University of Pennsylvania Department of Chemistry  
Chemistry 101 - Pietrovito - Summer Session I - 2018

Instructor:  A. J. Pietrovito – 540B inside of the Chemistry Library - 5th floor Chemistry (1973) Building. Office 540B is in the back section of the library, southeast corner. Phone: 215-898-3570.  e-mail: pietrov@seas.upenn.edu. The Chemistry Library is directly to the right of the elevators as you exit on the 5th floor.

- Lectures: Monday through Friday from 8:15 am - 10:00 am - in room CHEM 514**.
- Office Hours: Monday, Wednesday, & Friday, 2 pm - 4 pm - or by appointment.

**Chemistry (1973) Building (to the left of the elevators as you exit on the 5th floor).

Required text: Chemical Principles (EIGHTH Edition - NOT SEVENTH) by Zumdahl & DeCoste (2016). This is available at the University Bookstore. The OWL v.2 Mindtap Access Code is part of this. NOTE: Only ONE of the two options is required. BOTH options - with the Access Code - give access to the online OWL system AND a 24 month access to the electronic form of the 8/e textbook. A bit more expensive choice additionally provides loose-leaf (3-hole punched) paper copy of the text. This allows you to conveniently separate only those pages that you currently need (bound in a 3-hole binder of your choosing).

- Course Canvas website: CHEM 101-910 2018B. General Chemistry I  
  (URL: http://canvas.upenn.edu .... PennKey I.D. login required) 
  Course-related material is/will be located herein in Modules entitled: Course Information, Course Documents, Recitation Material, and External Links. The course entrance homepage reminds you of the above.

- Recitation: Meets Monday, Wednesday, and Friday after lecture from ~ 10:15 am - Noon  
  How much of this time slot you will use on a given recitation meeting will depend on problems/questions discussed. So, you should set aside the 10 am - noon time slot every Monday, Wednesday, Friday - as is listed in the Registrar's course/room roster listing. The two (2) recitation section meetings are at the following locations:
  - Section 911 - Chemistry (1973 Bldg.) room CHEM 514.
  - Section 912 - Chemistry (1973 Bldg.) room TBA

Examinations: Three (3) one examinations will be given (during the lecture period) throughout the term - the 3 dates listed below. The exams are worth 100 points each, the final exam 200 points. Final grades for the course will be based on 400 points total. The lowest 100 points will be dropped from consideration, this could either be one of the midterm exams or half of the score on the final. To ensure that the relative weighting of each exam is consistent, all examinations will be normalized. If you miss a midterm exam (for any reason), that exam score will be dropped. NO MAKE-UP EXAMS FOR ANY REASON. No makeup exams will be given.

The exams are on the following dates – locations TBA:

Exam 1: Friday, June 1 (up to, and including Lecture material of Tues., May 29).
Exam 2: Monday, June 11 (up to, and including Lecture material of Thurs., June 7).
Exam 3: Friday, June 22 (up to, and including Lecture material of Tues., June 19).

I will available for review/question/answer session, prior to each exam, beginning at the times indicated, at the following locations:

  Thursday, May 31 - Beginning at 2:30 P.M. – CHEM 514 (to-be-confirmed).
  Friday, June 8 - Beginning at 2:00 P.M. – CHEM 514 (to-be-confirmed).
  Thursday, June 21 - Beginning at 2:30 P.M. – CHEM 514 (to-be-confirmed).

The Final Exam is scheduled for Wednesday, June 28 at 8:15 am.
- [Location TBA - Bring PENN I.D.] There will be a review/question/answer session before the final exam - on Tuesday, June 27 - Time TBA - in Chem Library front tables.
Problem Solving - Word Problems
The end-of-chapter text problems and the posted problem set problems (in Assignments) are also good preparation for the examinations and you are heartily encouraged to work as many of these problems as you feel necessary. A list of suggested end-of-chapter problems from the text is be posted separately on Canvas.

Note that the problems - online and posted - are created to help you synthesize concepts and apply them to solving word problems. This should prove useful when preparing for examinations. Also, there may be short-answer/explain questions on each exam (non-computational) to see if you understand and/or can discuss/explain concepts from the lecture and the text in clearly and concisely.

Brief Course Outline (indicating order of coverage):
Besides some previous exposure to chemistry - see below - it is presumed that you are already facile with the material in Appendix 1 - Sections A1.1, A1.2, & A1.3 and Appendix 2.1 & A2.2 … such as scientific notation, basic algebra, graphing of functions, and SI units.

1. Introduction & Stoichiometry: Chapters 1, 2, and 3 - Most of this material - with some exceptions - is presumed to be review material. The review material denoted with (R) is considered to be:
   - Chapter 1 - Sec. 1.3 (R): Scientific Method. (The remainder of Chapter 1 may read as you wish.)
   - Chapter 2 - Secs.: 2.1 (R), 2.2 (R), 2.3 (R), 2.6 (R), 2.7 (R), 2.8 (R), and 2.9 (R)*.
     *Note, I will not specifically ask you to name compounds on any exam. However, this may be useful for lab.
   - Sec. 2.4: Will be postponed until we discuss gases in Chapter 5.
   - Sec. 2.5: You are only responsible for understanding the results of the experiments - not for analyzing all of the details.
   - Chapter 3 - Secs.: 3.2 (R), 3.2 (R), 3.3 (R), 3.4 (R), 3.5 (R), 3.6 (R), 3.7 (R), 3.8 (R), and 3.9 (R).
     - Sec. 3.1: For isotopes and average atomic weight - we will go into some more detail.
The posted .pdf (#3) in Course Documents should serve as a guide.

2. Types of Chemical Reactions & Solution Stoichiometry: Chapter 4 - excluding sections 4.10 & 4.11
Chemical reactions and calculations involving aqueous solutions - molarity, dilutions, precipitation reactions and acid-base reactions.

3. Gases: Chapter 2 - Section 2.4 & Chapter 5.
Properties of gases; Definition of pressure; the Absolute and Centigrade temperature scales; Gas laws; Ideal gas equation; Kinetic Molecular Theory; Effusion; Diffusion; Non-ideal gases.

Quantum theory, Bohr atom; Schrödinger wave mechanics, Particle-in-a-box, Atomic quantum mechanics of hydrogenic and polyelectronic atoms; Electronic configuration of neutral atoms; Electronic configuration of ions; Periodic relationships of size (radius) and ionization energies of neutral atoms and of ions. [Electronic configuration and periodic properties of ions are contained in Section 13.4.]

[Exclude Sections 13.5 & 13.8. Also, may exclude Sections 14.9, 14.10, & 14.11]
Periodic relationship of electronegativity; Ionic, Polar covalent, and Covalent Bonding - and the connection with electronegativity difference; Lewis structures; Resonance; Formal Charge; Valence Bond-Hybridization Theory, Molecular Orbital Theory; Multiple Bonds; Delocalization; Bond Order; Paramagnetism and Diamagnetism.

6. Solids and Liquids: Chapter 16 - Sec. 16.1 (intermolecular forces) and parts of other sections - as time permits.
Intermolecular Forces & Hydrogen Bonding.

7. Transition Metals & Coordination Complexes: Chapter 19 - specific coverage - as time permits.
Bonding & Structure of compounds comprised of transition metals.