

## PHYSICAL CHEMISTRY CHEM 4600 - SPRING 2017

Prof. Emilio Gallicchio, [egallicchio@brooklyn.cuny.edu](mailto:egallicchio@brooklyn.cuny.edu)  
Mondays and Wednesdays, 03:40-04:55PM, Room 432 NE

**Course description:** a one-semester introduction to physical chemistry concepts and applications suitable for students pursuing biology- or health-related careers. Not recommended for students who intend to take graduate courses in chemistry or biochemistry. Assumes mastery of general chemistry (I and II), general physics (I and II) and calculus (I and II). Familiarity with analytical chemistry and biochemistry is highly recommended.

**Learning goals:** students who successfully complete this course will acquire:

- Conceptual and quantitative understanding of chemical thermodynamics notions such as the enthalpy, entropy and free energy of chemical reactions, and the chemical potential of substances and how these relate to chemical, biological and life processes.
- Conceptual and quantitative understanding of notions of kinetic theory of chemical reactions and how these are applied to the study of chemical and biological reactions.
- Conceptual, mathematical, and quantitative understanding of quantum mechanical theory and how it relates to the properties of molecules and their interactions, including notions and applications of molecular spectroscopy, with an emphasis on biological macromolecules.

**Required text:** • Physical Chemistry, 6<sup>th</sup> Ed., Levine. Mc Graw Hill.

**Required items:** • Scientific calculator, • Computer web access (for blackboard, see below)

**Blackboard page:**

- <http://bbhosted.cuny.edu> *Spring Term (1) Phys Chem Health CHEM. 4600 MW3[21947]* (Brooklyn College). A copy of this syllabus is available under "Syllabus".
- Course material, announcements, homework assignments, practice quizzes, test grades and more will be distributed via blackboard. [Confirm you have access to blackboard.](#)

**Grading:** The overall percent grade for the course will be determined based on the percent grades of two midterm exams and the final as follows:

30% Midterm Exam #1

30% Midterm Exam #2

40% Final Exam

The letter grade will be assigned based on the percent grade above according to the following scale:

94 or more A+, 93-87 A, 86-80 A-, 79-75 B+, 74-70 B, 69-65 B-, 64-60 C+, 59-55 C, 54-50 C-, 49 or less F.

**Exam absences:** unjustified absences on midterm exams are graded as 0 (zero). The only exception is a missing grade on one of the midterms due to a justified absence (i.e. with a doctor's note), which will be calculated as the weighted average of the grades of the other midterm and the final exam, with 40% weight on the midterm and 60% on the final exam grade.

**Attendance:** attendance will be recorded but not graded. Lecture attendance is HIGHLY recommended to do well in this course. The textbook is a very imperfect guide to the topics that will be emphasized and that will be the subject of the exams. Note conversion day, Thursday April 20 runs on Monday schedule.

**Tentative exam dates:**

Midterm #1: **Monday March 20, 03:40-04:55PM, Room 432 NE**

Midterm #2: **Monday April 24, 03:40-04:55PM, Room 432 NE**

Final exam (unconfirmed): **Wednesday May 24 (Room/time TBD)**

**Lecturer:** Prof. Emilio Gallicchio, egallicchio@brooklyn.cuny.edu,  
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**Office hours:** Mon 3:00-3:30PM Room 3316 N  
Mon 5:00-5:30PM Room 3316 N  
Mon 6:00-6:30PM Room 2127 N  
Wed 5:00-6:00PM Room 3316 N  
or by appointment. E-mail questions are welcome. However do not expect answers on weekends and holidays.

**Study guide:** Physical chemistry requires a LOT OF WORK, make sure you have enough study time to dedicate to this course. Pay particular attention to the material from lectures, lecture notes, examples, assignments, and practice tests. The textbook will be used mainly as a reference. Attempting to study the textbook cover-to-cover is unlikely to lead to success. The textbook is almost 1,000 pages long and it is dense with advanced math, chemistry, and physics. This course covers only a fraction of the topics in the textbook. In addition, the course emphasizes specific aspects of those topics that are covered. It is a bad idea to try to tackle this course on your own. Study in a group. Do not be left behind. Attend the lectures and stay on top of the assignments. If you can, read up on upcoming topics before they are presented in lecture. Refresh your knowledge in general chemistry, physics and especially math. Having to relearn background material while also studying for physical chemistry is not a good recipe for success. It is best to tackle this course with a mindset towards an in depth scientific understanding of the material, rather than trying to memorize and second-guess what is going to be on the exams. You will do well on the exams if you can reach a real understanding of the concepts. **While homeworks, assignments, and practice tests are not graded, they are essential to your success in this course.**

**Course topics:**

1. General chemistry and math review: chapter 1
2. Foundations of Chemical Thermodynamics:
  - a. Principles of thermodynamics: chapters 2-4
  - b. Thermodynamic functions of reactions, chemical equilibrium: topics from chapters 5 and 6
  - c. Phase equilibrium: topics from chapter 7.
  - d. Solutions, colligative properties: topics from chapters 9 and 12
  - e. Electrochemistry: topics from chapter 13
3. Foundations of Chemical Kinetics:
  - a. Reaction kinetics: chapter 16
  - b. Transport and diffusion: topics from chapter 15
4. Foundations of Quantum Mechanics and Spectroscopy
  - a. Principles of Quantum Mechanics: lecture notes, chapter 17
  - b. Electronic structure of atoms and molecules: topics from chapters 18 and 19
  - c. Spectroscopy and photochemistry: topics from chapter 20
  - d. Principles of Statistical Mechanics: topics from chapter 21

**Weekly reading and homework assignments:** See blackboard. Course assignments will be distributed on blackboard at least two weeks in advance.

**Academic Integrity:** The faculty and administration of Brooklyn College support an environment free from cheating and plagiarism. Each student is responsible for being aware of what constitutes cheating and plagiarism and for avoiding both. The complete text of the CUNY Academic Integrity Policy and the Brooklyn College procedure for policy implementation can be found at [www.brooklyn.cuny.edu/bc/policies](http://www.brooklyn.cuny.edu/bc/policies). If a faculty member suspects a violation of academic integrity and, upon investigation, confirms that violation, or if the student admits the violation, the faculty member must report the violation.

**Student Disability Services:** In order to receive disability-related academic accommodations students must first be registered with the Center for Student Disability Services. Students who have a documented disability or suspect they may have a disability are invited to set up an appointment with the Director of the Center for Student Disability Services, Ms. Valerie Stewart-Lovell at (718) 951-5538. If you have already registered with the Center for Student Disability Services, please provide your professor with the course accommodation form and discuss your specific accommodation with him/her.

**Policy on non-attendance due to religious beliefs:** refer to p. 65 in the Undergraduate Bulletin.

**Important Dates:**

Sunday, February 5: Last day to add a course, Last day to file for elective course Pass/Fail

Wednesday, February 15: Last day to apply for Spring 2017 Graduation. Conversion Day; Classes follow a Monday Schedule

Sunday, February 19: **Last day to drop a course without a grade**

Friday, April 7: Last day to resolve Fall 2016 and Winter 2017 incomplete grade (INC)

Wednesday, April 19: **Last day to withdraw from a course with a W (non-penalty) grade**

Thursday, April 20: Conversion Day; Classes follow a Monday Schedule

**For information about how to withdraw using CUNYFirst and the effect of withdrawal on financial aid, see**

<http://www.brooklyn.cuny.edu/web/about/administration/enrollment/financial/faq/withdrawing.php>