

PHYS6336-001-1232

Quantum Mechanics II

PHYS 6336

Lecture Location/Time

Dallas Hall, rm 351, Tue & Thur., 3:30 - 4:50 pm.

Instructor Info:

Thomas Coan

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Office: 47 Fondren Science

Office hrs: 3-5 pm, Wed.

Text

Modern Quantum Mechanics, 3ed.

J.J.Sakurai and Jim Napolitano

Cambridge University Press

ISBN 978-1-108-47322-4

Grading Policy

Final grade will be a weighted mean of homework (70%) and test/exams (30%). You are encouraged to ask me throughout the semester how you are performing. Steady improvement through the semester will raise your grade above its raw weighted mean would imply.

Tentative Schedule Spring 2023

17 Jan Addition of angular momentum I

19 Jan Addition of angular momentum II

24 Jan Wigner-Eckart Theorem

26 Jan Symmetry in Quantum Mechanics I

31 Jan Symmetry in Quantum Mechanics II

2 Feb Approximation Methods: Time-Independent Perturbation Theory (TIPT)

7 Feb Approx Methods: TIPT & Degenerate Case

9 Feb Variational Methods

14 Feb Approx methods: Time-Dependent Potentials (TDP)

16 Feb TDP II; Hamiltonians w/ Extreme Time Dependence (Sudden & Adiabatic Approx)

21 Feb Applications: Interactions w/ Classical Radiation Field I

23 Feb Applications: Interactions w/ Classical Radiation Field II

28 Feb Scattering: Transition Rates & Cross Sections; Scattering Amplitude

2 Mar Scattering Amplitude II; Born Approximation

7 Mar Scattering: Phase shifts & Partial Waves I

9 Mar Scattering: Phase shifts & Partial Waves II

14 Mar **No Class.** Spring Break

16 Mar **No Class.** Spring Break

21 Mar Identical Particles & Permutation Symmetry

23 Mar Symmetrization Postulate

28 Mar Two-Electron System, He-atom

30 Mar Quantum Fields

4 Apr Quantization of Electromagnetic Field I

6 Apr Quantization of Electromagnetic Field II

11 Apr KG Equation I

13 Apr KG Equation II

18 Apr KG Field


20 Apr Dirac Equation I

25 Apr Dirac Equation II


27 Apr Dirac Equation III

Title IX and Disability Accommodations

Disability Accommodations

Students who need academic accommodations for a disability must first register with Disability Accommodations & Success Strategies (DASS). Students can call 214-768-1470 or visit [smu.edu/DASS](https://www.smu.edu/Provost/ProvostOffice/SAES/AcademicSupport/SASP/Services/DASS)  (<https://www.smu.edu/Provost/ProvostOffice/SAES/AcademicSupport/SASP/Services/DASS>) to begin the process. Once they are registered and approved, students then submit a DASS Accommodation Letter through the electronic portal, *DASS Link*, and then communicate directly with each of their instructors to make appropriate arrangements. Please note that accommodations are not retroactive, but rather require advance notice in order to implement.

Sexual Harassment

All forms of sexual harassment, including sexual assault, dating violence, domestic violence and stalking, are violations of SMU's Title IX Sexual Harassment Policy and may also violate Texas law. Students who wish to file a complaint or to receive more information about the grievance process may contact Samantha Thomas, SMU's Title IX Coordinator, at accessequity@smu.edu (<mailto:accessequity@smu.edu>) or 214-768-3601. Please note that faculty and staff are mandatory reporters. If students notify faculty or staff of sexual harassment, they must report it to the Title IX Coordinator. For more information about sexual harassment, including resources available to assist students, please visit [smu.edu/sexualmisconduct](https://www.smu.edu/SexualHarassment)  (<https://www.smu.edu/SexualHarassment>).

Pregnant and Parenting Students

Under Title IX, students who are pregnant or parenting may request academic adjustments by contacting the Office of Student Advocacy and Support by calling 214-768-4564. Students seeking assistance must schedule an appointment with their professors as early as possible, present a letter from the Office of the Dean of Students, and make appropriate arrangements. Please note that academic adjustments are not retroactive and, when feasible, require advance notice to implement.

Academic Policies

Religious Observance

Religiously observant students wishing to be absent on holidays that require missing class should notify their professors in writing at the beginning of the semester and should discuss with them, in advance, acceptable ways of making up any work missed because of the absence. [Click here for a list of holidays.](https://www.smu.edu/StudentAffairs/ChaplainandReligiousLife/ReligiousHolidays) [↗ \(https://www.smu.edu/StudentAffairs/ChaplainandReligiousLife/ReligiousHolidays\)](https://www.smu.edu/StudentAffairs/ChaplainandReligiousLife/ReligiousHolidays)

Medical-Related Absences

To ensure academic continuity and avoid any course penalties, students should follow procedures described by their instructors in order to be provided with appropriate modifications to assignments, deadlines, and exams.

Excused Absences for University Extracurricular Activities

Students participating in an officially sanctioned, scheduled university extracurricular activity should be given the opportunity to make up class assignments or other graded assignments that were missed as a result of their participation. It is the responsibility of the student to make arrangements for make-up work with the instructor prior to any missed scheduled examinations or other missed assignments. (See current [Catalog](https://catalog.smu.edu) [↗ \(https://catalog.smu.edu\)](https://catalog.smu.edu) under heading of "Academic Records/Excused Absences.")

Final Exams


Final course examinations shall be given in all courses where appropriate, and some form of final assessment is essential. Final exams and assessments must be administered as specified in the official examination schedule. Exams cannot be administered or due during the last week of classes or during the Reading Period. Syllabi must state clearly the form of the final exam or assessment, and the due date and time must match the official SMU exam schedule. Final exams are not required to be provided online.

Academic Dishonesty


Students are expected to embrace and uphold the [SMU Honor Code](https://www.smu.edu/StudentAffairs/StudentLife/StudentHandbook/HonorCode) [↗ \(https://www.smu.edu/StudentAffairs/StudentLife/StudentHandbook/HonorCode\)](https://www.smu.edu/StudentAffairs/StudentLife/StudentHandbook/HonorCode). Violations of the Honor Code will be acted upon in accordance with the policies and procedures outlined in the [Mustang Student Handbook](https://www.smu.edu/StudentAffairs/officeofthedeanofstudents/StudentHandbook) [↗ \(https://www.smu.edu/StudentAffairs/officeofthedeanofstudents/StudentHandbook\)](https://www.smu.edu/StudentAffairs/officeofthedeanofstudents/StudentHandbook).

Student Support Services


Student Academic Success Programs

Students needing assistance with writing assignments for SMU courses may schedule an appointment with the Writing Center through Canvas. Students who would like support for subject-specific tutoring or success strategies should contact SASP, Loyd All Sports Center, Suite 202; 214-768-3648; [smu.edu/sasp](https://www.smu.edu/sasp)  [. \(https://www.smu.edu/sasp\)](https://www.smu.edu/sasp).


Caring Community Connections Program

CCC is a resource for anyone in the SMU community to refer students of concern to the Office of the Dean of Students. The online referral form can be found at [smu.edu/deanofstudentsccc](http://www.smu.edu/deanofstudentsccc)  [. \(http://www.smu.edu/deanofstudentsccc\)](http://www.smu.edu/deanofstudentsccc). After a referral form is submitted, students will be contacted to discuss the concern, strategize options, and be connected to appropriate resources. Anyone who is unclear about what steps to take if they have concerns about students should contact the Office of the Dean of Students at 214-768-4564.

Mental Health Resources: On-Call and Ongoing Counseling Services

Throughout the academic year, students may encounter different stressors or go through life experiences which impact their mental health and academic performance. Students who are in distress or have concerns about their mental health can schedule a same-day or next-day appointment to speak with a counselor by calling [Counseling Services](https://www.smu.edu/StudentAffairs/DrBobSmithHealthCenter/Counseling-Services)  [. \(https://www.smu.edu/StudentAffairs/DrBobSmithHealthCenter/Counseling-Services\)](https://www.smu.edu/StudentAffairs/DrBobSmithHealthCenter/Counseling-Services). Counselors are available at any time, day or night for students in crisis at this number: 214-768-2277 (then select option 2) They will be connected with a counselor immediately. Students seeking ongoing counseling should call the same number (214-768-2277, then select option 1) during normal business hours to schedule an initial appointment.

Campus Carry Law

Do not blast people. In accordance with Texas Senate Bill 11, also known as the 'campus carry' law, and following consultation with entire University community, SMU chooses to remain a weapons-free campus. Specifically, SMU prohibits possession of weapons (either openly or in a concealed manner) on campus. For more information, please see: [smu.edu/campuscarrylaw](https://www.smu.edu/BusinessFinance/Police/Community-Resources/Campus-carry)  [. \(https://www.smu.edu/BusinessFinance/Police/Community-Resources/Campus-carry\)](https://www.smu.edu/BusinessFinance/Police/Community-Resources/Campus-carry).

