CHEM 104 Prof. Shelley Foster Fall 1999 Handout No. 1

Save This Packet for Future Reference

Class Meetings, Office Hours, Discussion Sections, Laboratories, Etc.

Lecture Meeting: TTh 2:30-3:45, in S-1-006

Office: S-1-087 **Lab**: S-1-100

Phone: office 287-6096 **lab** 287-6184

Office Hours: If you want to see me, feel free to come find me anytime. However, you are **GUARANTEED** to find me in my office on both *Monday and Wednesday afternoon from 4-5 pm.*

E-mail: michelle.foster@umb.edu

Discussion Sections: All students must register for *and attend* one discussion section each week. These sections will be held on Wednesday 10:30-11:30am and Thursday 1:00–2:00pm in room S-2-063. Exceptions include Sept.8-9 (first week of class), Nov. 10-11 (Veterans Day) and Nov. 24-25 (Thanksgiving Break). Quizzes given weekly during discussion will count as bonus points as explained on page 4 of this handout.

Laboratories: All students must register for *and attend* one laboratory session each week. These sessions will be held on Monday 1:30-4:30 pm and Wednesday 1:30-4:30 pm in room S-2-035. If you have taken 104 previously at UMASS or an equivalent course at another university, you may be able to receive credit for the laboratory session. You must still register for a laboratory session. It is the student's responsibility to submit documentation of prior completion of laboratory work within one week.

Prerequisites and Other Background Information

Success in chemistry, as in any area of modern science, depends on having the proper preparation, experience, and facility in mathematics and in quantitative reasoning. In addition, of course, the appropriate background in fundamentals of chemistry is necessary to start this course. CHEM 104 has the following prerequisite:

CHEM 103 with a grade of at least C

The Chemistry Department firmly enforces this prerequisite, and I will not approve any deviation from it in admission to this section of CHEM 104.

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It is *crucial* to your progress in CHEM 104 that you review *immediately* the following CHEM 103 material:

Chapter 2 Atoms, Molecules and Ions

#'s 11, 15, 21, 31, 33, 35, 39

Chapter 3 Stoichiometry

#'s 3, 9, 17, 27, 31, 35, 47, 55, 59, 65, 100

You must be able to carry out these calculations quickly, confidently and accurately.

For Further Review I suggest looking over the following problems.

Chapter 4 Aqueous Reactions and Solution Stoichiometry
#'s 7, 17, 27, 35

Chapter 5 Thermochemistry
#'s 21, 57

Chapter 6 Electronic Structure of Atoms
#'s 41, 47, 59, 69

Chapter 7 Periodic Properties of the Elements
#'s 13, 49

Chapter 8 Basic Concepts of Chemical Bonding
#'s 3, 29, 37, 63

Chapter 9 Molecular Geometry
#'s 9, 19, 33

Textbooks and Reading Assignments

Text (required): T.L. Brown, H.E. LeMay, Jr., and B.E. Bursten, CHEMISTRY: THE CENTRAL SCIENCE (7th Edition), Prentice Hall (1997)

Reading Assignments: are from the Brown text. The topics that will be covered in this section of CH 104 are (in this order):

Chapter 10	Gases
Chapter 11	Intermolecular Forces, Liquids and Solids
Chapter 13	Properties of Solutions
Chapter 14	Chemical Kinetics
Chapter 15	Chemical Equilibrium
Chapter 16	Acid-Base Equilibria
Chapter 17	Additional Aspects of Equilibria
Chapter 18	Chemistry of the Environment
Chapter 19	Chemical Thermodynamics
Chapter 20	Electrochemistry (if time permits)

Exam Schedule and Review Sessions

In Class Exams - - 2:30 – 3:45 (regular class time)

Exam 1	Tuesday	September 28
Exam 2	Tuesday	October 19
Exam 3	Tuesday	November 9
Exam 4	Tuesday	December 7

These four exams will be held in our normal classroom, the small science auditorium

Review Sessions for the in class exams will be held on the Monday evening prior to each exam, from 5-7pm in a room to be announced as soon as I find it. A review for the final will be given during lecture on the last day of class.

Final Exam

a. The final exam is required.
b. The final exam schedule will be announced near the end of the semester.

Grading for the Course

The grades for the course will be determined as follows:

In-Class exam average	60% of total
Final exam	20% of total
Laboratory Grade	20% of total
Weekly Quizzes	Bonus points as outlined below

DETAILS of the individual parts of grading are as follows:

(1) In-Class Exams: Four exams will be given throughout the semester. These will be spaced approximately equally throughout the semester and each exam will cover some portion of the course as announced in class. Each of these exams will be given at the scheduled class time.

Each of the exams will be graded on a scale of 100 points. Only three of these exam scores will be used in calculation your grade. The lowest numerical score of the four exams will be dropped in calculating your exam total. Because one exam score is being dropped, *no makeup exams will be given for any reason.* Exams will not be given at any times other than those scheduled. A score of ZERO will be recorded for any exam that is missed for any reason; in such a case, this score of zero would be the one dropped, so all three other in-class exams would count.

(2) Final Exam: The final exam is required of all the students in the course. That final exam will be comprehensive—i.e., it will cover the entire material of the course. It will be worth 100 points.

(3) Laboratory Grade: The lab grade is based upon your performance during your weekly lab section.

(4) Quizzes: Quizzes will be given at the end of the weekly discussion sections. These quizzes will be designed to last less than 15 minutes and will cover the assigned homework given during lecture. The quizzes will be open book and open notes and open whatever else you need. They will be graded and may be used to earn bonus points. These bonus points will be added to your exam score total before computing your final grade. There will be about 25 bonus points available in the form of quizzes throughout the semester. There is no penalty as such for not taking the quizzes; you just will not earn those bonus points.

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Your course grade will then be determined as follows:

(a)	Pick your THREE HIGHEST EXAM SCORES and add them	300 points
(b)	Add in your final exam score	100 points
(c)	Add in your lab grade	100 points
(d)	Add in your bonus points from quizzes	

Letter grades will then be given on the basis of total scores, using the following scale:

440 or more = A; 390–439 = B; 340–389 = C; 290–339 = D; less than 289 = F

Tentative Course Schedule

Sept 9	CHEM 103 Review and Gases	Ch10	l1
Sept 14	Gases	Ch10	l2
Sept 15-16	*Quiz 1* (Ch 9 and 10)		d1
Sept 16	Intermolecular Forces	Ch11	l3
Sept 21	Intermolecular Forces	Ch11	l4
Sept 22-23	*Quiz 2* (Ch 11)		d2
Sept 23	Properties of Solutions	Ch13	l5
Sept 28	**Exam 1** (Ch 10 and 11)		E1
Sept 29-30	*Quiz 3* (Exam 1 solutions)		d3
Sept 30	Properties of Solutions	Ch13	l6
Oct 5	Chemical Kinetics	Ch14	l7
Oct 6-7	*Quiz 4* (Ch 13)		d4
Oct 7	Chemical Kinetics	Ch14	l8
Oct 12	Chemical Equilibrium	Ch15	l9
Oct 13-14	*Quiz 5* (Ch 14)		d5
Oct 14	Chemical Equilibrium	Ch15	l10
Oct 19	**Exam 2** (Ch 13, 14 and part of 15)		E2
Oct 20-21	*Quiz 6* (Exam 2 solutions)		d6
Oct 21	Acid Base Equilibria	Ch16	l11
Oct 26	Acid Base Equilibria	Ch16	l12
Oct 27-28	*Quiz 7* (Ch 15 and 16)		d7
Oct 28	Additional Aspects of Equilibria	Ch17	l13
Nov 2	Additional Aspects of Equilibria	Ch17	l14
Nov 3-4	*Quiz 8* (Ch 17)		d8
Nov 4	Chemistry of the Environment	Ch18	l15
Nov 9	**Exam 3** (part of 15, 16,17)		E3
Nov 10-11	NO DISCUSSION Veterans Day		dV1
Nov 11	NO CLASS Veterans Day		lV1
Nov 16	Chemistry of the Environment	Ch18	l16
Nov 17-18	*Quiz 9* (Ch 18)		d9
Nov 18	Chemical Thermodynamics	Ch19	l17
Nov 23	Chemical Thermodynamics	Ch19	l18
Nov 24-25	NO DISCUSSION Thanksgiving		dV2
Nov 25	NO CLASS Thanksgiving		lV2
Nov 30	Electrochemistry	Ch20	l19
Dec 1-2	*Quiz 10* (Ch 19 and 20)		d10
Dec 2	Electrochemistry	Ch20	l20
Dec 7	**Exam 4** (Ch 18, 19, 20, 21)		E4
Dec 8-9	*Quiz 11* (Exam 4 solutions)		d11
Dec 9	Review for Final Exam		l21

Study Suggestions

Chemistry 104 is a course that involves understanding of basic concepts of chemistry and developing a proficiency in applying fundamental mathematical and reasoning skills to chemistry. In general, it is a more rigorous course than CH 103. The main difference you will see is the increased use of quantitative descriptions of the physical and chemical behavior of matter. One consequence of this is that there are many more problems to solve in CH 104; but it also means that you need to develop your ability to understand a concept expressed in equations or in graphs, as well as in words and pictures. You also need to develop a firm grasp of the physical and chemical ideas behind these quantitative descriptions, and you should be able to reason with and apply them in addition to solving problems. The exams will test your understanding of the concepts, both by direct questions and by requiring you to demonstrate your proficiency in applying the concepts in reasoning and in solving problems. It will never be sufficient merely to memorize material. Your exam performance will be directly related to the amount of real practice that you have devoted to thinking about and applying the concepts and to solving problems. Almost everything you study in this course will depend on a firm working knowledge of material already covered. Do not fall behind in your study, and do not neglect a topic just because you have already taken the exam over it.

1. Pre-read before lecture. I will not assume in lecture that you have completely understood the text material before lectures, but it is helpful if you have read ahead at least lightly, so that you have some idea what is coming. Also, at the end of each chapter in your text there is a section called "For Review: Summary and Key Terms". Even though you may not understand these summaries in detail before lectures, you should read over them so that some of the words begin to be familiar, and so that you can recognize key ideas when they come up in lecture.

2. Take class notes. You should take class notes that are sufficient to remind you of the general development being presented. You will not be able to write down everything that is said. It is much more important to pay attention and think about the reasoning being presented.

3. Rewrite your notes using the text. I strongly suggest that you re-write your class notes after each class. This should be done not just to improve their legibility, but also to expand them by adding material that was mentioned in class that you didn't have time to write down fully, AND by incorporating your summary of the textbook coverage of the same material, including examples. In this way, you will be organizing the material in your mind, relating the various ways the same topics are discussed in the lecture and in the text. Re-work your notes as soon as possible after each class, while it is still fresh in your mind. This also takes advantage of the impression that the act of writing the material makes on your mind. A good

technique for summarizing the material is to pretend that you have to teach it to someone else. Write out your own notes, and go over what you would say to help someone else understand the material. "Explain" it to yourself in your own words.

4. Use the material—Soon and often. It is absolutely essential that you USE the material as much as possible. The best way to do this is to answer questions and to work problems using the concepts you have learned. One of the most dangerous mistakes you can make in studying is to read the question, then read the answer or solution and then say to yourself, "Yes, I can do that." You are only fooling yourself – and it is better to find out during your study than on an exam that you really didn't know how to work that problem.

I suggest that this most important phase of your study follow this order:

(a) *Review of Important Terms in the Chapter*. It has been estimated that the number of new vocabulary terms in a first-year chemistry course is at least equal to the number in a first-year language course!! In chemistry, a careful use of words is essential, because it is in these terms that we present concepts, discuss new material, and ask and answer questions (including exam questions!) It is quite important that you have a clear understanding (not just a parrot-like recall) of the meaning of the words.

(b) *Examples From the Textbook*. Work these out yourself, writing down as fully as you can the reasoning for each step. A good approach is to cover up the solution presented in the example, and try to write out each step for yourself – then uncover it and compare your approach with the one given in the example.

(c) *Assigned Homework*. Even though you will only be quizzed over the concepts of the assigned homework, it is important that you work carefully and systematically, keeping a record of your reasoning and answers. This will make it easier for you to review these questions at exam time.

(d) *Questions at the End of the Text Chapter*. The assigned homework problems from the end of the chapter are not the only problems worth doing; they are merely the minimum effort I think is necessary to obtain a knowledge of the subject matter. Some of the questions in the Brown text are quite simple; others may be moderately or very difficult. Many of these questions require you to combine and use several concepts in your reasoning, and these will help you to see whether you really understand the material. The answers of many numerical problems are in the back of the text and the complete solutions to all RED numbered questions are available in the solutions manual. I suggest that you work these red numbered questions first, so that you know when you have gotten the correct answer (but do not just start with the known answer and work backwards). Then work other problems that are similar to these.

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Many students find it helpful to set aside a separate portion of the notebook for working problems and answering questions. At every stage of this problem working and question answering, be as thorough and systematic as you can. Write down why you are doing each operation in solving a problem. Writing down the reasoning forces you into the discipline of thinking about what you are doing, so it will be easier to do next time.

And be sure to spend some time trying to develop some speed in working problems. After you are comfortable and confident at working a particular type of problem, see how quickly you can work several such problems without reference to notes or text. This will simulate exam conditions, and will build your confidence.

As you follow these suggestions for practicing answering questions, you will find that a wide variety of problems actually involve only a few central concepts, but that these can be combined in many different ways. The more practice you have had at working and applying these concepts to specific situations, the better you will be learning the material, and the better your exam performance should be.

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Summary of Suggested Study Strategy