

PHYSICS 321
“Introduction to Modern Physics I”
Fall 2007

Syllabus

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Office Hours: normally M 1-3 pm, but feel free to stop by any time (A307, A304-314)

Course Web Page: <http://www.public.iastate.edu/~adamkam/teaching>

Time and place: Tuesdays and Thursdays 9:30 am – 10:50 am, Room: Physics 38.

Prerequisites: Physics 222 (Introductory calculus-based Physics) or equivalent, and Math 266 (Elementary Differential Equations) or equivalent.

Textbook: *Quantum Physics of Atoms, Molecules, Solids, Nuclei, and Particles, 2nd Edition*, by Eisberg & Resnick.

Course goals: This course covers some of the most important developments in Physics that form a foundation of our current understanding of Nature. Students will gain understanding of the basics of Quantum Mechanics and its application to solving many fundamental problems in different areas of Physics.

Homework: Typically 6-12 problems per chapter are assigned during first lecture of the chapter. Homework is due on the beginning of the lecture discussing next chapter. Late penalty: 1 point per day.

Quizzes: typically administered at the end of the final lecture for the chapter.

Exams: Two midterm and one final exam covering ~ one third of the material each. One double sided formula sheet allowed. Closed book and notes.

Preparation for the class: Reading of appropriate part of chapter as outlined in the schedule is required prior to the class.

Grades

Homework	15 %
Quizzes	5 %
Classroom participation	5%
Two midterm exams (25 % each)	50 %
Final exam (not a comprehensive exam)	25 %

Outline:

Chapter 1: Thermal radiation and Planck's postulate

Chapter 2: Photons – particle like properties of radiation

Chapter 3: De Broglie's postulate – wavelike properties of particles

Chapter 4: Bohr's model of the Atom



Exam 1

Chapter 5: Schrödinger's Theory of Quantum Mechanics

Chapter 6: Solution of time-independent Schrödinger equations

Chapter 7: One-electron atoms



Exam 2

Chapter 8: Magnetic dipole moments, spin and transition rates

Chapter 9: Multielectron atoms – ground states and X-ray excitations

Chapter 10: Multielectron atoms – optical excitations



Exam 3

SCHEDULE

<u>Week</u>	<u>Lecture</u>	<u>Date</u>	<u>Subject</u>
1	1	Aug. 21 st	Chapter 1
1	2	Aug. 23 rd	“
2	3	Aug. 28 th	Chapter 2 HW#1 due
2	4	Aug. 30 th	“
3	5	Sept. 4 th	Chapter 3 HW#2 due
3	6	Sept. 6 th	“
4	7	Sept. 11 th	Chapter 4 HW#3 due
4	8	Sept. 13 th	“
5	9	Sept. 18 th	Chapter 5 HW#4 due
5	10	Sept. 20 st	“
6	11	Sept. 25 th	“
6		x Sept. 27 th	EXAM #1
7	12	Oct. 2 nd	“
7	13	Oct. 4 th	Chapter 6 HW#5 due
8	14	Oct. 9 th	“
8	15	Oct. 11 th	“
9	16	Oct. 16 th	Chapter 7 HW#6 due
9	17	x Oct. 18 th	“
10	18	Oct. 23 th	“
10	19	Oct. 25 th	Chapter 8 HW#7 due
11		x Oct. 30 th	EXAM #2
11	20	Nov. 1 st	“
12	21	Nov. 6 th	“
12	22	Nov. 8 th	Chapter 9 HW#8 due
13	23	Nov. 13 th	“
13	24	Nov. 15 th	“
14		Nov. 20 th	Thanksgiving break
14		Nov. 22 nd	Thanksgiving break
15	25	Nov. 27 th	Chapter 10 HW#9 due
15	26	Nov. 29 th	“
16		Dec. 4 th	Review HW#10 due
16		Dec. 6 th	Review
17		Dec. 11 th	FINAL EXAM WEEK
18		Dec. 13 th	FINAL EXAM WEEK