Syllabus for Phys 402

Koç University, Spring 2019

Title of the Course: Quantum Mechanics II

Instructor: Ali Mostafazadeh (Office: Sci.154; Office Hours: Mon. & Wed. 15:15-15:45 & 17:30-18:00)

Textbook: "Principles of Quantum Mechanics," R. Shankar, 2nd Edition (Plenum Press, New York, 1994)

Website: http://home.ku.edu.tr/~amostafazadeh/phys402/Phys402_2019_S/phys402.htm

Topics to be covered:

0. Review of basic principles of quantum mechanics;
1. Continuity equation for probability and the probability current (Chapter 5)
2. Harmonic oscillator (Chapter 7)
3. The pilot-wave interpretation of quantum mechanics and the semiclassical approximation
4. Systems with N degrees of freedom (Chapter 10)
5. Symmetry in quantum mechanics (Chapter 11)
6. The quantum angular momentum (Chapter 12)
7. The Hydrogen atom (Chapter 13)
8. Spin (Chapters 14)
9. Addition of angular momenta* (Chapter 15)

* Will be covered depending on the progress of the class.

Objective: This is the second of a two-semester undergraduate course on Quantum Mechanics that aims to provide the student with a basic knowledge of Nonrelativistic Quantum Mechanics. This includes the mathematical structure, conceptual implications, physical aspects, and computational methods used in the study of quantum systems.

Evaluation method: Students' progress will be evaluated according to their performance in homework assignments, two midterm exams, and the final exam. These will contribute to the final grade of the student according to: Homeworks 25%, Midterm Exams 20% each, and final exam 35%. The schedule for quizzes and exams are posted in the webpage of Phys 402.

Eligibility to take the final exam: In order to take the final exam a student should not miss more than 8 lectures and his/her average grade in the midterms must not be below 30 out of 100. If a student misses more than 8 lectures and has a valid excuse for all of them, then (s)he will be allowed to take the final exam only if (s)he has taken at least one of the midterm exams and her/his average grade in the midterm exams is not below 40 out of 100. A student who is not eligible to take the final exam will automatically fail the course and will not be allowed to take the remedial exam.

Attendance & Bonus: Students are strongly advised to attend all the PSs and lectures. n bonus points will be added to the final exam grade of the students who attend 20+n lectures.

Policy for Homework Assignments: Homework papers will be collected in class. The assistant will not accept late homework papers. Late homework papers will be accepted within a week from their due date, but they will be subject to 50 points deduction of the grade.

Make-ups: If a student misses a midterm exam and has a valid excuse, his (her) grade in the final exam will be substituted for the grade in the midterm exam(s). If (s)he also misses the final exam, (s)he will be given zero in the midterm exams that (s)he has missed regardless of whether (s)he has a valid excuse or not. If a student misses the final exam and has a valid excuse, (s)he will be given a make-up exam.

Auditing Students: In order to get an AU, a student must attend at least 20 lectures.

Suggested Method of Study: Students are advised to study the subjects covered in class immediately after the lectures. Reading the lecture notes and the book is necessary for grasping the subject, but it is by no means sufficient. Students must try to reproduce the definition of the concepts and derivation of the results covered in class on their own. They are expected to spend an average of three hours per week on studying the material covered in class in addition to the time spent on homework assignments.