

**Lectures:** MWF 11:00 - 11:50 in Wright 114

**Instructor:** Mr. FitzGerald: Ph: x-8334  
Office: Wright 217 or Wright Basement 016  
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**Problem Session:** Wednesday Evening 8:00 – 9:00

**Textbooks:**

*Required:* Introduction to Quantum Mechanics by David J. Griffiths 2<sup>nd</sup> Edition  
There are dozens of books in the library on quantum mechanics. Attached is a list of 5 that I have put on reserve in the science library.

**Course Description**

Quantum mechanics is quite simply the most successful theoretical model the human species has ever devised. Theory and experiment have been found to agree (over and over again) on a whole range of different systems to an amazing level of precision. Quantum mechanics has made many theoretical predictions that at first seemed bizarre but have always been confirmed by experiment. The goal of this course is to introduce you to the tools of quantum mechanics and to show you how to use them on real world systems.

Why quantum mechanics works so well and what it all means is a much more subtle question that we will touch on only briefly.

**Grades:**

1 <sup>st</sup> midterm (take home Oct 7 -10)	20 %
2 <sup>nd</sup> midterm (take home Nov 11 -14)	20 %
Final Exam	25 %
Weekly Problem sets	20 %
In-class presentation and class participation	15 %

**Exams:**

The midterm and final exams will be take home and open book. All three exams will be 2 hours in length.

**Problem Sets:**

In general problem sets are handed out on Friday and due the following Friday. You get to miss/drop one problem set for the semester. Do not ask for any extensions.

**In-class Presentation**

These will consist of a 10-15 minute oral presentation, with 5 minutes for questions afterwards. Presentations will be made by pairs of students and should cover a topic in quantum mechanics. You should also prepare a one-page handout to accompany your talk. This should summarize the calculations and derivations used in your talk and will be distributed to the class. The topic is of your own choosing. American Journal of Physics articles are a good place to start for inspiration.

**Course Topics:** A tentative list of topics and the schedule.

Dates	Topics
Sep 7, 9	Ch. 1. Schrodinger Eq. & The Wave Function
Sep 12,14, 16	Ch. 1. Normalization & Momentum Ch. 2. Schrodinger (time independent) & Stationary states
Sep 19, 21, 23	Ch. 2. Infinite square well & SHO
Sep 26, 28, 30	Ch. 2. Free Particle, Delta-Function, & Finite well
Oct 3, 5, 7	Ch. 3. Linear Algebra and Function space
<b>1<sup>st</sup> Midterm Exam</b>	
Oct 10, 12, 14	Ch. 3. Uncertainty Principle & Ch. 4. 3-d
Oct 17, 19, 21	Ch. 4. Spherical Coordinates & The Hydrogen Atom
<b>Fall Recess</b>	
Oct 31, 2, 4	Ch. 4. Angular Momentum & Spin
Nov 7, 9, 11	Ch. 5. Identical Particles, Solids, & Quantum Statistics
<b>2<sup>nd</sup> Midterm Exam</b>	
Nov 14, 16, 18	Ch. 5 Hydrogen Molecule & Ch. 6. Perturbation Theory
Nov 21, 23,	Ch. 6. Fine structure & Zeeman Effect
Nov 28, 30, 2	Ch. 6 Hyperfine splittings
Dec 5, 7, 9	Special topics and student presentations
Dec 12, 14, 16	Special topics and student presentations

**HONOR CODE:**

Oberlin take's the honor code **very** seriously, and expect the same of its students. You should all be familiar with the honor code (available at [http://www.oberlin.edu/~stlife/Honor\\_Code/Honor\\_Code.html](http://www.oberlin.edu/~stlife/Honor_Code/Honor_Code.html)), and expect your professors to describe its application on their syllabi. In particular, it is essential that you write and sign the honor code on all work you hand in for this class. The Honor Code reads: "I affirm that I have adhered to the Honor Code on this assignment."