

Chemistry 4610, Fall 2016
Physical Chemistry I

Lecture: *Mondays and Wednesdays 2:15 – 3.30 PM, Room 232NE*

Prerequisites: Two semesters of physics and three semesters of calculus.

Required textbook: Ira Levine, Physical Chemistry, 6th Ed.

Recommended: Student Solution Manual for Physical Chemistry, 6th Ed.

Lab text: in the lab syllabus

The lecture course covers **Chaps. 1–12** of the textbook.

Physical chemistry requires a LOT OF WORK, so make sure you do not have too heavy school schedule and/or job time commitment.

EXAMS:

Midterm 1	100 pts
Midterm 2	100 pts
Midterm 3	100 pts
Midterm 4	90 pts
Final (Cumulative)	150 pts
Graded HW:	25 pts
Lab:	200 pts (26.1%)

In the past, the majority of questions on exams have been problems closely related to the slides material or that were assigned for homework. Reading material and solving assigned problems at HOME is essential for the course.

ABSENCES: If you are absent from one exam without a doctor's note, the missing grade will be calculated as $(3/4)X + (1/4)Y - 3$, where X and Y are the percentage grades on the two exams (excluding the final exam) closest to the exam you missed and where X is LESS than Y. (Thus the exam with the lower grade counts three times as much.) **If you miss two exams without a doctor's note, both exams will be counted as 0.**

Drop days: Wednesday, September 14 is the last day to DROP a course without a grade. Tuesday, November 10 is the last day to apply for non penalty withdrawal (*i.e.*, W grade). Remember that to withdraw, you **MUST** file a form in the Registrar's Office (either electronically or in person) and go to a stockroom to check out from the lab.

Note that you do not need a C- in this course in order to get a BS degree in chemistry but you do need a minimum of 24 credits in advanced chemistry courses with a grade of C- or higher.

Contact Information and Office Hours:

Lecturer:

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Office hours:

Mondays 5:00-5:30 pm, **Tuesdays** 12:00-12:30 pm and **Wednesdays** 5:00-5:45 pm

Assigned Reading and Problems

(1) For Wed. Aug. 31: Read Chap. 1. Problems: 1.1, 1.2, 1.3, 1.5a, 1.6, 1.7, 1.9, 1.11, 1.16a, 1.17, 1.18, 1.19, 1.23, 1.25, 1.28a, 1.32, 1.35, 1.37, 1.38, 1.41, 1.42, 1.43c, 1.44a, 1.50, 1.60, 1.62, 1.60, 1.61, 1.62, 1.63, 1.64, 1.65, 1.67, 1.69, 1.71,

(2) For Wed. Sept. 7: Read Secs. 2.1-2.5. Problems: 2.1, 2.2, 2.3, 2.7, 2.8, 2.9, 2.12, 2.13, 2.14, 2.16, 2.20, 2.24, 2.25.

(3) For Mon. Sept. 12. Read Secs. 2.6-2.9. Problems: 2.29, 2.30, 2.31, 2.32, 2.36, 2.37, 2.38, 2.39, 2.40, 2.41, 2.42, 2.43, 2.44, 2.45, 2.46, 2.47, 2.48, 2.49

(4) For Wed. Sept. 14: Read Secs. 2.10-2.13. Problems: 2.50, 2.51, 2.52, 2.53, 2.59, 2.61, 2.62, 2.63, 2.64, 2.65, 2.66, 2.67, 2.69, 2.70, 2.71.

(5) Monday Sept. 19: EXAM on Chaps. 1 and 2. (100 points)

(6) For Wed. Sept. 21: Read Secs. 3.1, 3.2, 3.3, 3.4, 3.5. Problems: 3.1, 3.2, 3.7, 3.8, 3.9, 3.10, 3.11, 3.12, 3.13, 3.14, 3.15, 3.16, 3.17.

(7) For Mon. Sept. 26: Read Secs. 3.6, 3.7, 3.8, 3.9. Problems: 3.20, 3.21, 3.22, 3.28, 3.30, 3.31, 3.32, 3.33, 3.34, 3.39, 3.40, 3.41.

(8) For Wed. Sept. 28: Read Secs. 4.1, 4.2, 4.3, 4.4, 4.5, 4.6. Problems: R3.1, R3.2, R3.4, R3.5, R3.7, R3.11, 4.1, 4.2, 4.3, 4.6, 4.7, 4.8, 4.9, 4.10, 4.11, 4.12, 4.16, 4.19a,b,e,f.

(9) For Wed. Oct. 5: Read Secs. 4.6, 4.7, 4.8, 4.9, 4.10, 4.11. Problems: 4.24, 4.25, 4.26, 4.27, 4.28, 4.31, 4.35, 4.38, 4.39, 4.40, 4.41, 4.42, 4.43, 4.44, 4.45, 4.47, 4.48, 4.49, 4.50, 4.51, 4.52, 4.55, 4.56, 4.57, 4.58.

(10) For Thur. Oct. 6 (**Conversion Day – runs as Monday**): Read Secs. 5.1, 5.2, 5.3, 5.4, 5.5. Problems: 5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 5.8, 5.9, 5.10a,b, 5.11, 5.13, 5.14, 5.15, 5.16, (5.17—optional), 5.18, 5.21, 5.23, 5.24a, 5.25--semioptional; you need not do the problem in detail, but make sure you know how to do it.

(11) For Mon. Oct. 17: Read Secs. 5.6, 5.7, 5.8, 5.9, 5.10, 5.11, 5.12. Problems: 5.26, 5.27 (send Problem 5.27 on Oct. 23 (Sunday before midnight!!!) or earlier as an e-mail attachment to prof.jarzecki@gmail.com. It is worth 8 points – each point counts), 5.30, 5.31, 5.32, 5.36, 5.37a, 5.41, 5.42—do only the first reaction, 5.45, 5.50, 5.56, 5.59, 5.61, 5.62, 5.64, 5.65, 5.66.

(12) Wednesday Oct. 19; EXAM on chaps. 3, 4, 5, logs. (100 points)

(13) For Mon. Oct. 24: Read Secs. 6.1–6.4. Problems: 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.8, 6.9, 6.10, 6.12, 6.13a, 6.14, 6.16a, 6.20, 6.23.

(14) For Wed. Oct. 26: Read Secs. 6.5, 6.6, 6.7. Problems: 6.24, 6.25, 6.26b, 6.28, 6.29, 6.36, 6.41, 6.42, 6.43a, 6.47, 6.48, 6.53, 6.54, 6.55, 6.56, 6.65, 6.67, R6.1, R6.5, R6.11.

(15) For Mon. Oct. 31: Read Secs. 7.1–7.4, 7.10. Problems: 7.1, 7.2, 7.4, 7.5, 7.10, 7.11, 7.12, 7.13, 7.14, 7.16, 7.17, 7.21, 7.22, 7.23, 7.24, 7.27, 7.28, 7.29a,b, 7.36, 7.37, 7.71, 7.73.

Start work on **computer assignment. It is worth 12 points**—Problem 6.47b and c at the temperature next to your name (**Read Subchapter 6.5 “Simultaneous Equilibria” for help**). To solve the problem you will need to find the thermodynamic values corresponding to your assigned temperature in NIST-JANAF table or other reliable source.

CORNEJO, MIKE	3500 K
DURLIK, PHILIP	3600K
EDELSTIEN, JONATHAN	3700 K
GHANEM, LUBNA	3800 K
GILL, JOSEPH	3900 K
HUNTE, ERROL	4000 K
JOHNSON, SUNNY	4100 K
LIU, ANTONG	4200 K
MCCALLUM, KATHRYN	4300 K
RODRIGUEZ, CHABELY	4400 K
RUM, SANDY	4500 K
STASIAK, JOHN	4600 K
STERN, YONI	4700 K
SUSTER, IZABELA	4800 K
SYED, SULIMAN	4900 K
ZHU, YAN XIA	5000 K

You must work individually on this without anyone’s help. If you get help from someone else, your grade will be zero on this assignment If you give help to someone else, you will lose half credit. **Assignment is due to Dec. 7 early submission welcomed. Late submission will not be accepted.**

(16) by Wed. Nov. 2: Chap 7 as above—get caught up.

(17) For Mon. Nov. 7: Read Chapter 8, but OMIT Sec. 8.5. Problems: 8.1, 8.2, 8.3, 8.7, 8.10a, 8.19, 8.28, 8.29, 8.30, 8.31, 8.32, 8.40, 8.42, 8.45. Read Secs. 9.1–9.2 (OMIT integral and differential heats of solution). Problems: 9.1, 9.2, 9.3, 9.4, 9.5, 9.6, 9.7, 9.10, 9.11.

(18) For Wed. Nov. 9: Read Secs. 9.3–9.9. Problems: 9.12, 9.13, 9.14, 9.15, 9.18, 9.19, 9.22, 9.23, 9.25, 9.32, 9.33, 9.34, 9.35, 9.36, 9.37, 9.38, 9.39, 9.43, 9.45, 9.48, 9.49, 9.68, 9.69, 9.70. R9.1, R9.3, R9.4, R9.5, R9.6, R9.7, R9.8, R9.10, R9.12, R9.13.

(19) For Mon. Nov. 14: EXAM on chaps: 5 (second half), 6, 7, 8, 9 (100 points)

(20) by Wed. Nov. 16: Finish Chap 9.

(21) For Mon. Nov. 21: Read Secs. 10.1, 10.2, 10.3, 10.4. Problems: 10.1, 10.2, 10.6, 10.7, 10.8, 10.12, 10.20, 10.20, 10.21,

(22) For Wed. Nov. 23: Read Secs. 10.5, 10.6, and 10.7. Problems: 10.24, 10.25, 10.26, 10.27, 10.28, 10.29.

(23) For Mon. Nov. 28: Reads Secs. 10.8 10.9 (don't worry about details in Sec. 10.9), 10.10, 10.11, 11.1, 11.2, 11.3. Problems: 10.35, 10.36, 10.37, 10.38, 10.42, 10.48, 10.49, 10.50, 10.60, 10.61, 10.63a, 10.72, 10.73, 11.1, 11.2, 11.3, 11.4.

(24) For Wed. Nov. 30: Read Secs. 11.4–11.10; 12.1, 12.2, 12.3, 12.4. Problems: 11.7, 11.8, 11.10, 11.12 11.23, 11.24, 11.25, 11.26, 11.31, 11.32, 11.33, 11.37, 11.38, 11.39, 11.47 and 12.1, 12.2, 12.3, 12.4, 12.5, 12.6, 12.8.

(25) For Mon. Dec. 5: EXAM, Chap 10 and 11 (90 points)

(26) For Wed. Dec. 7: **Prob. 6.47b and 6.47c computer assignment due**--Use log scale on horizontal axis. Read Secs. 12.5–12.8. Probs. 12.11, 12.16a,b, 12.17, 12.18, 12.19, 12.28, 12.29, 12.31, 12.32, 12.34, 12.36, 12.37, 12.38, 12.40.

(27) For Mon. Dec. 12: Read Secs. 12.9–12.12; 7.6, 7.7.; Probs. Chap.12: 43, 47, 49, 53, 60, 75, R12.1, R12.2, R12.4, R12.5, R12.6, R12.13; Ch 7: 7.45, 7.46. **SciFinder Scholar and Google Scholar assignment due.**

Final exam: The final is a cumulative exam. It is scheduled for **Monday Dec. 19 from 1 to 3 PM**. We will need considerably more than 2 hours and I would like to move to a special room so you will have that extra time. For the final and only the final, you can bring an index card measuring 3 by 5 inches (**no other size**) written on both sides. You cannot put any *unstarred* formulas or any solutions to problems or the names of any Greek letters or any derivations on this card.

SciFinder Scholar and Google Scholar Assignment (5 points)

Due on December 12 (lecture time)

(A) Go to a computer in the Brooklyn College Library or the Library Cafe. Bring a flash drive with you. Open Internet Explorer or Firefox and go to the website

<https://scifinder.cas.org/registration/index.html?corpKey=22FAB24B-86F3-5055-3171-F551C9A641A7>

and register (choose Undergraduate student under Job title). After you register, go the website

scifinder.cas.org

and sign in. (At the bottom of the sign-in page, you can click on SciFinder Support and Training to get information on how to use SciFinder.) Once the SciFinder program starts, it is pretty obvious what to do. (Note: No more than 7 people at once in the City University can use this program so if you are unable to use the program, try again later)

(1) Find recent references by an author whose last name and first initial are the same as yours. (To find authors, click Authors in the list at the left on the screen.) If your name is Robert Jones, find references by R. Jones. I want you to save on your disk the abstracts of **three** papers by someone with the same last name and first initial as you. (If you have an unusual name and there are less than three such references, you can try a different first initial. If you have an extremely unusual last name and so cannot find such references, you can use the name of a friend who is not in this class.) To choose which papers you save, click in the box next to each one you want to save, and click on Export to save them to your disk.

(2) Choose a topic in chemistry that interests you. **Do not choose a broad topic**, but make it **very** specific (for example, “MP2 calculations on the water dimer”, but you can’t use this one). (Once someone chose the topic “Analytical chemistry” which is much too broad. You can check your topic with me **in advance** by e-mail.) Find recent references on this topic. Save the abstracts of **three** of the articles on your disk or flash drive. For some articles you will be able to view the complete article by clicking on Full Text. When you find a reference for which you can view the complete article, I want you to save the complete article on your disk. You have to save only **one** article.

(3) Once you are finished, make sure you sign out from SciFinder.

(4) Submit what you saved to me. I prefer that you e-mail me the 7 files that you saved.

(B) On Google, click on **more** at the top and choose Scholar. On Scholar, click on Advanced Scholar Search. Find abstracts of three articles on your topic chosen in (2) above; these articles must have been published after 2000 (you can use Advanced Scholar search) and must be different from the articles you found in (2). Save and submit the abstracts to me.