

## Physics 462/Math 411 Spring Semester 2023

Quantum Mechanics II (3 credits)

**Physics 462:** This course meets the Bachelor of Sciences Honours (majors in Physics) degree requirements.

### Course Prerequisites and Goals:

(Phys-461)

The course of Phys-462 (Advanced Quantum physics) is for senior undergraduate students.

The course will be offered (at FCC campus) during the winter-spring semester.

### Course Objectives:

In Physics 462, the emphasis is on learning both by solving application problems, and by listening to lectures. The intended audience is students majoring in Physics. Prior training in physical science is assumed (indicated in the prerequisites), and we will try to achieve a qualitative and, insofar as possible, a quantitative understanding of the systems we study. We will achieve this by direct problem solving and relevant analysis, and by learning advanced principles specifically including those reached as a result of advanced mathematical tools.

### Course content:

This course deals with quantum mechanics; studying Matrix Mechanics, Vector spaces, Linear Operators and Perturbation theory.

Students attend three lectures/class activity periods per week. Use of a combination of lecture activity and traditional learning exercises will be used in classroom settings. Course evaluation is based on a blend of regular homework sets and/or quizzes, midterm and final exams and other evaluative tools.

### Learning outcomes:

This course is designed to provide students desirous of majoring in Physics advanced knowledge and practices in the principles described above, as well as their applications, and to enhance their conceptual understanding of physical laws. The special role played by linear systems will be a theme of this course, culminating in the treatment of continuous systems, and providing a transition to electrodynamics.

**Duration:** one semester 16 weeks including examinations and preparation time

**Contact time:** Three lessons/hours per week.

### Break up of marks/credits

	<u>% credit/marks</u>
Quizzes	10
Assignments / tests / participation / project work etc.	30
Mid-term test/examination	20
Final examination	<u>40</u>
<b>Total</b>	<b>100</b>

### Minimum attendance requirement: 67%.

**Note:** *All examination, tests and assignments shall be cumulative, i.e. may or may not contain material from previous assignments and tests.*

**Attendance is mandatory**, and will be recorded. Homework assignments can be done in teams, but all team members MUST turn in an individual set of homework solutions neatly written or typed. Late homework will NOT be accepted unless it is accompanied by proof of an extenuating circumstance.

Note: 1. Absences will be approved ONLY in the case of extenuating circumstances (a submitted copy of a doctor's certificate, etc., is REQUIRED as proof). Non-approved absences will erode your course grade dependant upon number of violations.

2. There are NO makeup exams.

**Required texts:**

**David J. Griffith**, Introduction to Quantum Mechanics, ISBN 0-13-124405 (1994).

John. L. Pawell and Bernd Crasemann, Quantum Mechanics ISBN 81-85198-02-0 (Addison Wesley reprinted 1998)

**Suggested reading**

Richard L. Liboff, Introduction to Quantum Mechanics (Fourth Edition)

Leonard I. Schiff, Quantum Mechanics

**Syllabus**

<b>Week</b>	<b>Chapter</b>	<b>Articles/Topics</b>
1	4	4.1
2	4	4.1
3	4	4.2
4	4	4.3
5	4	4.3,4.4
6	4	4.4
7	5	5.1,5.2
8	<b>Mid Term Examination</b>	
9	5	5.3
10	5	5.4
11	6	6.1
12	6	6.2
13	6	6.3-6.4
14	9	9.1
15	9	9.2
16	<b>Final Examination</b>	

**Required Work:**

- Attend ALL classes. Arrive on time and stay the entire period.
- Read all assignments, and submit all homework on time.
- Take both exams.
- Explore, be attentive, interact - pose questions to each other and figure things out.

**Homework Assignments and Collaboration Policy**

Homework assignments constitute an important part of the course. Collaboration on homework assignments is encouraged, provided the collaboration involves roughly the same amount of give and take. However, students may submit only their own work for grading and this work must be written solo, without copying from any other sources. Students are on their honour to adhere to this policy. Copying plagiarism and submission of work not one's own will result in a penalty the minimum of which is a zero grading for that particular task.

Collaboration on quizzes and tests is not permitted.