



**FLORIDA
ATLANTIC
UNIVERSITY**

**COURSE CHANGE REQUEST
Undergraduate Programs**

Department Physics
College Science

UUPC Approval 3/27/23
UFS Approval _____
SCNS Submittal _____
Confirmed _____
Banner Posted _____
Catalog _____

Current Course Prefix and Number PHY 4604

Current Course Title Quantum Mechanics 1

Syllabus must be attached for ANY changes to current course details. See [Template](#). Please consult and list departments that may be affected by the changes; attach documentation.

Change title to:

Change description to:

Change prefix

From: _____ **To:** _____

Change course number

From: _____ **To:** _____

Change credits*

From: 4 **To:** 3

Change grading

From: _____ **To:** _____

Change WAC/Gordon Rule status**

Add Remove

Change General Education Requirements***

Add Remove

**See [Definition of a Credit Hour](#).*

***WAC/Gordon Rule criteria must be indicated in syllabus and approval attached to this form. See [WAC Guidelines](#).*

****GE criteria must be indicated in syllabus and approval attached to this form. See [Intellectual Foundations Guidelines](#).*

Change prerequisites/minimum grades to:

Change corequisites to:

Nothing

from: PHZ 4113

Change registration controls to:

Please list existing and new pre/corequisites, specify AND or OR and include minimum passing grade (default is D-).

Effective Term/Year for Changes: Fall 2023

Terminate course? Effective Term/Year for Termination:

Faculty Contact/Email/Phone Korey Sorge / ksorge@fau.edu / 7-3380

Approved by

Date

Department Chair _____

3-21-23

College Curriculum Chair _____

3-21-23

College Dean _____

3-21-23

UUPC Chair _____

3/27/23

Undergraduate Studies Dean _____

3/27/23

UFS President _____

Provost _____

Email this form and syllabus to mjenning@fau.edu seven business days before the UUPC meeting.

PHY 4604-001
Quantum Mechanics 1

TR 4:00 – 5:20
3 credits

Semester, Year
Prof. XXXXX YYYYY
Office: XXXXXX
Office hours: MWF 11-12
Classroom: XXXX
Telephone: 561-297-XXXX
Email: zzzzz@fau.edu



| | |
|--------------|-------------------|
| TA name | xxxxxx xxxxxxxxx |
| Office | xxxxxx |
| Office hours | MWF xx:xx – xx:xx |
| Telephone | 561-297-xxxx |
| Email | xxxxxx@fau.edu |

Catalog Description

This course introduces the modern theory of quantum mechanics. It studies both wave and matrix mechanics as well as their interrelation in the modern theory. Applications studied include particle systems, the simple harmonic oscillator, and the hydrogen atom.

Instructional Method

In-Person: Traditional concept of in person. Mandatory attendance is at the discretion of the instructor.

Prerequisites / Corequisites

Prerequisite: PHY 3101C
Corequisite: None

Course Objectives/Student Learning Outcomes

- To understand operation of the time-independent and the time-dependent Schrodinger equation.
- To understand the results of standard “well” problems in 1 dimensional systems.
- To understand the structure of the hydrogen atom.
- To understand the principle behind Dirac notation.

Course Evaluation Method

- **Homework (30%)** – Collaboration on homework is permitted, even encouraged, but copying is of course not allowed.
- **Midterm Exam (20%)** – Will be in-class, and is open book and open note. No collaboration is allowed, but you can ask me questions.
- **Final Exam (30%)** – Will be take-home, and is open book and open note. No collaboration is allowed, but you can ask me questions.
- **In-class Group Projects (10%)** – If you cannot attend, make up is possible, though it is not guaranteed you will be able to work in a group in that case.
- **Presentation or Report on a Primary Source Article (10%)** - I will give a list of original articles in the foundations of modern physics, and you can choose from those, or you can suggest another. You will be required to either give a 10-20 minute in-class presentation on the chosen article or submit a 4-5 page (double spaced) report on it. The report or presentation should include a summary of the article contents and what you found surprising or interesting. You will be graded on how well you show that you understand the key point(s) of the article. I strongly encourage students to freely ask me for help always, but especially for this assignment – understanding articles can be difficult even for experts.

Course Grading Scale

| | |
|--------|----|
| >94% | A |
| 90-94% | A- |
| 87-90% | B+ |
| 84-87% | B |
| 80-84% | B- |
| 77-80% | C+ |
| 74-77% | C |
| 70-74% | C- |
| 67-70% | D+ |
| 64-67% | D |
| 60-64% | D- |
| <60% | F |

Policy on Makeup Tests, Late Work, and Incompletes (if applicable)

- **Make-up Policy:** Make-up exams are possible only with a documented, exceptionally good, excuse, with forewarning given me when possible.
- **Policy on Late Homework:** For each class period late, there will be a 15% penalty, up to a maximum 30% penalty. Late homework turned in after the final exam due date might not be accepted. (Thus, no matter how late the homework, as long as it is turned in by the final exam due date, not more than 30% will be taken off.)
- **Extra Credit:** I may designate certain homework problems or problems on exams as extra credit. This is the only extra credit in the course.

Classroom Etiquette Policy

University policy on the use of electronic devices states: “In order to enhance and maintain a productive atmosphere for education, personal communication devices, such as cellular telephones and pagers, are to be disabled in class sessions.”

Policy on the Recording of Lectures (optional)

Students enrolled in this course may record video or audio of class lectures for their own personal educational use. A class lecture is defined as a formal or methodical oral presentation as part of a university course intended to present information or teach students about a particular subject. Recording class activities other than class lectures, including but not limited to student presentations (whether individually or as part of a group), class discussion (except when incidental to and incorporated within a class lecture), labs, clinical presentations such as patient history, academic exercises involving student participation, test or examination administrations, field trips, and private conversations between students in the class or between a student and the lecturer, is prohibited. Recordings may not be used as a substitute for class participation or class attendance and may not be published or shared without the written consent of the faculty member. Failure to adhere to these requirements may constitute a violation of the University’s Student Code of Conduct and/or the Code of Academic Integrity.

Attendance Policy

Students are expected to attend all of their scheduled University classes and to satisfy all academic objectives as outlined by the instructor. The effect of absences upon grades is determined by the instructor, and the University reserves the right to deal at any time with individual cases of non-attendance. Students are responsible for arranging to make up work missed because of legitimate class absence, such as illness, family emergencies, military obligation, court-imposed legal obligations or participation in University-approved activities. Examples of University-approved reasons for absences include participating on an athletic or scholastic team, musical and theatrical performances and debate activities. It is the student’s responsibility to give the instructor notice prior to any anticipated absences and within a reasonable amount of time after an unanticipated absence, ordinarily by the next scheduled class meeting. Instructors must allow each student who is absent for a University-approved reason the opportunity to make up work missed without any reduction in the student’s final course grade as a direct result of such absence.

Counseling and Psychological Services (CAPS) Center

Life as a university student can be challenging physically, mentally and emotionally. Students who find stress negatively affecting their ability to achieve academic or personal goals may wish to consider utilizing FAU's Counseling and Psychological Services (CAPS) Center. CAPS provides FAU students a range of services – individual counseling, support meetings, and psychiatric services, to name a few – offered to help improve and maintain emotional well-being. For more information, go to <http://www.fau.edu/counseling/>

Disability Policy

In compliance with the Americans with Disabilities Act Amendments Act (ADAAA), students who require reasonable accommodations due to a disability to properly execute coursework must register with Student Accessibility Services (SAS) and follow all SAS procedures. SAS has offices across three of FAU's campuses – Boca Raton, Davie and Jupiter – however disability services are available for students on all campuses. For more information, please visit the SAS website at www.fau.edu/sas/.

Code of Academic Integrity

Students at Florida Atlantic University are expected to maintain the highest ethical standards. Academic dishonesty is considered a serious breach of these ethical standards, because it interferes with the university mission to provide a high quality education in which no student enjoys an unfair advantage over any other. Academic dishonesty is also destructive of the university community, which is grounded in a system of mutual trust and places high value on personal integrity and individual responsibility. Harsh penalties are associated with academic dishonesty. For more information, see [University Regulation 4.001](#).

Required Texts/Readings

- DJ Griffiths, “Introduction to Quantum Mechanics” (Third Edition)

Course Topical Outline

| Dates | Topic | Assigned Reading |
|---------------------|---|-------------------------|
| Week 1 | The Wavefunction and Wave Variables | Chapter 1 |
| Week 2 | Time-independent Schrodinger Eqsn | Chapter 2 |
| Week 3 | Harmonic Oscillators and Wells | Chapter 2 |
| Week 4 | Hermitian Operators and the Uncertainty Principle | Chapter 3 |
| Week 5 | Dirac Notation | Chapter 3 |
| Week 6 | The Hydrogen Atom | Chapter 4 |
| Week 7 | Spin and Angular Momentum | Chapter 4 |
| Week 8 | Review and Midterm Exam | |
| Spring Break | | |
| Week 9 | Bosons and Fermions | Chapter 5 |
| Week 10 | The Periodic Table Band Structure | Chapter 5 |
| Week 11 | Symmetries and Conservation Laws | Chapter 6 |
| Week 12 | Perturbation Theory | Chapter 7 |
| Week 13 | Student Presentations | |
| Week 14 | Approximation Techniques | Chapters 8 and 9 |
| Final Exam | | |