

PHYS 530B: QUANTUM MECHANICS II

SYLLABUS (2016 Fall)

Department of Physics, Southern Illinois University–Carbondale

Last updated: August 23, 2016

1 General information:

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Class meetings: TR 1:00-2:15 PM, in Neckers 410.

Office hours: MWF 10:00-11:30 AM; TR 11:00-11:45 AM.

2 Prerequisites:

Completed PHYS 530A, which introduced the mathematical foundations of quantum mechanics, harmonics oscillator, angular momentum, and hydrogen atom. Familiarity with the following topics will be assumed: vector space, complex variables, partial differential equations.

3 Course description

We shall cover the following topics: Zeeman and Stark effect, perturbation theory, scattering theory, Dirac equation.

References

1. Lecture notes for PHYS-530A Quantum Mechanics II (2014 Spring and 2016 Spring), available at <http://www.physics.siu.edu/~shajesh/tc/201401-SIU-P530A/> and <http://www.physics.siu.edu/~shajesh/tc/201601-SIU-P530A/>.
2. *Quantum Mechanics: Symbolism of Atomic Measurements*, by J. Schwinger, edited by B.-G. Englert.
3. Schwinger's Quantum Action Principle, by K. A. Milton, <http://arxiv.org/abs/1503.08091>.
4. *Introduction to Quantum Mechanics*, lecture notes by K. A. Milton, available at <http://www.nhn.ou.edu/~milton/p3803-12.html> and <http://www.nhn.ou.edu/~milton/p4803-12.html>.
5. *Quantum Mechanics*, by L. I. Schiff.
6. *Principles of Quantum Mechanics*, by R. Shankar.
7. *Quantum Mechanics*, by E. Merzbacher.
8. *Modern Quantum Mechanics*, by J. J. Sakurai.
9. *Quantum Mechanics*, by C. Cohen-Tannoudji, B. Diu, and F. Laloë.

Webpage

Lecture notes and homework will be posted at <http://www.physics.siu.edu/~shajesh>. It is advised to download relevant materials to your computer, because the website (or the internet) could be occasionally down.

4 Course work

Evaluation

Homework	30 %
Midterm Exams ($2 \times 20 \%$)	40 %
Final Exam	30 %

Homework

Homework will be assigned roughly every ten days. It will be available on the course webpage. Students are encouraged to discuss homework problems with their classmates, instructor, and anyone. But, each student should submit their own work describing detailed steps of thought process.

Exams

Four examinations (including the final exam) will be administered.

Midterm Exam 1	September 30 (Friday, in class)
Midterm Exam 2	November 4 (Friday, in class)
Final Exam	December 15 (Thursday, 12:30 PM-02:30 PM)

The midterm exams will assess you on concepts covered in lectures and homework. Midterm exams will be an hour-long exam. All the midterm exams will be cumulative, but you are recommended to concentrate more on topics covered in the later part of the semester.

Grading

The grading will be done on a scale of 0-100. This raw score should be used to assess your knowledge in the subject. The raw score will be converted to the university scale using the following formula

$$(\text{Your Score}) = \frac{(\text{Raw Score})}{2} + 50. \quad (1)$$

For example, a Raw Score of 60 will lead to Your Score of 80.

5 Syllabus Attachment

The Provost Office has created a “Syllabus Attachment” to assist the student. It lists and provides web links for many elements that are important for a student. Kindly find it attached.

IMPORTANT DATES *

Semester Class Begins:	08/22/2016
Last day to add full-term course (without Dean's signature):	08/28/2016
Last day to withdraw from the University with a full refund:	09/02/2016
Last day to drop a full-term course for a credit/refund:	09/04/2016
Deadline to apply to graduate at the end of this term:	09/16/2016
Last day to drop a full-term course (W grade, no refund):	10/30/2016
Final examinations:	12/12–12/16/2016
Commencement:	12/17/2016

Note: For more detailed information on the above deadlines, please visit <http://registrar.siu.edu/calendars>. For add/drop dates that apply to shorter-than-full-term courses, please look at the Schedule of Classes search results at <http://registrar.siu.edu/schedclass/index.php>

FALL SEMESTER HOLIDAYS

Labor Day Holiday 09/05/2016
Fall Break 10/08—10/11/2016
Veterans Day Holiday 11/11/2016
Thanksgiving Vacation 11/23—11/27/2016

WITHDRAWAL POLICY ~ Undergraduate only

Students who officially register for a session must officially withdraw from that registration in a timely manner to avoid being charged as well as receiving a failing grade for those classes. An official withdrawal must be initiated by the student, or on behalf of the student through the academic unit, and be processed by the Registrar's office. For the proper procedures to follow when dropping courses and when withdrawing from SIU visit: <http://registrar.siu.edu/students/withdrawal.php>

INCOMPLETE POLICY ~ Undergraduate only

An INC grade may be assigned when, for reasons beyond their control, students engaged in passing work are unable to complete all class assignments for the course. An INC must be changed to a completed grade within one full semester (undergraduates), and one full year (graduate students), from the close of the term in which the course was taken or graduation, whichever occurs first. Should the student fail to complete the remaining course requirements within the time period designated, the incomplete will be converted to a grade of F and such grade will be computed in the student's grade point average. For more information visit:

<http://registrar.siu.edu/grades/incomplete.php>

REPEAT POLICY

An undergraduate student may, for the purpose of raising a grade, enroll in a course for credit more than once. For students receiving a letter grade of A, B, C, D, or F, the course repetition must occur at Southern Illinois University Carbondale. Effective for courses taken Summer 2013 or later, only the most recent (last) grade will be calculated in the overall GPA and count toward hours earned.

This policy will be applied to all transferrable credit in that only the last grade will be used to calculate grade point average. Only those courses taken at the same institution are considered repeats under this policy. See full policy at

<http://registrar.siu.edu/students/repeatclasses.php>

GRADUATE POLICIES

Graduate policies often vary from Undergraduate policies. To view the applicable policies for graduate students, please refer to the graduate catalog at

<http://gradschool.siu.edu/about-us/grad-catalog/>

DISABILITY POLICY

Disability Support Services provides the required academic and programmatic support services to students with permanent and temporary disabilities. DSS provides centralized coordination and referral services. To utilize DSS services, students must contact DSS to open cases. The process involves interviews, reviews of student-supplied documentation, and completion of Disability Accommodation Agreements.

<http://disabilityservices.siu.edu/>

PLAGIARISM

Student Conduct Code <http://srr.siu.edu/student-conduct-code/>

Guidelines for Faculty http://pvcaa.siu.edu/_common/documents/Plagiarism/Guide%20to%20Preventing%20Plagiarism.pdf

SAFETY AWARENESS FACTS AND EDUCATION

Title IX makes it clear that violence and harassment based on sex and gender is a Civil Rights offense subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories such as race, national origin, etc. If you or someone you know has been harassed or assaulted, you can find the appropriate resources here:

<http://safe.siu.edu>

SALUKI CARES

The purpose of Saluki Cares is to develop, facilitate and coordinate a university-wide program of care and support for students in any type of distress—physical, emotional, financial, or personal. By working closely with faculty, staff, students and their families, SIU will continue to display a culture of care and demonstrate to our students and their families that they are an important part of the community. For Information on Saluki Cares: call(618) 453-1492, email siucares@siu.edu, or <http://salukicare.siu.edu/>

SIU's EARLY WARNING INTERVENTION PROGRAM (EWIP)

Students enrolled in courses participating in SIU's Early Warning Intervention Program might be contacted by University staff during a semester. More information can be found at the Core Curriculum's Overview webpage: <http://corecurriculum.siu.edu/program-overview/>

EMERGENCY PROCEDURES

We ask that you become familiar with **Emergency Preparedness @ SIU**. Emergency response information is available on posters in buildings on campus, on the Emergency Preparedness @ SIU website, and through text and email alerts. To register for alerts visit: <http://emergency.siu.edu/>

STUDENT MULTICULTURAL RESOURCE CENTER

The Student Multicultural Resource Center serves as a catalyst for inclusion, diversity and innovation. As the Center continues its work, we are here to ensure that you think, grow and succeed. We encourage you to stop by the Center, located in Grinnell Commons, to see the resources available and discover ways you can get involved on the campus. Visit us at <http://inclusiveexcellence.siu.edu/>

LEARNING AND SUPPORT SERVICES

Help is within reach. Learning support services offers free tutoring on campus and math labs. To find more information please visit the Center for Learning and Support Services website:

Tutoring : <http://tutoring.siu.edu/>

Math Labs <http://math.siu.edu/courses/course-help.php>

WRITING CENTER

The Writing Center offers free tutoring services to all SIU students and faculty. To find a Center or Schedule an appointment please visit:

<http://write.siu.edu/>

AFFIRMATIVE ACTION & EQUAL OPPORTUNITY

Our office's main focus is to ensure that the university complies with federal and state equity policies and handles reporting and investigating of discrimination cases. For more information visit: <http://diversity.siu.edu/#>

MILITARY COMMUNITY

There are complexities of being a member of the military community and also a student. Drill schedules, calls to active duty, complications with GI Bill disbursement, and other unforeseen military and veteran related developments can complicate academic life. If you are a member of the military community and in need of accommodations please visit Veterans Services at <http://veterans.siu.edu/>

Additional Resources:

ADVISEMENT: <http://advisement.siu.edu/>

SIU ONLINE: <https://online.siu.edu/>

SALUKI SOLUTION FINDER: <http://solutionfinder.siu.edu/>

MORRIS LIBRARY HOURS: <http://libguides.lib.siu.edu/hours>