Syllabus

People:

Prof. Raymond Frey  |  rayfrey@uoregon.edu (mailto:rayfrey@uoregon.edu)  |  web page (https://pages.uoregon.edu/rayfrey)

TA: Justin Kittell  |  jkittell@uoregon.edu (mailto:jkittell@uoregon.edu)

Classes:

Tu, Th 2:15-3:45 on Zoom:

<table>
<thead>
<tr>
<th>Day</th>
<th>Time</th>
<th>Zoom link</th>
<th>password</th>
</tr>
</thead>
</table>
| Tuesday   | 2:15  | https://uoregon.zoom.us
  /j/96253840046?pwd=UDBxUFdybUxoMGFLZHFBCXhuR2s5QTo9       | 7v522i   |
| Thursday  | 2:15  | https://uoregon.zoom.us
  /j/96253840046?pwd=UDBxUFdybUxoMGFLZHFBCXhuR2s5QTo9       | 7v522i   |

Office hours:

- Tuesdays 4:00  |  Zoom link  (https://uoregon.zoom.us
  /j/97002228341?pwd=OHpWYWIbS2FLQzVZZzE5SEZrRFpaQTo9)  |  password:  4o685i
- Fridays 2:00   |  Zoom link  (https://uoregon.zoom.us
  /j/91840938276?pwd=NzBDcGhWNGZ2aVpyQk5IMIiZNNFNdz09)  |  password:  6d517p

Course Objectives:

The primary goal of the course is provide the mathematical background necessary for a 400-level or graduate course in quantum mechanics. We will illustrate the topics with examples from quantum mechanics and other areas of physics.

We will start by covering the linear algebra of finite spaces. We will then move to the heart of the course: Vector spaces of functions and how a certain class of differential equations - those often appearing in physics - are connected to the function spaces. Finally, we will cover Fourier transforms and a quick overview of some important applications of complex analysis.

Main Topics:
The Canvas modules are organized according to the major topics we will study:

- Linear algebra of vector spaces: ordinary and function
- Linear operators and their properties
- Sturm-Liouville systems
- Eigenvalue equations
- Inhomogeneous differential eqns. and Green's functions
- Integral Transforms, esp. Fourier transforms and properties
- Cauchy's theorem and contour integration

**Textbook:**


The UO Price Science Library has attained a license for the e-book. You can view it or download pdf files of the book by following this link: [e-book](https://alliance-primo.hosted.exlibrisgroup.com/permalink/f/3ua1r/CP71340949590001451)

The text is also available from the UO Bookstore. It looks like [this](https://canvas.uoregon.edu/courses/174052/pages/syllabus?module_item...). It is expensive for a one-term course, but is an excellent reference which you will probably want to hold on to. The [publisher](https://www.elsevier.com/books/mathematical-methods-for-physicists/arfken/978-0-12-384654-9) also offers an e-book.

**Course assignments:**

- Homework: We will have (typically) weekly homework assignments. Assignments are to be turned in via this Canvas site as pdf files. Normally, students will provide their (legible!) work on paper and then scan it in some way for upload. Solutions will be provided.
- Exams: A midterm and a final exam.

**Grading:**

- Homework: 50%
- Midterm exam: 20%
- Final exam: 30%

You can monitor scores in the Canvas grade book.

**Late policy:** Unless excused in advance, late homework will be assessed a penalty of 10% for each late day.

Exams:

- Midterm Exam: TBD
• Final Exam: Thursday, March 18, 12:30-14:30

**Accessibility:**

The University of Oregon is working to create inclusive learning environments. Please notify me if there are aspects of the instruction or design of this course that result in disability-related barriers to your participation. You are also encouraged to contact the Accessible Education Center at 541-346-1155 or uoaec@uoregon.edu.

**Expect and Respect Diversity:** All classes at the University of Oregon welcome and respect diverse experiences, perspectives, and What is not welcome are behaviors or contributions that undermine, demean, or marginalize others based on race, ethnicity, gender, sex, age, sexual orientation, religion, ability, or socioeconomic status. We will value differences and communicate disagreements with respect. We may establish more specific guidelines and protocols to ensure inclusion and equity for all members of our learning community.

**Academic Integrity:**

The [University Student Conduct Code](https://dos.uoregon.edu/conduct) defines academic misconduct, which includes unauthorized help on assignments and examinations and the use of sources without acknowledgment. Academic misconduct is prohibited at UO. I will report misconduct to the Office of Student Conduct and Community Standards—consequences can include failure of this course.

Homework and exams are open book and notes. You are welcome to discuss the homework with your classmates, but the work you submit must be your own.