PHY 4605 – Quantum Mechanics II

General Information

Lecture Time: Tuesdays & Thursdays, 9:30AM – 10:45AM
Location: CP 103
Instructor: Prof. Hebin Li (Office: CP222; Email: hebin.li@fiu.edu; Phone: 305-348-7641)
Office Hours: Tuesdays & Thursdays 11:00 pm ~ 1 pm (or by appointment)
Textbook: Quantum Mechanics, by David H. MacIntyre
Reference book: Introduction to Quantum Mechanics, by David J. Griffiths (Optional)
Course Website: http://faculty.fiu.edu/~hebli/spring2018
Prerequisite: PHY 4604

Overview

Quantum Mechanics II (PHY4605) serves as an introduction to quantum mechanics. This is the second semester of a two-semester course. The topics in this semester include hydrogen atom, harmonic oscillator, perturbation theory, hyperfine structure and the addition of angular momenta, perturbation of hydrogen, identical particles, time-dependent perturbation theory, periodic systems, and modern applications of quantum mechanics. It is assumed that you have good knowledge of quantum mechanics I, introductory physics, introductory calculus and good working knowledge of differential equation and linear algebra.

Course schedule

The course schedule is attached to this syllabus. It shows the topics that will be covered in each lecture and corresponding reading assignment. **Please note that reading should be done prior to the lecture that covers the topic**. The professor reserves the right to change, add or omit any material in the course outline as needed throughout the course. Any changes will be announced in class and through your official FIU email. Students are responsible for obtaining information given in class and in your official FIU email, even if the student is absent.

Lectures and classroom participation

To be successful in this class, it is extremely important to attend all lectures and actively participate in the classroom learning. All students are required to attend all lectures. (**Yes, it is mandatory!**) The attendance will be taken and counted towards your final grade. Each student may have up to three unexcused absences without penalty. **Being in class late by over 15 minutes is considered an absence**.

Homework

Homework will be assigned on the class website every week. Working on homework problems is an essential part for learning physics, as well as preparing for exams. It is fine to discuss the homework problems with your classmates. However, it is strictly prohibited to

duplicate solutions from your peers or any other sources. You should understand and independently work out the solutions.

Each student will have a chance to present the solution of a homework problem in class. The presenting student will have the floor for about 10 minutes to explain the solution and answer questions.

Exams and Grading

There will be three exams including two midterms and a final exam. Each exam covers specific chapters noted in the course schedule. You might need a non-programmable scientific calculator (<$20) to use on exams and make sure you know how to use it before exams. You may NOT use calculators on cell phone/iPad or other similar devices. Midterm exams will be held in class. The final exam will be held in the final exam week. The specific time will be announced as the university final exams are scheduled. Please mark your calendar and plan accordingly. **Missing an exam will result in a zero score on that exam. No make-up exams will be given.**

The midterm exams will be reviewed and returned to you during the lecture in the following week. It is students' responsibility to attend the class and retrieve the exam. **Any questions regarding the grading have to be brought up to the professor within a week from when the exam is returned in class**. The scores will be official and cannot be modified after a week.

Students' understanding of the course materials will be assessed using both homework and exams. Grad percentages will be based on the following breakdown.

Course requirement	Distribution of final grade	Date
Homework + HW presentation	10% + 5%	See HW assignments
Exam 1	25%	**Feb. 6 (in class)**
Exam 2	25%	**Mar. 6 (in class)**
Final exam	25%	**Time TBA**
Attendance and in-class participation	10%	

Academic Integrity Statement

The academic integrity of the classes offered by any universities solidifies the foundation of its mission and cannot be sacrificed to expediency, ignorance, or fraud. Therefore, I will enforce rigorous standards of academic integrity in all aspects and assignments of this course. For the detailed policy and rules, please refer to the FIU Student Code of Conduct (http://regulations.fiu.edu/regulation=FIU-2501).

Disability Notice

The Disability Resource Center collaborates with students, faculty, staff, and community members to create diverse learning environments that are usable, equitable, inclusive and

sustainable. The DRC provides FIU students with disabilities the necessary support to successfully complete their education and participate in activities available to all students. If you have a diagnosed disability and plan to utilize academic accommodations, please contact the Center at 305-348-3532 or visit them at the Graham Center GC 190.

Week	Lecture	Topic	Reading
1	Jan. 09 Jan. 11	Hydrogen atom	p 250~272
2	Jan. 16 Jan. 18	Harmonic Oscillator	p 275~296
3	Jan. 23 Jan. 25	Harmonic Oscillator	p 296~308
4	Jan. 30 Feb. 02	Harmonic Oscillator Perturbation Theory	p 312~329
5	**Feb. 06** Feb. 08	**Exam 1** Perturbation Theory	p 329~343
6	Feb. 13 Feb. 15	Perturbation Theory Hyperfine Structure	p 343~351 p 355~370
7	Feb. 20 Feb. 22	Addition of Angular Momenta	p 370~379
8	Feb. 27 Mar. 1	Perturbation of Hydrogen	p 387~407
9	**Mar. 6** Mar. 8	**Exam 2** Identical Particles	p 410~423
10	Mar. 13 Mar. 15	No classes. Spring break.	
11	Mar. 20 Mar. 22	Identical Particles Time-Dependent Perturbation Theory	p 423~442 p 445~450
12	Mar. 27 Mar. 29	Time-Dependent Perturbation Theory	p 450~466
13	Apr. 03 Apr. 05	Periodic Systems	p 469~484
14	Apr. 10 Apr. 12	Periodic Systems	p 484~498
15	Apr. 17 Apr. 19	Modern Application of Quantum Mechanics	p 502~526
16	**TBA**	**Final Exam**	