Course Outline

Course: Quantum Mechanics II Instructor: Dr Alakabha Datta Office: 209 Lewis Hall Meeting: MWF 11.00 am to 11.50 am, Lewis 104 Office Hours: By Appointment Email:datta@olemiss.edu, datta@phy.olemiss.edu Phone: (662) 915-5611 Course homepage: Check Blackboard.

Book : Modern Quantum Mechanics Third Edition J.J. Sakurai and Jim Napolitano



Many other books can be used as references:

Quantum Mechanics by E. Merzbacher.

Principles of Quantum Mechanics by R. Shankar.

Introduction to Quantum Mechanics by David J Griffiths. Quantum Mechanics by L. Schiff.

Quantum Mechanics by Claude Cohen Tannoudji

Quantum Mechanics by David H. McIntyre.

Quantum Mechanics with Basic Field Theory by Bipin R. Desai.

Course Goals: Learning to apply the basic postulates and rules of Quantum Mechanics learnt in QM 711 to solve problems in various areas of research.

Independent study: The course will also involve solving problems that will require students to research material on published journals to complete the project. The purpose of this is to help the student acquire skills to pursue independent research. The students will also complete a report on a topic of current research interest.

Marking:

Homework: 60 %

Mid Term Exam/ Midterm report: 15%

Final Exam: 25%

An overall course average of the following percentages will guarantee the corresponding letter grade:

90% A

80% B

70%	С
60%	D

Topics Covered in course:

Potentials and the E & M fields. Density matrix, Tensors.

Symmetries: Parity, Lattice and Time reversal transformation.

Time independent Perturbation Theory: Stark Effect, spin-orbit and Zeeman effect. Relativistic corrections. Lenard Jones potentials. Time dependent problems: Dyson Series, Dipole atomic transitions, Photoelectric effect. Identical particles and many particle system. Scattering, Dirac Equation.

Attendance: There is no attendance requirement. However if you miss an exam or cannot turn in HW on time because of illness I will require a doctor' note. If you will away on other reasons inform me prior to your absence and get a note if applicable. I might take random roll-call and give extra credits to students who have good attendance.

COVID INFORMATION

If you need to isolate due to contracting the coronavirus at any point this semester, you should do so, and email me as soon as possible. I will work with you to help you continue your progress in the course. More information on isolation protocols can be found at <u>https://coronavirus.olemiss.edu/</u>.

Quarantines are an important tool for controlling the spread of the virus. If you need to quarantine at any point this semester, you should do so, and email me as soon as possible. In your email, state how long you expect not to attend class. I [will/will not] be able to provide recordings of class sessions, and we can work together to establish a plan for completing the necessary work. You will have access to your texts, my course slides, and our Blackboard course site. More information on quarantine protocols can be found at <u>https://coronavirus.olemiss.edu/</u>.

Students attending the virtual component of hybrid or online courses are subject to the same attendance policy and procedures as traditional students. However, participation is defined in a different manner. The University's "Attendance Policy for Online Education" states: "Student attendance in online courses is defined as active participation in the course as described in the individual course syllabus." If students fail to meet online attendance requirements as stated in the syllabus, they will be given an absence.

Students are encouraged to visit the University's Keep Learning site https://keeplearning.olemiss.edu/ to access information and resources related to COVID-19 support. The site provides links to University student services to facilitate and support learning.

Students with diagnosed health concerns that may affect their compliance with COVID-19 health requirements should contact UM's Student Disability Services (SDS) Office https://sds.olemiss.edu/ to see if they are eligible for an SDS accommodation as soon as possible.

The University Counseling Center is a professional facility offered by the University of Mississippi to assist students, faculty, and staff with many types of life stressors that interrupt day-to-day functioning, including the stressors associated with the COVID-19 pandemic. They offer individual counseling, couple's counseling, group counseling, stress management, crisis intervention, assessments and referrals, outreach programs, consultations, and substance abuse services. There is no fee for currently enrolled University students and everything you say to your counselor is confidential. You can contact the Counseling Center for information about mental health issues at https://counseling.olemiss.edu, counslg@olemiss.edu, 662-915-3784, 320 Lester Hall, and

https://www.facebook.com/universitycounselingcenterolemiss/. You can schedule an appointment or get information about appointments by calling the UCC at 662-915-3784. Attendance Policies (Language in this section can be inserted into syllabus.) Student Support Services (Language in this section can be inserted into syllabus.) Updated Contact Information (Language in this section can be inserted into syllabus.)

The University must have accurate contact information, including cell phone numbers, to facilitate student communications and contact tracing. Students should check and update their University contact information available at https://olemiss.edu/mystudentprofile. Exams, tests, or quizzes exceeding 10% of the grade are not be given on the last three days of classes. Papers and projects (so long as due dates are in the syllabus) are allowed during these last three days, just not exams, tests, or quizzes. The Fall 2021 semester will end on Friday, Dec. 3, 2021. Thus, exams, tests, or quizzes exceeding 10% of the total grade) are not permitted on the Wednesday (Dec. 1), Thursday (Dec. 2), or Friday (Dec. 3) of that week.

All University visitors must follow COVID-19 emergency health and safety protocols.

Academic Integrity: We will follow the University's policy of academic integrity (M-book). Violations of these policies will result in a failing grade and other disciplinary actions. In particular you are not allowed the use of the Instructor's Solution Manual.