

**Physics 309**  
**Quantum Mechanics**

- Class: MWF 3:00 - 3:50pm, D-212
- Professor: G.P.Gilfoyle; Office: Gottwald Science Center, D-110, phone: 804-289-8255; email: ggilfoyl@richmond.edu; Office hours: MWF 10:20-11:20 am, T 10:30-11:30 am, T 3:30-4:30 pm. Other times are when you catch me.
- Objective: To gain an understanding of the fundamentals of quantum mechanics.
- Textbook: **Introductory Quantum Mechanics, 4th ed.** by Richard L. Liboff (required); **Mathematical Handbook** by M.R.Spiegel, Schaum's Outline Series (recommended), and **Physics for Scientists and Engineers, 4th ed.** by Knight (recommended).
- Software: *Mathematica*, (required) (to download go to <http://is.richmond.edu/hardware-software/software/specialty/mathematica.html>).
- Webpage: <https://facultystaff.richmond.edu/~ggilfoyl/qm.html>.
- Prerequisites: Physics 260 or Chemistry 310 or permission of the Department.
- Course Work: Each class meeting will consist of some combination of lecture, demonstration, computational laboratory work, or student presentation.
- Attendance: Attendance at all classes is expected. Unexcused absences will result in a grade of zero for any missed activity. Excessive absences will lower the final grade. An excused absence is one given by the dean, a doctor, a department, or the instructor for what is deemed to be sufficient reason provided there is adequate advanced warning (one day). A student is responsible for all work missed during an absence.
- Grading: Grades will be computed on the following basis:
- |            |                               |
|------------|-------------------------------|
| Homework   | 40%                           |
| Tests      | 30% (15% for each of 2 tests) |
| Final Exam | 30% (Dec 13, 2 pm)            |
- Make-up tests and laboratories will not be administered. If a test is missed for an excused absence the next test will count more heavily to make up the loss.
- Homework: Homework will be assigned regularly, but only a fraction will be collected. Exams are based on these assignments. Unexcused, late, homework submissions will be reduced by one point if not handed in during the appropriate class period. An additional point will be subtracted for each subsequent day late. Late submissions will be excused only at the discretion of the instructor.
- Homework assignments will be listed on the course webpage (see above).
- You are encouraged to discuss the homework with others, but any work handed in must be entirely your own to receive full credit.
- Exams: Tests and exams will consist of short-answer questions and problems.

## Attendance Policy

Students should attend all classes for the full period. Those who are sick should not attend class and should inform the instructor in a timely fashion. Excessive, unexcused absences will be penalized. An excused absence is given by the instructor for sufficient reason provided there is adequate warning in a timely fashion.

- Make-up tests, quizzes, and labs will not be administered. If an activity is missed due to an excused absence the next activity will count extra to make up the loss. Unexcused absences will result in a grade of zero. The student is responsible for all missed work.
- Students must:
  - Notify instructors in advance of the absence if possible.
  - Contact the Student Health Center if sick.
  - Keep up with classwork if they are able to do so.
  - Submit assignments on time whenever possible.
  - Work with their instructors to try to reschedule any missed assignments.
  - Stay in close communication with their instructors.
- This attendance policy puts everyone on their honor. Falsely reporting a reason for an absence is an honor code violation.

## Honor Code

This course is taught in accordance with the University of Richmond Honor Code, which can be accessed **here**. For each test and quiz you are required to sign a pledge to neither give nor receive unauthorized assistance during the completion of the work. You can work together on homework and problem sets, but each student must contribute to the group and materials turned in for evaluation must represent your own understanding. You are expected to treat everyone with respect.

## Diversity and Inclusion

The University of Richmond is committed to developing a diverse workforce and student body and to modeling an inclusive campus community which values the expression of differences in ways that promote excellence in teaching, learning, personal development and institutional success: **inclusion.richmond.edu**.

## Homework Assignments

A VERY effective way to study physics is to do the homework as the material is covered in class and then do additional problems when you study for an exam. See the course website below for the latest updates on assigned homework problems.

<https://facultystaff.richmond.edu/~ggilfoyl/qm/homework309.html>

Electronic copies of the problems are linked to the homework assignment page. Solutions for those assigned problems can also be found on the course website at the appropriate time usually the week after they are assigned. The problems and solutions are password-protected and are solely for the use of students in Physics 309 and are not be shared with people outside this class. The solutions, in particular, are not be downloaded, printed, or archived in any way. Sharing, saving, or archiving these solutions are Honor code violations.

The sections on the website refer to the text **Physics for Scientists and Engineers** (4th edition) by Knight.

## Help With Physics Homework

If you have trouble with homework help is available from me during my office hours (see page 1 of this syllabus) and at other times when I'm available. A list of the services at the Academic Skills Center (<http://asc.richmond.edu>, 289-8626 or 289-8956) is at the following address along with other information.

<http://asc.richmond.edu>

## Course Webpage

This syllabus and the other course materials can be found on the Phys 309 webpage at the following address.

<https://facultystaff.richmond.edu/~ggilfoyl/qm.html>

You can also find this link on the Blackboard page for Physics 309.

**Physics 309 Schedule**  
**Fall, 2024**

Date	Topic (Chapter)	Date	Topic (Chapter)
Aug 26	Experimental Foundations (1-2)	Oct 21	Spring Break
28	"	23	"
30	The Postulates (2-3)	25	"
Sep 2	MLK Day	28	The CO Spectrum (7)
4	The Postulates (2-3)	30	"
6	"	Nov 1	"
9	Rules of the Game I (4)	4	Solar Fusion (7)
11	"	6	"
13	"	8	"
16	"	11	Radioactive Decay (7)
18	Uncertainty	13	"
20	"	15	"
23	"	18	"
25	Rules of the Game II (5)	20	Test 2
27	"	22	The CO rotator
30	"	25	"
Oct 2	Test 1	27	"
4	Time Development (6)	29	"
7	"	Dec 2	"
9	"	4	"
11	"	6	"
14	The CO Spectrum (7)		
16	"		
18	"		

**Final Exam:** Friday, Dec 13, 2 pm - 5 pm.

## SYLLABUS INSERT REGARDING ACADEMIC AND PERSONAL SUPPORT SERVICES

Hope N. Walton, Director Academic Skills

Below is a boxed statement that describes the services available from the Weinstein Learning Center and other resources. We recommend that you consider including this boxed statement in your course syllabus, on Blackboard, or perhaps on a separate handout. Of course, other support services that relate specifically to your course can also be added.

Staff members from the resources below are available for consultations about concerns related to students as well as issues related to services.

### Weinstein Learning Center

**Academic Skills Center** ([asc.richmond.edu](http://asc.richmond.edu)): Academic coaches assist students in assessing and developing their academic and life-skills (e.g., critical reading and thinking, information conceptualization, concentration, test preparation, time management, stress management, etc.). Peer tutors offer assistance in specific subject areas (e.g., calculus, chemistry, accounting, etc.) and will be available for appointments in-person and virtually. Peer tutors are listed on the ASC website. **Email Roger Mancastroppa** ([rmancast@richmond.edu](mailto:rmancast@richmond.edu)) and **Hope Walton** ([hw Walton@richmond.edu](mailto:hw Walton@richmond.edu)) for coaching appointments in academic and life skills.

**English Language Learning** assists multi-lingual and international students in honing their language, academic, and/or intercultural skills. Among other available services for students are one-on-one tutoring, group workshops, and semester-long classes on writing and U.S. culture. **Please contact Dr. Bohon, Director of English Language Learning, at** [Leslie.Bohon@Richmond.edu](mailto:Leslie.Bohon@Richmond.edu) for more information and appointments.

**Quantitative Resource Center:** ([qrc.richmond.edu](http://qrc.richmond.edu)): Provides services related to quantitative and computational learning across the curriculum through tutoring, consultation and training.

**Speech Center:** ([speech.richmond.edu](http://speech.richmond.edu)): Assists with preparation and practice in the pursuit of excellence in public expression. Recording, playback, coaching and critique sessions are offered by teams of trained student consultants. During scheduled [appointments](#), consultants assist in developing ideas, arranging key points for more effective organization, improving style and delivery, and handling multimedia aids for individual and group presentations. We look forward to meeting your public speaking needs.

**Technology Learning Center:** ([tlc.richmond.edu](http://tlc.richmond.edu)): The TLC is a staffed public lab dedicated to supporting digital media projects. Services include camera checkout, video/audio recording assistance, virtual reality, poster printing, 3D printing and modeling. The TLC is located on the second floor of Boatwright Library.

**Writing Center** ([writing.richmond.edu](http://writing.richmond.edu)): Assists writers at all levels of experience, across all majors. Students can attend [walk-in hours](#) at Boatwright Library (room 171A) with trained writing consultants who offer friendly critiques of written work.

### Other Campus Services

**Boatwright Library Research Librarians:** ([library.richmond.edu/help/ask/](http://library.richmond.edu/help/ask/) or 289-8876): Research librarians help students with all steps of their research, from identifying or narrowing a topic, to locating, accessing, evaluating, and citing information resources. Librarians support students in their classes across the curriculum and provide individual appointments, class library instruction, tutorials, and [research guides](#) ([libguides.richmond.edu](http://libguides.richmond.edu)). Students can [contact an individual librarian](#) ([library.richmond.edu/help/liaison-librarians.html](http://library.richmond.edu/help/liaison-librarians.html)) or ASK a librarian for help via email ([library@richmond.edu](mailto:library@richmond.edu)), text (804-277-9ASK), or [chat](#) ([library.richmond.edu/chat.html](http://library.richmond.edu/chat.html)).

**Career Services:** ([careerservices.richmond.edu](http://careerservices.richmond.edu) or 289-8547): Can assist you in exploring your interests and abilities, choosing a major or course of study, connecting with internships and jobs, and investigating graduate and professional school options. We encourage you to update your profile in [Handshake](#) and schedule an appointment with a career advisor early in your time at UR.

**Counseling and Psychological Services:** ([caps.richmond.edu](http://caps.richmond.edu) or 289-8119): Assists currently enrolled, full-time, degree-seeking students in improving their mental health and well-being, and in handling challenges that may impede their growth and development. Services include brief consultations, short-term counseling, skills-building classes, therapy groups, crisis intervention, psychiatric consultation, and related services.