Instructor: Professor David Collins
Office: Wubben 184
Phone: 248-1787
email: dacollin@mesastate.edu
Office Hours: TBA
Class Meetings: TTh 11:00am-12:15pm, Medesy 180
Course Website: http://www.mesastate.edu/~dacollin/teaching/2008Spring/Phys422/index.html
Prerequisites: PHYS 321

Overview

Phys 422 is a continuation of Phys 321, Quantum Theory I, which covered the basic framework and some fundamental tools of quantum mechanics. In Quantum Theory II, this framework will be applied to various widely encountered physical situations and additional tools will be developed. The material which will be covered is more than just a set of situation specific topics and applications. Many of the new concepts and techniques that you will learn are useful in a diverse array of physical situations. The course syllabus, subject to modification, is:

1. Review of the framework of quantum mechanics.
2. Hydrogen atom energy levels.
3. Time-independent perturbation theory.
5. Scattering.
6. Systems of more than one particle, entanglement.
7. Identical particles.
8. Quantum mechanical description of photons.
Assignments

1. **Homework:** Homework assignments will be due each week by 5pm on Tuesdays. It is in your best interests to work by yourself on the homework problems but collaboration is acceptable. You can discuss the broad outlines of problem solutions with your colleagues but must write your final solutions independently. You are also encouraged to consult me for help with homework problems.

Exams and Quizzes

1. **Class Exams:** There will be two exams during class meetings:

   Exam 1  Tuesday 26 February
   Exam 2  Tuesday 15 April

Exams will be closed book and closed notes although a formula sheet will be provided and calculators will be allowed.

2. **Final Exam:** There will be a final exam at 10:00am on Tuesday 13 May. The final will last one hour and 50 minutes and be comprehensive and closed book although a formula sheet will be allowed. Calculators will be allowed.

Grades

Individual assignments and exams will be graded using suitable scales. In general, to get full credit (100%) for a problem your solution must be correct and well justified. Partial credit will be given for incomplete or partly correct solutions. No credit (0%) will be given for problems not attempted, assignments not turned in or quizzes and exams missed without good reason.

The numerical grades for each component will be totaled and a final numerical grade will be computed according to the following distribution.

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<thead>
<tr>
<th>Component</th>
<th>Weight</th>
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<tbody>
<tr>
<td>Homework</td>
<td>40%</td>
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<tr>
<td>Class Exams</td>
<td>30%</td>
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<tr>
<td>Final Exam</td>
<td>30%</td>
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</tbody>
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The following final numerical scores will guarantee letter grades:

<table>
<thead>
<tr>
<th>Score</th>
<th>Grade</th>
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<tbody>
<tr>
<td>90%</td>
<td>A</td>
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<td>80%</td>
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<tr>
<td>70%</td>
<td>C</td>
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<tr>
<td>60%</td>
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Policies

1. **Helpful Resources:** I will be happy to discuss course material and help with homework assignments outside the class.

   If you have a documented physical or learning disability and need accommodation for this class, please contact the Educational Access Services Office, 248-1856, who will notify me of your needs.

2. **Attendance:** Attendance policies are described in the Mesa State College catalog. You are expected to attend all the class meetings. In case of illness or other emergencies you must be able to produce the appropriate documentation. There are other circumstances under which you can be excused but you must discuss these with me in advance. If you miss a class or lab for a valid reason, turn in any assignments due before the start of the next class. Assignments turned in beyond your return to class will not be accepted.

   If there is an unavoidable conflict with one of the class exams or the final exam, please discuss it with me as soon as possible. In general I will assume that the final exam will have priority, since you know the dates of the exam.

3. **Academic integrity:** You are expected to present your own work in assignments, exams and quizzes. Fabrication of data, plagiarism, and copying from anyone else, particularly in closed book exams, are serious violation of academic norms. Mesa State College has extensive policies on these matters and penalties for infringement can be severe. For more details, consult the academic integrity policies in the Mesa State College catalog.