

PHYS 440: QUANTUM MECHANICS-II

SYLLABUS (2017 Fall)

Department of Physics, Southern Illinois University-Carbondale

Last updated: September 16, 2017

1 General information:

Instructor: K. V. Shajesh

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Class meetings: TR 2-3:15 PM, in Neckers 410.

Office hours: MWF 12:30-1:30 PM.

2 Prerequisites:

Completion of PHYS 430 Quantum Mechanics-I with grade C or better is an official prerequisite for the course. Prior exposure to the Schrödinger equation will be assumed. Familiarity with the following mathematical techniques will be assumed: linear algebra, vector algebra, partial differential equations.

3 Course description

We shall cover the following topics: Stern-Gerlach experiment; simple harmonic oscillator and angular momentum using Heisenberg equations of motion; perturbation theory.

References

1. *Introduction to Quantum Mechanics*, by D. J. Griffiths.
2. *The Principles of Quantum Mechanics*, by P. A. M. Dirac.
3. Lecture notes for PHYS-530A Quantum Mechanics II (2014 Spring), available at <http://www.physics.siu.edu/~shajesh/tc/201401-SIU-P530A/>.
4. *Quantum Mechanics: Symbolism of Atomic Measurements*, by J. Schwinger, edited by B.-G. Englert.
5. *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>.

Webpage

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	40 %
Midterm Exams ($3 \times 15\%$)	45 %
Final Exam	15 %

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 19 (Tuesday, in class)
Midterm Exam 2	October 17 (Tuesday, in class)
Midterm Exam 3	November 16 (Thursday, in class)
Final Exam	December 12 (Tuesday, 2:45-4:45 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 x (out of 100) should be used to assess your knowledge in the subject. The raw score will be converted to the university scale using the following formula for Your Score x' ,

$$x' = x + a(1 - x), \quad (1)$$

where $0 \leq a \leq 1$ is the curve parameter. The curve parameter a is calculated as

$$a = a_0 \frac{(1 + 0.50y)}{2}, \quad (2)$$

where a_0 is the primary curve parameter that is decided by the instructor. The curve parameter can be boosted by submitting problems assigned for Extra Credit, y being the total score in Extra Credit submissions (out of 1.00). For example, for $a = 0.50$, 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.

Syllabus Attachment

Fall 2017

MISSION STATEMENT FOR SOUTHERN ILLINOIS UNIVERSITY CARBONDALE

SIU embraces a unique tradition of access and opportunity, inclusive excellence, innovation in research and creativity, and outstanding teaching focused on nurturing student success. As a nationally ranked public research university and regional economic catalyst, we create and exchange knowledge to shape future leaders, improve our communities, and transform lives.

IMPORTANT DATES *

Semester Classes Begin:08/22/2017
Last day to add full-term course (without Dean's signature):08/27/2017
Last day to withdraw from the University with a full refund:09/01/2017
Last day to drop a full-term course for a credit/refund:09/03/2017
Last day to drop a full-term course (W grade, no refund):10/29/2017
Final examinations:12/11–12/15/2017

Note: Please verify the above dates with the Registrar calendar and find more detailed information on deadlines at <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 09/04/2017
Fall Break 10/07—10/10/2017
Thanksgiving Break 11/22—11/26/2017

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

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

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

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

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/>

DIVERSITY

Southern Illinois University Carbondale's goal is to provide a welcoming campus where all of our students, faculty and staff can study and work in a respectful, positive environment free from racism and intimidation. 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, and 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/>

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

Need help with an issue? Please visit SALUKI SOLUTION FINDER at <http://solutionfinder.siu.edu/>