

# Physics 481 – Quantum Mechanics II – Syllabus<sup>1</sup>

Spring Semester 2022, University of Hawaii at Manoa

Class: Tue, Th, 12:00 am – 1:15 pm, in Wat 114

Recitation: Fri 3:30-4:20 pm, in Wat 114

Instructor: Prof. Sven E. Vahsen

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Office Hours: Wednesdays, 4-5 pm

TA&grader: Joshua Oliver

## Lecture Format and Rules

- The current plan is to have all lectures in-person (only).
- We follow the university mask guidance, if any.
- No cell phones use or texting in class.
- Please interrupt me any time to ask relevant questions. I strongly encourage it.
- Don't email me physics questions. Come to office hours!

## Course materials

Important news and materials (e.g. homeworks) will be sent out via google classroom.

- **If you were enrolled as of January 9<sup>th</sup>, you should have already received an email invitation to join google classroom. Please accept this promptly.**
- **If you are not enrolled yet, instead join google classroom at:**  
<https://classroom.google.com/u/0/c/NTExNjkzMTU1NTEz>  
You may then need the class code, which is: fa5hzco

## Description in Course Catalog

Continuation of 480; atomic physics, scattering, perturbation theory. Prerequisite: Physics 480.

## Course Description

Quantum mechanics 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 scale, and thus is at the heart of modern physics. Although I will do my best to elucidate the material, be warned that Quantum Mechanics can be both mathematically and conceptually difficult. The only way to become proficient is by solving a large number of problems, so expect to work hard. The intellectual rewards are however great.

In the precursor course Physics 480 we focused on the *postulates and formalism* of Quantum Mechanics. This semester, the focus will shift to common *applications* of Quantum Mechanics, and commonly used approximation methods

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<sup>1</sup> 1/26/2023 version

### Recitations

Will happen most weeks, and are taught by the TA/Grader. Fri 3:30-4:20 pm, in Wat 114

### Prerequisites

Physics 480.

### Required Materials

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

The class will also include material not in the main text book. You may benefit from also referencing other books. There are many books out there. I'd particularly recommend the book by Bransden & Joachain, which is also titled "Quantum Mechanics", Second Edition. Also check out "Introduction to Quantum Mechanics" by Griffiths, Second Edition or later.

### Homework

Weekly sets of written problems, and occasional reading assignments. Typically, written problems are due one week after assignment, and will be handed in at the beginning of class. Honest collaboration is encouraged, but the **material handed in must be your own work.**

### Cheating

**Utilizing homework solutions manual or similar help (e.g. websites that may provide you previous exams and homework solutions) will be considered cheating and will be reported.**

### Learning Goals

- You don't have to know everything in the book.
- You should understand and will be tested on all *material presented in class and/or covered in homeworks.*
- 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.
- A more detailed, lecture-level list of concepts will also be developed during the semester.

### Evaluation (may be revised – preliminary plan)

Quizzes & Class Participation	10%
Homework	20%
Midterm I	20%
Midterm II	20%
Final exam	30%

### 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. This semester, I plan to cover chapters 8 through 14, nominally using the schedule shown on page xvii in the preface of the textbook, but I will adjust the pace as needed. I expect to substitute scattering and some particle physics for chapters 15 and 16. **I will distribute a list that shows the planned topic for every class of the semester.**