

2021F CHEM104 Chemistry & Problem Solving (Owens), Section 001 (on-line)

Course Text: *Introduction to Chemical Principles, 11th Ed*, H Stephen Stoker, 2014

Instructor: Pat Owens (owensp@winthrop.edu) Phone: three two three four nine two five

Zoom Office Hours: T 1:00-1:50 PM, W 1:00-1:50 PM, R 11:00 - 11:50 AM

(Please email me owensp@winthrop.edu if you need to set up a Zoom session at a different time or have difficulty connecting during Office Hours)

- Zoom information:
 - <https://us02web.zoom.us/j/88483654667?pwd=WCs1YIRDVjZ3M2hNOWdTtaXY3RU93UT09>
 - Meeting ID: 884 8365 4667
 - Passcode: 3iCnUF
- **Note: I will also be available to meet in person on Tuesdays** from 11:00-12:30 in my Sims312A office reached by first entering my Sims312 computer lab.

Calculator: This course requires an inexpensive (\$8-\$12) non-graphical, non-programmable science calculator for all classes and tests. It should have capabilities for square roots, logarithms, exponentiation (antilogarithms), and exponential (scientific) notation operations. Graphical and programmable calculators cannot be used during exams.

Schedule: Course materials will be organized by week with two lectures per week. The course weekly schedule provides an overview of the topics and text sections covered each week.

- Lectures will be on-line in both lecture video and lecture note formats. I recommend that you print out the lecture notes, watch each video at least twice, take notes, and work problems covered in each video as you view these.
- Each week, there will be two lecture-based problem sets that students must complete and upload for grading by Wednesday and Friday evenings in a single and legible .pdf file.
- For the first four weeks, there will be also be a quiz that will be available starting Thursday at noon and must be uploaded by the following Sunday evening.
- There will be three major tests that will each include both an open-book problem set and a closed book test. The final exam is cumulative and closed-book.
- The individual weekly modules (Week 1, Week 2, etc.) on Blackboard provide the lectures notes and videos, the practice problem sets and quizzes, and links to upload assignments for grading. All course information is posted on Blackboard.

Course Requirements and Graded Exercises

- Graded practice problem sets are assigned for each lecture and worth 20 points each during the initial four weeks and 30 points each during the rest of the semester.
- Weekly quizzes during the first four weeks will be worth 20 points each.
- Three 120-point tests (each with a 60-point open-book problem set and a 60-point closed-book test) will be given during the weeks noted in the schedule.
- A three-page report on a noteworthy environmental science book will be due by December 10 and weighted 75 points. A reading week after Test 2 is blocked out for this.
- The cumulative final is a closed-book exam and weighted 120 points. Students must complete the final exam on the scheduled class final exam day December 8, 2021 to earn credit for this course.

Grades: Percentages will be calculated based upon total earned points divided by total points tested. *Students are responsible for keeping track of their individual grades and for calculating their overall average.* Students can request a spreadsheet of their scores from the various graded exercises to verify their own records. *Due to privacy and security concerns, no grades will be posted to Blackboard.* The following grade range will be used: A = 93.00-100%; A- = 88.00-92.99%; B+ = 85.00-87.99%; B = 80.00-84.99%; B- = 76.00-79.99%; C+ = 72.00-75.99%; C = 66.00-71.99%; D = 56-66%; F = <66%

Course Objectives:

- Develop intensive study habits and develop problem-solving skills to prepare for advanced science and engineering courses
- Gain an understanding of chemistry's central role in modern science
- Understand the process used by scientists and civilizations to observe, to learn about, and to understand the physical world
- Demonstrate an understanding of the fundamental principles that underlie the modern chemical sciences
- Understand molecular structures and changes that govern physical properties and processes
- Develop an intuitive appreciation for how chemistry affects our daily lives in so many wonderful ways

Course Topical Outline:

- This is an intense college-level course that focuses upon the fundamentals of chemistry and problem-solving, a rigorous chemistry course for incoming science majors. Chemistry is a problem-solving discipline that requires a firm foundation in quantitative thinking. The class will provide a broad overview of chemistry and will focus on problem solving strategies that are critical to success in subsequent math and science courses. The development of problem-solving and critical thinking skills that is the central focus of CHEM104 is also the first of Winthrop's four University-wide student learning objectives.
- Because of its relevance, students usually find this material to be quite interesting. For example, over 80% of our nation's energy needs come from chemical energy production; most of the rest from nuclear power. We will examine these subjects and develop a fundamental understanding of these processes.
- During the semester, we will examine these specific subjects:
 - Units and Dimensional Analysis
 - Subatomic Particles and Nuclear Chemistry
 - Electronic Structure and Chemical Periodicity
 - Chemical Bonds and Molecular Structure
 - Chemical Nomenclature
 - Mole Concepts and Stoichiometric Calculations
 - States of Matter, Intermolecular Forces, and Energy
 - Gas Laws
 - Solutions
 - Acid-Base Chemistry
 - Oxidation-Reduction Chemistry

Class Preparation: You are responsible for all assigned material and for all material discussed in lecture. For each lecture, I recommend that you first print out the lecture notes, watch the video, take notes, and then work problems covered in each video as you view these. You can then do the practice problems for that lecture. You must work all problems using the Problem-Solving Approach (PSA) best practices used in lectures. There will be a standard 50% to 75% cut on those problems that do not use these. It is critically important to learn early how to employ a well-organized and consistent approach to solving problems.

Student Competencies: This course is problem-solving focused; each week's schedule will include a specific list of student learning objectives. Students should expect to face challenging and what may seem like unfamiliar questions on all graded work; this is done to focus attention on competencies that students have not yet fully mastered. *Graded work is based on materials that have been covered and students are expected to solve practice problems without instructor assistance as these are modeled on lecture and example problems covered earlier. Student learning occurs most effectively by working through themselves to solve problems.* Students are urged to not fall behind and to master each competency as soon as it is first examined. Students are required to submit graded work in a single .pdf file having one clear and properly oriented image on each page using an app such as Office Lens, Genius Scan, or Notes. Submitted assignments not in this format will not be accepted as students must demonstrate fundamental technology competencies and attention to detail in their professional work.

Attendance: Course attendance will be measured by student expected participation in timely uploading completed and organized assignments for grading as outlined each week. Makeup tests and quizzes will not be given.

Students with Disabilities:

- *Winthrop University is committed to providing accessible learning experiences and equal access to education for all students. The syllabus is available in alternate formats upon request.*

If you are a student with a disability (including mental health concerns, chronic or temporary medical conditions, learning disabilities, etc.) and you anticipate or experience academic barriers due to the condition, please contact The Office of Accessibility (OA) for information on accommodations, registration, and procedures. After receiving approval for accommodations through OA, please make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely manner.

OA contact information: accessibility@winthrop.edu; 803-323-3290; 307 Bancroft Hall Annex.

Student Conduct Code:

- Responsibility for good conduct rests with students as adult individuals.
- The policy on student academic misconduct is outlined in the Student Conduct Code Academic Misconduct Policy in the online *Student Handbook* (<https://www.winthrop.edu/studentconduct/winthrop-university-student-handbook.aspx>).

On-Line Learning: Any student enrolled in courses at Winthrop regardless of modality (traditional in-person, online, hybrid, ...) is entitled access to all campus resources. These resources include, but are not limited to, admissions counseling, recreational facilities, and health, library, and academic services. Questions regarding access to these resources should be directed to the assigned academic advisor.