

Chem 170 Syllabus – Spring 2009

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Course Description. Chem 170 provides a review of the basic stoichiometric calculations of importance to chemists. Among the topics you will cover are significant figures and dimensional analysis, the mole and molar mass, empirical formulas, balancing chemical reactions, gram-to-mole conversions, limiting reagents, theoretical yields and working with gaseous and aqueous species. This material is equivalent to approximately 2-3 weeks of a traditional first-semester introductory course in general chemistry as offered at other colleges and universities. Chem 170 is a pre-requisite for Chem 260 (Thermodynamics, Equilibria, and Kinetics) and for most advanced courses in the Department of Chemistry and Biochemistry.

Required Materials. All course materials are provided to you from the course's web page. You also will need access to a calculator that can handle scientific notation. If you do not own one, then this is an appropriate time to invest in a good scientific calculator.

Personalized System of Instruction. Unlike most courses, which rely on regularly scheduled class meetings, Chem 170 uses a "personalized system of instruction," or PSI. In a traditional course, class time consists of lectures and discussions with all students progressing through the material at the same pace. In a PSI course, however, there are no class meetings. Instead, the course consists of a series of modules that you complete at a pace that best meets your needs. You may complete the course in as few as 3 or 4 weeks, or you may choose to spread the work across the entire semester; the choice is yours.

Another key feature of a PSI course is a focus on mastering a limited number of well-defined objectives. To this end, each module consists of the following:

- a list of objectives to be mastered
- a study guide providing a discussion of the objectives
- worked examples illustrating each objective
- practice problems for evaluating your understanding of each objective

To demonstrate mastery in a PSI course you must pass an exam at the end of each module. There is no penalty for failing a module exam other than the need for additional study of the module's material before retaking the exam. You must pass a module's exam before proceeding to the next module.

The term "mastery," as it applies to a PSI course, deserves additional elaboration. In a traditional course, mastery of the course's basic content usually equates to a grade of C+ or B-. Extending your understanding of the course's basic content by applying it to new areas or to new problems generally leads to a higher grade. In a PSI course, however, the emphasis is on mastering a limited number of essential concepts that all students are expected to solve routinely, correctly and with ease. Questions on Chem 170 exams will never ask you to apply your knowledge to completely new situations. If you truly master these concepts, therefore, you should expect to receive a grade of A on the midterm and final exams.

Implementing a PSI in Chem 170. The material in Chem 170 is divided into eight modules, the topics of which are listed here:

1. Units, Scientific Notation, Significant Figures, and Dimensional Analysis
2. Atoms, Molecules, and Moles
3. Characterizing Molecules Using Mass Percents and Empirical Formulas
4. Balancing Chemical Reactions
5. Stoichiometric Calculations Using Balanced Chemical Reactions
6. Limiting Reagents, Theoretical Yields, and Percent Yields
7. Including Liquids and Solutions in Stoichiometric Calculations
8. Including Gases in Stoichiometric Calculations

Begin with Module 1 and carefully read the written material, paying particular attention to the module's objectives. Study the worked examples with the goal of understanding each step in the provided solutions. Next, work through the practice problems, checking your answers with those provided at the end of the module. When you feel confident in your mastery of the module's objectives, come by and take the module's exam (see details below).

Module Exams. Each module exam has eight questions that will test your understanding of the module's objectives. You will have 60 minutes to complete the module exam, although you probably will need significantly less time.

To demonstrate mastery you must correctly answer all problems on the exam. Correct use of significant figures are checked on each and every problem on each exam. Your exam usually will be graded immediately upon completion and the result reviewed with you. If you pass the exam, then you are free to move to the next module. You will need to wait at least 24 hours before retaking any module exam that you do not pass successfully. For reasons of confidentiality, module exams cannot be returned.

No one likes to fail an exam. It is normal, however, in a PSI course for students to fail one or more module exams. Because the goal of this course is to master the material, such that solving stoichiometry problems becomes routine, there is no penalty for failing a module exam. Please keep in mind that the number of module exams failed does not affect your final grade.

You may take module exams at any of the times listed below. You will be allowed one hour for each exam, so be sure to give yourself enough time to complete your exam before the end of office hours.

Monday	1:00 – 3:00 pm
Tuesday	9:30 – 11:30 am
Wednesday	8:30 – 9:30 am and 12:00 – 2:00 pm
Thursday	1:30 – 2:30 pm

You must complete the exams for modules 1-4 by Wednesday, March 4th and complete the exams for all eight modules by Thursday, May 7th.

Midterm Exam. The midterm exam consists of 16 questions and covers modules 1 – 4. When ready, schedule an appointment for the exam, reserving two hours (although you probably will need less time).

The last day for taking the midterm exam is Thursday, March 5th. If you do not take the midterm exam by this deadline, you will be asked to withdraw from the course (the last day to withdraw from a course is Friday, March 13th). Your grade on the midterm exam will count for 33% of your final grade. For reasons of confidentiality, midterm exams cannot be returned.

Final Exam. The cumulative final exam for this course may be taken anytime after you successfully complete the last module, but *you must complete it by Thursday, May 14th*. (NOTE: If you will be taking the final during finals week, it will be offered in a variety of the normal final exam time banks. Details will be made available via e-mail later.) The final exam has 16 problems; it covers all 8 modules but is weighted toward modules 5 – 8. When ready, schedule an appointment to take the final exam, reserving two hours to complete the exam (again, you probably will not need the full time). Your grade on the final exam will count for 67% of your final grade. For reasons of confidentiality, final exams cannot be returned.

Grading. Your grade for this class is determined by the following scale:

Score = $1/3 \times$ Midterm Exam + $2/3 \times$ Final Exam	Grade
100 – 93	A
92 – 90	A-
89 - 87	B+
86 – 83	B
82 – 80	B-
79 – 77	C+
76 – 73	C
72 – 70	C-
69 – 60	D
59 and below	F

Failing to complete the eight modules will result in a grade of F.

How Do I Get Help? Although Chem 170 is offered as a self-paced course, you are not being asked to “go it alone.” In fact, significant resources are available to help you with understanding the readings, the worked examples and the practice problems; these are:

- *Instructor:* Regular office hours for this course are the same as those listed in the section on module exams. In addition, you may contact either of us by email with questions.
- *Q-Center:* Tutoring is available through the Academic Resource Center (the ARC), which is located in Room 115, Asbury during its regular hours of operation.
- *Other Students:* Talk with your classmates or with other students who have already completed Chem 170.

Incompletes. University policy dictates that a grade of incomplete may not be given for failing to complete work on time because of inadequate planning, or to extend time for improving a grade. An incomplete grade can be given for extenuating circumstances only, such as an extended illness. In most circumstances, therefore, failing to complete all eight modules will result in a grade of F for the course. You may re-enroll in the course, however, without needing to repeat any modules that you already passed. Upon successfully completing the course, the new grade will be used in calculating your GPA, although the original grade will remain on your transcript. Please keep in mind that University policy does not allow you to repeat a course more than once.

Don't Procrastinate! The biggest problem students encounter in a PSI course is procrastination. When faced with deadlines and exams in other course, it is easy to say, "I'll put off Chem 170 for a week and return to it when things calm down." That's okay and is a good use of time. Remember, however, that mastery requires consistent practice over an extended period of time. You cannot demonstrate mastery by cramming four modules into a single week; this is a recipe for failure. It ultimately is your responsibility to complete the course.