

CHEM 102

General Descriptive Chemistry II

General Description

Aim of the Course

The purpose of this correspondence course is to introduce you to the basic concepts, vocabulary, and techniques of general chemistry. It should also prepare you for additional study of chemistry, the physical and biological sciences, and other intellectual pursuits that capture the attention of the modern person in a scientifically and technologically oriented culture. The emphasis of the course will be on understanding chemistry; the approach will be the presentation of a wide variety of chemical facts and information ranging from historical discoveries and developments through the well-established theories, laws, and models of inorganic, organic, and physical chemistry.

In CHEM 102, you will study the concepts of solutions, phases, kinetics, equilibrium, acids and bases, solubility, electrochemistry, thermodynamics, environmental chemistry, and nuclear chemistry. These topics most frequently constitute the second three-hour (semester) course in general chemistry. It is our intention that, exclusive of laboratory experience, the sequence of CHEM 101 and 102 will prepare you for the sophomore-year chemistry curriculum at most colleges and universities, including The University of North Carolina at Chapel Hill.

Organization of the Course

CHEM 102 has been organized to follow closely an integrated package of materials consisting of a textbook and an accompanying study guide. These materials are also used for CHEM 101. They have proven to be successful in American

colleges and universities—in fact, these are arguably the most successful materials in the teaching of chemistry the world has known.

This course manual provides an overview of each chapter in the textbook and a list of problems from the textbook that must be solved and submitted for grading by your instructor. By this means I can monitor your progress and offer assistance and aid in the study of the material. **Grades on the problems constitute 40 percent of the course grade while the final examination constitutes the remaining 60 percent.** You must pass the final exam in order to pass the course.

Textbook and Materials

The textbooks for the course are as follows:

Brown, Theodore L; H. Eugene Lemay, Jr.; Bruce E. Bursten; Catherine J. Murphy, *Chemistry: The Central Science*, 11th edition, Pearson/ Prentice Hall, 2009.

Hill, James C., *Student's Guide* to the text *Chemistry: The Central Science*, 11th edition, Pearson/Prentice Hall, 2009.

Wilson, Roxy, *Solutions to Red Exercises* to accompany *Chemistry: The Central Science*, 11th edition, Pearson/Prentice Hall, 2009.

You may purchase the text from Friday Center Books & Gifts at the Friday Center using the book order form in this manual, or online at <https://s4.its.unc.edu/HigherGrounds>. You should also secure for your use an electronic calculator. The calculator should be capable of computing scientific functions such as logs, sines, and cosines. You will be permitted to use a non-programmable electronic calculator on the final examination.

The textbook, *Chemistry: The Central Science*, will serve as your lecture material and the course manual will be your recitation guide. If you have difficulties with the material you may always call upon your instructor either by phone or e-mail (lee_pedersen@unc.edu). The most effective procedure, however, is to write well-thought-out questions when you submit your written work.

A copy of a periodic chart is included with this course manual. This periodic chart is more detailed than the one in *Chemistry: The Central Science* and will be useful for the study of the course material.

General Instructions

As a general rule, college instruction requires at least three hours of study for each hour spent in the lecture hall. Like all other worthwhile endeavors, the knowledge and understanding gained from this course will be in direct proportion to the amount of effort expended. **Only you can determine how much of your time you wish to devote to this course.**

However, I can assure you that you will obtain a background in general chemistry comparable to any university course if you conscientiously follow the instructions that are provided, complete the written work, and prepare properly for the final examination.

Study Plan

I suggest the following study plan:

- Read over the requirements and comments for the lesson, noting especially the lesson objectives.
- Do the assigned reading in *Chemistry: The Central Science* with an aim toward **understanding** the material. The textbook publisher left a great deal of space in the margins; use this space to make notes to yourself. (Of course, this reduces the resale value of the textbook, but few serious students sell their textbooks anyway!) A number of problems have been worked in the text and are given as examples. You should pay particular attention to these examples since they serve two important purposes. First, they call attention to important points as these are developed. Second, they provide an illustration of the most logical approach to the solution of the specific problem. It is a good idea to focus on the strategy employed to solve the problems.
- After you have finished the assigned text reading, work through the material assigned in this course manual. In no case should you proceed past a lesson without understanding the material; later lessons assume that you have mastered all

preceding material. Chemistry is a “vertical” science, and unlike many subjects, you should attempt to understand all of the subject as it unfolds. If you do not understand a section of *Chemistry: The Central Science*, write out specific questions for me or carefully work through the example problems again. I emphasize that the instructions in the course manual must be followed explicitly. General experience has shown that there is a much higher success rate in courses that have good supplementary materials.

- Now you are ready to do the written work. The problems listed in the lessons in this course manual have been selected carefully; each one illustrates a principle or utilizes a technique that is of fundamental importance for the mastery of the material in the lesson. In many cases, a similar problem immediately preceding or following your assigned problem in the text will have a solution in the solutions manual. Frequently, properties of compounds such as solubility constants, acid dissociation constants, and so on, which are needed for the solution of the problems, are not given in the problem but must be taken from the tables in the chapter or one of the Appendices. While I encourage you to work **all** of the problems at the end of each chapter in *Chemistry: The Central Science*, I will only check, as homework, your solutions for the listed problems.
- Submit your solutions on the solution sheets that are provided in this course manual. **Work the problems out on scratch paper and transfer the answers to the solution sheets when you have reached a satisfactory solution.** Please use a #2 or #2½ pencil. **Do not use ink.** Should you need more space than is provided on a problem, use the reverse side of the solution sheet and clearly indicate that you are doing so. If you have access to a copy machine, you may wish to make a copy for your reference and study. On rare occasions material can be lost in the mail and it is prudent to have a backup copy.

Grading and Final Examination

Forty percent of your final grade will be the average grade made on the submitted assignments. All work in this course is considered to be open-book except for the final examination.

Thus you are free to refer to any of the course materials when preparing your problem assignments; of course, all work submitted should be your own.

The final examination grade will constitute the **remaining 60 percent of your course grade**. The final examination **must be passed with a score of 60 percent** or better for you to pass the course. The examination will consist of problems very similar to those found in the problem assignments and programmed material. A good procedure for exam study is (1) rework “homework” problems, (2) rework examples/exercises in the chapters, (3) work extra problems, especially those that you can check in the solutions manual. If a “red-coded problem” is similar to a homework problem, it has a solution in the solutions manual. Those “red-coded” problems similar to the assigned homework problems (“black-coded”) could be of special interest. Physical constants, Appendix data, and a periodic chart will be included with the final exam.

Optional: A sample final exam is included in this course manual. I will be happy to “grade” it for you should you wish to submit it prior to taking the final exam.