

KOÇ UNIVERSITY
College of Arts and Sciences
Department of Physics

Course: PHYS402 Quantum Mechanics II

Credits: 3

Semester: Spring 2004

Instructor: Professor **Tekin Dereli**

Office: Science 159, Phone: 1510, E.mail: tdereli@ku.edu.tr

Office hours: By appointment

Lecture hours: Tuesdays and Thursdays, 12.30-13.45, Scie 129

Course Description: Angular momentum; spin; identical particle systems; fermions and bosons; quantum statistics; time independent perturbation theory; fine structure of the hydrogen spectrum; variational approximation; helium atom; time-dependent perturbation theory; emission and absorption of radiation.

Textbook: *Introduction to Quantum Mechanics* D.J.Griffiths (Prentice-Hall, 1994)

Problem book: *Quantum Mechanics* (Schaum Series) Y. Peleg, R. Pnini, E. Zaarur (McGraw Hill, 1998)

Grading: Homework 16%

1. Midterm 24%, March 29, 2004 (Time and place to be fixed)
 2. Midterm 24%, April 29, 2004 (Time and place to be fixed)
- Final Exam 36%, June 2004. (Date to be announced later)

Remember:

1. Attendance will be taken in the classes. Any student who misses more than 9 lectures with or without excuse automatically fails.
2. In the exams no exchange of information among students should take place. You are expected to hand in your own work in all the exams and HW assignments.
3. For the homework you may discuss the problems, consult your teachers and use the library and internet. However, the submitted work must be totally yours. You must not submit work done in groups, transfer files or copy from a book.
4. Late homework is going to be accepted but you lose half the grade.

Course plan:

Week:1 Angular momentum.

Week:2 Spin. Addition of angular momentum.

Week:3 Electron spin precession in a magnetic field. HW1

Week:4 Identical particle systems. Atoms. Periodic table of elements.

Week:5 Solids. Quantum statistics. HW2

1. Midterm

Week:6 Time-independent perturbation theory.

Week:7 Stark effect. Zeeman effect.

Week:8 Fine structure of the hydrogen spectrum.

Week:9 Variational approximation. Helium atom. HW3

Week:10 Spring Break

2. Midterm

Week:11 Two level systems. Time-dependent perturbation theory.

Week:12 Emission and absorption of radiation.

Week:13 Transition probabilities. Selection rules. HW4

Week:14 Spontaneous emission rate.