particle physics