Goal: to understand the development of our understanding of the quantum nature of matter via review of experimental results and mathematical description

Instructor: Dr. Michael L Allen
Office: Webster 1246
Lab: Webster 249
Email: mlfa@wsu.edu (reliable)
Phone: 509-335-1279 (unreliable)

Credits: 3
Level: Tier II
Prereq’s: Math 220, Phys 202
Office Hours: tba
Web Page: astro.wsu.edu/allen/courses/phys303/

Text: *Quantum Physics*, by Eisberg & Resnick (problem sets will be assigned from this text)

Meeting Places: Regular Lectures MWF 1:10-2 pm, in Webster 11
Planetarium Sloan Hall 231
Observatory on Olympia Ave, near the racetrack and greenhouses, south-east end of campus

Assignments: will be a combination of written exercises, small research projects, and computer-based graphing and programming. Assignments submitted after the solutions have been posted will receive zero credit. In preparation for Phys 304 and other upper-division courses, a large number of problems will be assigned as homework, but only a subset of these may be graded.

Important Dates:
- ML King Jr Day (holiday) Mon Jan 18, 2010
- President’s Day (holiday) Mon Feb 15, 2010
- March Break March 15-19, 2010

The full academic calendar is available on the website of the Registrar: http://www.registrar.wsu.edu.

Course webpages: Assignment statements will be posted there, as will timely announcements.

Course Notes: From time to time, notes will be handed out in class. These notes will highlight the major results of a given discussion. They should not be treated as a substitute for either the textbook or the in-class notes. Students are advised that the best way to prepare for class is to preview the material in the textbook.

Classroom Etiquette:

1. The course is conducted mostly by lecture format. There will be in-class learning exercises that will not be graded. You are advised to take advantage of them.
2. The final exam will consist of questions totalling 60-100 points. For every cell phone and pager that rings during lecture time, 10 points will be added to the final exam. You are advised to leave your cell phones at home.
3. Please show courtesy to your fellow classmates and do not chat unnecessarily during the lecture. Being disruptive in class is grounds for expulsion from the course.

Evaluation:

Assignments: 40% due approx every week
Test #1: 10% tbd
Test #2: 10% tbd
Test #3: 10% tbd
Final Exam (cumulative): 30% Wed May 5, 2010, 3:10 - 5:10pm sharp
To receive credit in this course, you must sit for the final exam. Your grade is based entirely upon your ability to communicate in writing and mathematically, an understanding of the course material. Your test and exam grades will be reported on the percentage scale. Your final grade will be the weighted average of these. You are allowed to bring a crib sheet to tests and the exam. The crib sheet must be a single-sided sheet of 8.5 × 11 in paper with no attachments.

Possible test/exam questions include (i) numerical problems modelled after the homework problems, (ii) one derivation selected from a list, and (iii) word definitions.

The following table shows approximately how percentages translate to grade points. These numbers WILL change in a way dependent upon the performance of the class, but never in such a way as to reduce your grade.

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<td>56</td>
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<td>3.3 B+</td>
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<td>1.0 D</td>
<td>76</td>
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<td>92</td>
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<tr>
<td>64</td>
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<td>96</td>
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<tr>
<td>68</td>
<td>1.7 C−</td>
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Extra credit: Extra credit will be granted for participation in evening planetarium shows (dates announced in class) and star parties at the Jewett Observatory (http://astro.wsu.edu/observatory.html) or elsewhere, hosted by the Palouse Astronomical Society (http://www.palouseastro.wsu.edu).

Observing dates: Sat Apr 24 all observing begins at dusk (cancelled if cloudy)

List of possible topics:

<table>
<thead>
<tr>
<th>Topic</th>
<th>Text Reference</th>
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<tbody>
<tr>
<td>Special Relativity</td>
<td>Appendix A</td>
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<tr>
<td>Thermal Radiation and Planck’s Postulate</td>
<td>Chapter 1</td>
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<td>Photons - Particle-like Properties of Radiation</td>
<td>Chapter 2</td>
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<tr>
<td>De Broglie’s Postulate - Wave-like Properties of Matter</td>
<td>Chapter 3</td>
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<td>Bohr’s Model of the Atom</td>
<td>Chapter 4</td>
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<td>Schroedinger’s Theory of Quantum Mechanics</td>
<td>Chapter 5</td>
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<td>Solutions of the Time-independent Schroedinger Equation</td>
<td>Chapter 6</td>
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<td>One-Electron Atoms</td>
<td>Chapter 7</td>
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<tr>
<td>Magnetic Dipole Moments, Spin, and Transition Rates</td>
<td>Chapter 8</td>
</tr>
<tr>
<td>Special topics, time permitting</td>
<td>Selected Appendices</td>
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Academic Integrity: “Academic dishonesty” is anytime you represent someone else’s work as your own. All forms of cheating, plagiarism, and fabrication, are prohibited as stated in the WSU Handbook (WAC 504-25-015). Academic integrity is policed rigorously in this course. Students receive zero credit for a first offense, and fail the course on subsequent offenses. In all cases, a report is sent to the Office of Student Conduct. Ref: http://www.conduct.wsu.edu/.

Students with Disabilities: Reasonable accommodations are available for students who have a documented disability. Please visit the Disability Resource Center (DRC) during the first two weeks of every semester to seek information or to qualify for accommodations. All accommodations must be approved through the DRC, located in Washington Bldg 217, 509-335-3417 in Pullman, or http://www.drc.wsu.edu.

WAC policies on final exams: (1) No final exams will be given at a different time than posted, except (2) an exam date may be changed if a student has 3 or more exams on a single day. (3) No exams shall be given during Dead Week, except make-up exams.

Strategies for success: Look up any word you do not understand in a good dictionary. Re-write your notes in your own words. Form a weekly study group that can meet for 30-60 minutes. Get an early start on assignments. Make good use of instructor office hours by arriving with a written list of questions. Mental and physical health go hand in hand: eat right, stay active, stop watching TV. Maintain an academic mindset: question everything, do not be content with your knowledge.