



NAZARBAYEV  
UNIVERSITY

**Course Syllabus: PHYS 452 Quantum Mechanics II (Fall 2017)**  
**Nazarbayev University, School of Science and Technology**  
**Department of Physics**

**Location & Contact Info**

Instructor: Sergiy Bubin  
 Lecture Hours: Tue, Thu 9:00 AM - 10:15 AM in room 7.427  
 Recitations: Thu 3:00 PM - 4:15 PM in room 7.427  
 Office Hours: Tue, Thu 10:20 AM - 11:30 AM in room 7.204, or by appointment  
 Phone: +7 (7172) 69 46 63  
 Email: [sergiy.bubin@nu.edu.kz](mailto:sergiy.bubin@nu.edu.kz)  
 Course Website: <http://sergiybubin.org/teaching.html>

**Course Description** A significant part of this course is dedicated to the approximate methods of quantum mechanics: the variational method (including the Hartree-Fock approach), stationary and time-dependent perturbation theory, semiclassical approximation, and adiabatic approximation. Students will also learn the basics of quantum scattering theory. If time permits, some elements of relativistic quantum mechanics and/or the formalism of second quantization will be considered. The course will include two lectures per week accompanied by a recitation.

**Required Textbook**

[David J. Griffiths, \*Introduction to Quantum Mechanics\* \(2nd Edition\)](#)

**Other Useful References** Many other texts exist on quantum mechanics at the introductory level, some can be found in the library, and can also be very useful in this course. Students are encouraged to explore those. Examples are:

- [Richard Liboff, \*Introductory Quantum Mechanics\* \(4th Edition\)](#)
- [Robert Scherrer, \*Quantum Mechanics: An Accessible Introduction\*](#)
- [Robert Eisberg, David O. Caldwell, and Richard J. Christman, \*Quantum Physics of Atoms, Molecules, Solids, Nuclei, and Particles\*](#)
- [Ira N. Levine, \*Quantum Chemistry\* \(6th Edition\)](#)

**Grading Policy** The course will be graded based on the cumulative score. The minimum cumulative percentages necessary for obtaining the following letter grades are:

Letter grade	A	A-	B+	B	B-	C+	C	C-	D+	D	F
Min. %	95.0	90.0	85.0	80.0	75.0	70.0	65.0	60.0	55.0	50.0	<50.0

There will be two midterm and one final exam. Homework will be assigned every 1-2 weeks. In addition, several short quizzes will be given on random dates. The problems in quizzes will be directly related to the material in recent lectures or resemble the problems in recent homeworks. The cumulative scores for the letter grades will be computed as follows:

Homework	10%
Quizzes	10%
Midterm 1	20%
Midterm 2	20%
Final Exam	40%

An extra credit (up to 2%) may be earned through active participation in recitations and lectures. Any homework/quiz/exam requested to be regraded must be brought no later than one week after it was given back to the students. Also, this instructor reserves the right to regrade the entire homework/quiz/exam as grading mistakes happen in both directions. Hence, there is a theoretical possibility that a student may get a lower total score after his/her work is regraded.

Some partial credit will be given for those homework/quiz/exam problems where a student demonstrates relevant knowledge of physical concepts and makes mistakes in algebraic manipulations. However, students should not expect that they will automatically get some partial credit for “effort” by simply writing a bunch of irrelevant expressions or copying basic equations out of a textbook or formula sheet.

No late homework assignments will be accepted. There will be no make-up for any of the exams, unless there is a serious and documented health reason for missing it (a note from an NU doctor is required).

**Homework/Exam Submission Guidelines** In order to ensure unbiased evaluation of students’ performance all homeworks, quizzes, and exams should be submitted in the following format:

- Solutions are written on standard white paper of size A4 (blank white paper will be provided for exams and quizzes)
- Do not write your name on the front page or elsewhere! Use your Student ID # instead.

In homeworks and exams students must clearly show the thinking process of obtaining the solution and that the results are not just copied from somewhere or guessed. Solutions or answers turned in without explanation will receive no credit. A student who wants to have the best possible score for a homework assignment must:

- Staple pages together and clearly indicate problem numbers
- Turn in neat and readable work as points may be deducted otherwise

Homeworks are normally expected to be submitted in the paper form. However, electronic submissions via email (e.g. a pdf file of scanned pages) are acceptable for those students who are away or must miss a class when the homework is due.

**Academic Integrity** Students are expected to follow Nazarbayev University student code of conduct, which can be found at <http://registrar.nu.edu.kz/policies-and-procedures>, and adhere to the principles of truth and academic honesty. Students who infringe upon the code of conduct will be subject to disciplinary procedures. While students are strongly encouraged to discuss the conceptual points of the homework problems among themselves, plagiarism is strictly prohibited and will not be tolerated. No collaboration, notes, books, calculators, or use of mobile phones will be allowed during the exams.

**Communication** Email communication with students is important for this course. Students are encouraged to use email for quick correspondence regarding lecture material, homework problems, and anything else that does not require long discussions and explanations (for which office hours exist). It is students’ responsibility to check their NU email regularly as important announcements, homeworks corrections, etc. may be sent.

Homework assignments, solutions to homework assignments, exam solutions, and other relevant materials (including this syllabus) will be made available in the electronic form on the course website. Neither homework assignments nor solutions will be handed out to students in paper form in classroom.