PHYS 443: Atomic and Nuclear Physics – Course Syllabus
Fall Semester 2017

• Credits: 3

• Prerequisites: PHYS 340

• Designation: Required course for all options of the B.S. in Physics

• Course Description and Goals: We will first review the seminal experiments which led to the development of Quantum Mechanics. We will then apply the principles of quantum mechanics to atoms, molecules and atomic nuclei in order to understand the structure of matter on a microscopic level, and their interaction with external electric and magnetic fields.

• Location and time of lectures: Workman Center 310,
Tuesday and Thursday, 11:00 — 12:15.

• Text: Quantum Physics of Atoms, Molecules, Solids, Nuclei, and Particles, second edition, by R. Eisberg, and R. Resnick. Reading assignments are announced in class. Other sources, like important papers from the research literature will also be used.

• Instructor: Dr. P. Hofner (Office: Wkmn. Center 307, Tel. x5233,
email: peter.hofner@nmt.edu)

• Office Hours: I maintain an open door policy. Feel free to look me up any time.

• Homeworks: There will be approximately 10 homework assignments.

• Exams: There will be 3 partial exams. There is no final exam. Partial exams will be held after each course section (see below) has been completed, and announced with at least one week of anticipation. The exams are closed-book.

• Attendance Policy: Students are expected to attend class. While in general we will be staying close to our main text, additional material will be provided during the lectures. If a lecture is missed, it is the students responsibility to make sure that he/she makes up all relevant material discussed in that lecture. Acceptable reasons for missing class include illness, travel to visit grad. schools, personal or family emergencies, special research opportunities, and field trips for work in other classes. Please notify me if you know you will be missing class.

• Grading: Grading is based on homeworks (40%), and partial exams (20% each). The initial standard is listed below. The grading will never be more demanding than this, and is usually curved at the end of the semester to make it more lenient.

A – 90 % or above
B – 89 % – 80 %
C – 79 % – 70 %
D – 69 % – 60 %
F – 59 % or below

Preliminary Course Schedule and Content

Part I:
Chapters 1 – 4: Late August through late September.
Thermal Radiation, Photons, Matter Waves, Bohr's Model

Part II:
Chapters 8 – 10: late September through October
H-atom including Electron Spin, Identical Particles, Multielectron Atoms

Part III: Chapters 12, 15 and 16: November to early December
Molecules, Bonds, Spectra, Nuclear Models, Nuclear Reactions and Decays

Counseling and Disability Services

Reasonable Accommodations: New Mexico Tech is committed to protecting the rights of individuals with disabilities. Qualified individuals who require reasonable accommodations are invited to make their needs known to the Office of Counseling and Disability Services (OCDS) as soon as possible. In addition, New Mexico Tech offers mental health and substance abuse counseling through the Office of Counseling and Disability Services. The confidential services are provided free of charge by licensed professionals.

Academic Honesty

New Mexico Tech's Academic Honesty Policy can be found in the NMT catalog. You are responsible for knowing, understanding, and following this policy.