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### CHEM 104.01: Preparatory Chemistry

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## CHEMISTRY 104 PREPARATORY CHEMISTRY AUTUMN 2000

- Instructor: Prof. Mark S. Cracolice, CP 101A, markc@selway.umt.edu
- Office Hours: MWF 8:15 AM–9:00 AM and by appointment. The purpose of office hours is to provide help in learning chemistry to individuals or small groups. Please submit other items such as requests for drops, etc., in writing so that I can reserve office hours for those who need help.
- Tutoring: CP 101B, times to be announced. Ideally, I would love to see the tutoring room open 24 hours a day. Unfortunately, we do not have a great deal of funding for this course, so there is a limit on the number of hours we will have available. There is also a limit on the space available. No more than 10 students may take exams simultaneously. Historically, warning and deadline dates have been the busy times, so try to avoid these if you can. I suggest that you periodically check with the tutors to learn the slower and busier times this semester.
- Prerequisite: The ability to use algebra to solve "word problems." Whether or not you have "taken" an algebra course, the prerequisite for this course is the ability to *use* algebra. If your algebra skills are weak, you should consider putting off Chem 104 until you get up to speed. Students enrolled in Math 005 are *not* ready for Chem 104. If you are "chemistry deficient" and work hard in this course, you will be prepared for Chem 151 or 161. If you are "algebra deficient," you will not do well neither in this course nor in Chem 151 or 161.
- Course Purpose: An introduction to chemistry specifically designed to prepare you for Chem 151 or 161. A major theme of the course is to introduce you to looking at the universe at the particulate level.
- Lecture: TR 8:10 AM–9:30 AM, CP 109. Lecture is based on the expectation that you complete the *study* and *strategy* parts of each assignment before class. Research clearly shows that active students learn much more than passive students. Traditional lecture is a passive activity, and therefore not as effective as alternate approaches. I will briefly highlight the main points of each assignment at the beginning of the lecture period, and then I will assign questions from the textbook that you will complete with a partner. Solutions to these problems will then be discussed with the whole class.
- Required: Peters, E.I., and Cracolice, M.S. (1998). *Introductory Chemistry FlexText*. Fort Worth: Saunders College Publishing.  
The course textbook. Royalties from sales of this book on the UM campus are donated to the UM Foundation.
- Cracolice, M.S. (1998). *Study Guide to Accompany Introductory Chemistry FlexText*. Fort Worth: Saunders College Publishing.  
The course format is based on the assignments in the Study Guide, so this is also required.
- A nonprogrammable, single-line display scientific calculator.  
You may not use a programmable calculator for quizzes or exams in this course. You can get an appropriate calculator for about \$10 at discount stores. It needs to be able to handle logs and exponents. Personally, I prefer solar-powered calculators.

- Optional: Molecular Model Set for General Chemistry. Prentice Hall, 1984.  
Most students need a model set to learn how to visualize molecules in three dimensions. It will not be needed until Unit D, which is the last unit in the course, and even then, we will look at only one three-dimensional structure, but you will need the kit if you take Chem 161.
- Peters, E.I., and Scroggins, W.T. (1992). *Chemical Skills, 2nd edition*. New York: McGraw-Hill.  
A supplementary book with yet another perspective on the course material. Extensive review of mathematics necessary for general chemistry.
- PSI: This course is taught using a modification of an instructional design known as the *Personalized System of Instruction (PSI)* or the *Keller Plan*, in honor of its originator, Fred S. Keller. The fundamental features of a PSI course are: (1) you work at your own pace, subject to some constraints so that you finish the course within the semester, (2) the primary mode of learning is the study guide and textbook—lectures are optional, (3) frequent quizzes are given to monitor your progress, and you work one-on-one with a peer tutor to correct deficiencies demonstrated on those quizzes, (4) *mastery* of each unit is required, and (5) up to three chances are given to demonstrate mastery with no penalty.
- Self-pacing: You can work through this course as quickly as you can learn the material on the front end, but you must meet minimum progress standards on the back end. *Falling behind is the most common reason for failure in this course*. You must have the self-discipline to pace yourself in order to succeed. One tried-and-true method to pace yourself is to attend lecture and keep up with quizzes at the pace of the lecture, or in other words, treat this as a traditional course.
- Assignments: The *Study Guide* is the key to the assignments in this course. Each assignment is laid out in the study guide in four steps: (1) *Study*, which tells you which sections to study and the associated Goals, (2) *Strategy*, which gives you hints and directs you to the important parts of the assignment, (3) *Answer*, which assigns end-of-unit questions, exercises, and problems, and (4) *Take*, which gives you a quiz that you should take under exam conditions—no references other than a clean periodic table.
- Schedule: Five dates are listed in this schedule for each assignment or assignments: (1) the *lecture* date tells you what will be covered in each of the 27 course meetings, (2) the *early* date sets the pace you should follow if you wish to complete the course before Thanksgiving, (3) the *recommended* date sets a pace that will allow you to finish the course over the 15-week semester, (4) the *warning* dates are set to notify you when you are seriously behind in the course and to alert you to the fact that you will suffer a grade penalty, and (5) the *deadline* date is the last day that the test will be available and the date after which you receive a more severe grade penalty.
- Welcome: As soon as possible, go to the tutoring center and complete the Welcome Assignment. This assignment acquaints you with the tutoring center, allows us to set up your record sheets, and gives you an opportunity to ask any questions about the course format. Bring a pen, a pencil, and your copy of this syllabus.
- Unit exams: Once you have completed your study of each unit, including the Summary and Review assignment (which is not covered in lecture), come to the tutoring center, present a photo ID (required), and you will receive an exam over that unit which is similar in content and style to the unit sample tests in the *Study Guide*. When you complete the exam, you will sit down one-on-one with a tutor, who will look over the exam. At this point the tutor may (a) tell you that you have passed the exam at mastery level, (b) ask additional verbal or written questions to probe your understanding, and/or (c) tell you that you did not pass the exam and make suggestions for further study. You may attempt a unit exam up to three times for each unit with no penalty, provided that all attempts occur before the warning or deadline dates. Before you take a unit exam for a second or third time, you are required to show your homework and *Study Guide* work to the tutor. This will allow you and the tutor to catch and correct any conceptual errors before you begin to incur grade penalties.

If you do not pass a unit exam, short-term cramming and retesting will not help you prepare for the next course. In keeping with this philosophy, we allow you to take only one unit exam per day.

- Mastery:** Part of the PSI design requires you to show *mastery* of each unit before you move on to the next unit. This is ideally suited for introductory chemistry because, as an example, you cannot solve chemical reaction problems until you master the metric system, dimensional analysis, nomenclature, writing and balancing chemical reactions, etc. In general, we set the mastery level at 90%, although on some shorter exams, 100% may be required to pass.
- Tutors:** Your tutors are available to help you learn chemistry. Don't hesitate to see a tutor *before* you take an exam or any other time when you need help. Please do not badger them with complaints about course policies or harass them about doing you favors. They are not allowed to break the rules under any circumstances; if they do so, they get fired.
- Study Time:** A standard formula used in colleges and universities is to allow for two hours study time for each hour of lecture. Given that this is a three-credit course, there are three scheduled lecture hours per week and thus six hours per week outside of class, for a total of nine hours per week devoted to the course. (A standard load of 15 credits therefore results in a 45-hour schoolweek.) This means that an "average" student should spend nine hours per week working on this course. Students who expect higher than average grades should expect to spend a higher than average amount of time studying for the course.
- Study Log:** In order to make you aware of your study habits, you will receive course credit for keeping a study log. A log template is included with this syllabus. Each week you should make a copy of this form and use it to keep track of your study time. Every Thursday, you may turn in a copy of your study log for the previous week (Thursday through Wednesday). If you work less than nine hours in a given week on this course, you are also required to write a paragraph on the back of the log sheet describing the effect of your lack of study time on your performance in the course and how you plan to correct the problem. You will receive a 0.5% reduction in each grade requirement for each study log turned in and properly completed. You may turn in a maximum of ten logs for a maximum grade requirement reduction of 5.0%. If you complete the course in less than ten weeks, you will receive credit for all weekly logs after your completion date. Study logs are only accepted on Thursdays; no late logs are accepted.
- Study Logs are not accepted for the week of Thanksgiving.
- Philosophy:** Given that this course is specifically designed to prepare you for the next course in chemistry, what you have learned by the end of the course is what is most important. To be consistent with this philosophy, your course grade is primarily based on your performance on the final examination, subject to penalties for not passing unit exams or taking them after the warning date.
- Grades:** To qualify for a grade of C or D, you must complete unit exams through Review 8 (Unit H) **AND** meet the final exam score requirement for that grade.
- To qualify for a grade of A or B, you must complete all of the unit exams **AND** meet the final exam score requirement for that grade.

<u>Grade</u>	<u>Final Exam Score Minimum</u>	<u>Unit Exam Requirement</u>
A	90.0	All
B	80.0	All
C	65.0	Through Review 8 (Unit H)
D	55.0	Through Review 8 (Unit H)

You will receive a grade of F for the course if you do not meet both of the requirements for a D: a score greater than or equal to 55.0 on the final exam and completion of the unit exams through Review 8 (Unit H).

Final exam score minimums are decreased by 0.5% for each weekly log documenting study time, up to a maximum of 5.0%. Logs with fewer than nine hours must include a paragraph analyzing the effect of lack of study time.

Final exam score minimums are increased by 1.0% for each unit exam passed after the warning date but before or on the deadline date.

Final exam score minimums are increased by 2.5% for each unit exam not passed. Not passing a unit exam includes both (a) failure to pass after three attempts and (b) failure to pass by the deadline date.

Students choosing the P/NP option must meet the requirements for a D to pass.

**Final:** You may take the final at any time after completion of the unit exams. There are three forms of the final exam, and you may take the final a maximum of three times.

Your final exam score is determined according to the following formula:

One attempt:      Score on that attempt  
 Two attempts:     $0.1 \times (\text{Score on 1st attempt}) + 0.9 \times (\text{Score on 2nd attempt})$   
 Three attempts:  $0.1 \times (\text{Score on 1st attempt}) + 0.1 \times (\text{Score on 2nd attempt}) + 0.8 \times (\text{Score on 3rd attempt})$

Second and third attempts at the final should be undertaken only if you are confident that you can improve your score. The "basic" final exam is comprehensive and covers the material through Review 8 (Unit H). Additional questions covering Units Q, B, and D are included on the final examination for those students who qualify for a grade of A or B.

**Deadlines:** All warning and deadline dates are absolute and final. ***NO REASONS WILL BE ACCEPTED TO EXTEND WARNING OR DEADLINE DATES.*** These dates are far enough behind where you should be in the course to allow for personal emergencies and illnesses, etc.

**Drops:** Monday 25 September is the last day to drop by Cyberbear Dial Bear. Monday 16 October is the last day to drop with the signatures of your advisor and myself. After 16 October, you have made the decision to stay in the course until the end. After this date, you must have documented justification of a circumstance beyond your control to drop the course. This includes accident, illness, family emergency, etc. If this is the case, submit your completed drop petition and a copy of the documentation to my mailbox, and I will return the forms to the tutoring room by the next day. If you have not passed the Review 4 (through Unit A) exam by 11 October, you should give serious consideration to dropping the course.

Unit Notes: Assignment G–A: The only pressure units you are responsible for memorizing the relationships among are the atm, mm Hg, and the torr. You need to be able to convert among the other units if conversion relationships are given.

Unit N: Most students find this unit more difficult than the others. Plan your time accordingly. What you learn in Unit N is continually applied in Units F, R, and H.

Unit H: We do not cover Assignments B or C.

Assignment H–D: I recommend the smaller amount method for limiting reactant questions.

Unit D: We do not cover Assignment D–C.

Other: Any student in this course who has a disability that may prevent him or her from fully demonstrating his or her abilities should contact me personally as soon as possible so we can discuss accommodations necessary to ensure full participation and facilitate your educational opportunities.

This course syllabus is not a contract; it is a tentative outline of course policies. Changes may be made during the semester at my discretion.