Physics 480 – Quantum Mechanics I – Syllabus

Fall Semester 2020, University of Hawaii at Manoa
Class: Mon, Wed, Fri 12:30 pm – 1:20 pm, Watanabe Hall 114

Instructor: Prof. Sven E. Vahsen
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Class will be in zoom
Announcements, homework assignment, homework submission: in google classroom

• Google classroom “Class code” – which you may need to join, is: ---removed ---
• Zoom link which will be used for every class: ---removed from this public version---

Description in Course Catalog
Wave mechanics, Schrödinger equation, angular momenta, potential problems.

Course Description
Quantum mechanics (QM) got me excited about physics – and I hope to pass on this excitement to you. Quantum mechanics is required to understand phenomena at the atomic and sub-atomic scales, and thus is at the heart of modern physics.

QM can be mathematically and conceptually difficult. To become proficient requires solving sometimes time-consuming problems on your own, so expect to work hard. The intellectual rewards are, however, great. QM tends to lead to a number of interesting conceptual and philosophical questions. We will begin with the math and problem solving but stop once in a while to reflect on what it all means.

Recitations
No recitations this semester.

1 Version: 8/24/2020.
Prerequisites
Prerequisites: Physics 274, 310, 350, and MATH 244 or MATH 253A; and MATH 311; or consent. Co-requisite: Physics 400.

Required Materials
Textbook: *Quantum Mechanics, A Paradigms Approach* by David H. McIntyre

Homework
Weekly sets of written problems, and occasional reading assignments. (You’ll benefit greatly from previewing topics in the book before my lectures and should make such pre-reading a habit.) Typically, written problems are due one week after assignment. Honest collaboration is encouraged, but the material handed in must be your own work. Utilizing homework solutions found on the web will be considered cheating and will be reported.

Learning Goals
- You should understand and will be tested on all material presented in class and/or covered in homeworks. (You don’t have to know everything in the book.)
- You should be able to independently solve problems of the same difficulty level as the homework.
- The end-of-chapter summaries in the book provide a good overview of the major concepts.

Evaluation (this may be revised – preliminary plan)
<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
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<tbody>
<tr>
<td>Homework</td>
<td>(15%)</td>
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<tr>
<td>Two midterm Exams</td>
<td>(20% each, 40% total)</td>
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<tr>
<td>Final Exam</td>
<td>(35%)  (cumulative, but emphasis on last 3rd of class)</td>
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<tr>
<td>class participation, quizzes</td>
<td>(10%)</td>
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Office hours
I want to get to know you, and help you succeed in the class. I strongly encourage you to come to office hours. These will be held online via zoom. These will be scheduled at the optimal time, as determined by the poll. If you have physics questions, do not ask them via email. Come to office hours to discuss instead. Physics via email is highly inefficient.

Course Outline
This course is part of a 1-year sequence (Physics 480 and 481) that will cover most of the material in the textbook by McIntyre. I plan to cover chapters 1 through 8 in 480, nominally using the schedule show on page xvii in the preface of the textbook, but I will adjust the pace as needed. When I teach Phys 481, I tend to substitute scattering and some particle physics for chapters 15 and 16.