CHEM 1412 - General Chemistry II CHEM-1412L.001 (SP25/T) Course Syllabus

Description

Chemical equilibrium; phase diagrams and spectrometry; acid-base concepts; thermodynamics; kinetics; electrochemistry; nuclear chemistry; an introduction to organic chemistry and descriptive inorganic chemistry.
Prerequisites CHEM 1411
Credits 4
Lecture Hours 3
Lab Hours 3
Extended Hours 1
Contact Hours 112
State Approval Code 40.0501.57 03
Instructor Name John Stuart
Semester/Year Spring 2025

Meeting Time and Location
TUESDAY 01:45PM - 05:05PM PSC 2309

Alternate Operations During Campus Closure

In the event of an emergency or announced campus closure due to a natural disaster or pandemic, it may be necessary for Panola College to move to altered operations. During this time, Panola College may opt to continue delivery of instruction through methods that include, but are not limited to: online learning management system (CANVAS), online conferencing, email messaging, and/or an alternate schedule. It is the responsibility of the student to monitor Panola College's website (www.panola.edu) for instructions about continuing courses remotely, CANVAS for each class for course-specific communication, and Panola College email for important general information.

Student Basic Needs

Unexpected circumstances may arise, but Panola College offers various resources to support students. If you need mental health services or are facing challenges with transportation, affording class materials and supplies, or accessing food regularly—issues that may impact your class performance—please visit panola.edu/resources.

Class Attendance

Regular and punctual attendance of classes and laboratories is required of all students. When a student has been ill or absent from class for approved extracurricular activities, he or she should be allowed, as far as possible, to make up for the missed work. If a student has not actively participated by the census date, they will be dropped by the instructor for non-attendance. This policy applies to courses that are in-person, online, hybrid, and hyflex.

Attendance in online courses is determined by submission of an assignment or participation in an activity. According to federal guidelines, simply logging into a distance learning course without participating in an academic assignment does not constitute attendance. Distance learning is defined as when a majority (more than 50%) of instruction occurs when the instructor and students are in separate physical locations. Students must engage in an academic activity prior to the course census date.

When an instructor feels that a student has been absent to such a degree as to invalidate the learning experience, the instructor may recommend to the Vice President of Instruction that the student be withdrawn from the course. Instructors may seek to withdraw students for non-attendance after they have accumulated the following number of absences:

Fall or spring semesters:

3 or more class meeting times per week - 5 absences

2 class meeting times per week - 3 absences

1 class meeting per week - 2 absences

The student is responsible for seeing that he or she has been officially withdrawn from a class. A student who stops attendance in a class without officially withdrawing from that class will be given a failing grade; consequently, the student must follow official withdrawal procedures in the Admissions/Records Office.

Please note: Health Science and Cosmetology courses may require more stringent attendance policies based on their accreditation agencies. Please see the addendum and/or program handbook for further information concerning attendance.

Pregnant/Parenting Policy

Panola College welcomes pregnant and parenting students as a part of the student body. This institution is committed to providing support and adaptations for a successful educational experience for pregnant and parenting students. Students experiencing a need for accommodations related to pregnancy or parenting will find a Pregnancy and Parenting Accommodations Request form in the Student Handbook or may request the form from the course instructor.

Artificial Intelligence (AI) Course Policy

No use of Generative AI permitted.

This option assumes that all work submitted by students will be generated by the students themselves, whether they are working individually or in groups. Students should not have another person or entity do the writing of any portion of an assignment, which includes hiring a person or a company to write assignments and/or using artificial intelligence (AI) tools like ChatGPT. Use of any AI-generated content in this course qualifies as academic dishonesty and violates Panola College's standards of academic integrity.

Student Learning Outcomes

Critical Thinking Skills – to include creative thinking, innovation, inquiry and analysis, evaluation and syntheses of information

- CT2: Gather and assess information relevant to a question
- CT3: Analyze, evaluate, and synthesize information

Communication Skills – to include effective development, interpretation, and expression of ideas through written, oral, and visual communication

- CS2: Develop, interpret, and express ideas through oral communication
- CS3: Develop, interpret, and express ideas through visual communication

Empirical and Quantitative Skills – to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions

- EQS2: Manipulate and analyze observable facts and arrive at an informed conclusion

Teamwork – to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goa

- TW1: Integrate different viewpoints as a member of a team
- TW2: Work with others to support and accomplish a shared goal

Instructional Goals and Purposes

Chemistry 1412 is the second of a two semester general college chemistry course. The prerequisite for the course is successful completion of Chemistry 1411. There is a required laboratory section which meets once a week for four hours. The second semester course covers thirteen chapters of the text, surveying topics in materials, kinetics, equilibria, thermodynamics, electrochemistry, oxidation-reduction reactions, nonmetal and coordination chemistry, and nuclear chemistry, with a brief introduction to organic chemistry.

Chemistry 1412 has a required laboratory component that forms an important portion of this study. Experiment results will be recorded in a bound laboratory notebook. Lab reports will be submitted in Canvas.

Course Objectives: (that will be assessed)

1. Understand and be able to explain the general principles, laws, and theories of chemistry that are discussed and presented throughout the semester
2. Use critical thinking and logic in the solution of problems
3. Apply learned chemistry skills to new situations
4. Demonstrate an understanding of chemistry through technological advancement
5. Apply chemical principles in the laboratory setting

Course Objectives: (not assessed)

1. Develop independent and cooperative learning skills
2. Recognize and acquire attitudes that are characteristic of the successful worker regardless of the major field of study
3. Develop an awareness of the value of chemistry in our daily living

Learning Outcomes

After studying all materials and resources presented in the course, the student will be able to:

1. State the characteristics of liquids and solids, including phase diagrams and spectrometry.
2. Articulate the importance of intermolecular interactions and predict trends in physical properties.
3. Identify the characteristics of acids, bases, and salts, and solve problems based on their quantitative relationships.
4. Identify and balance oxidation-reduction equations, and solve redox titration problems.
5. Determine the rate of a reaction and its dependence on concentration, time, and temperature.
6. Apply the principles of equilibrium to aqueous systems using LeChatelier's Principle to predict the effects of concentration, pressure, and temperature changes on equilibrium mixtures.
7. Analyze and perform calculations with the thermodynamic functions, enthalpy, entropy, and free energy.
8. Discuss the construction and operation of galvanic and electrolytic electrochemical cells, and determine standard and non-standard cell potentials.
9. Define nuclear decay processes.
10. Describe basic principles of organic chemistry and descriptive inorganic chemistry.

Course Content

A general description of lecture/discussion topics included in this course are listed in the Learning Outcomes section of this syllabus.

Students in all sections of this course will learn the following content:

1. List factors that affect reaction rates.
2. Write rate laws.
3. Compare first and second order reactions.
4. Determine, using the collision model, the effect of temperature on rates of reactions.
5. Define reaction mechanisms.
6. Describe elementary reactions.
7. Describe and give examples of 2 types of catalysts.
8. Describe equilibrium in terms of LeChatelier's principle.
9. Write equilibrium constant expressions.

10. Calculate equilibrium constants.
11. Compare and contrast the 3 acid – base models.
12. Perform pH calculations.
13. Distinguish between strong and weak acids and bases.
14. Show the mathematical relationship between Ka and K
15. Using the common-ion effect, calculate the concentrations of ions in buffer solutions.
16. List the factors that affect solubility.
17. Describe a qualitative analysis scheme suitable for separating a selected list of metal ions.
18. Describe the atmosphere and problems that the atmosphere is experiencing in chemical terms.b
19. List current freshwater challenges.
20. Provide evidence of the importance of green chemistry.
21. List the 2nd and 3rd laws of Thermodynamics.
22. Compare entropy and enthalpy.
23. Solve problems using the Gibbs Free Energy relationships.
24. Balance redox equations.
25. Distinguish between voltaic and electrolytic cells.
26. Calculate cell EMF under specified conditions.
27. Compare types of batteries.
28. Describe the effects of electrolysis and methods to control electrolysis.
29. Describe nuclear reactions.
30. Track nuclear transmutations from starting radioactive atom to stable atom.
31. Describe biological effects of radiation.
32. List the periodic properties of metals and nonmetals.
33. Name coordination compounds and write their formulas.
34. Explain the chemical source of color in vision.
35. Use crystal field theory to explain molecular phenomena that other bonding theories do not explain.
36. List the IUPAC nomenclature for common classes of organic compounds.
37. Draw the structures for common classes of organic compounds.

Methods of Instruction/Course Format/Delivery

Lecture, flipped and semi-flipped formats, video/screencast lecture, class discussion, lecture activities, reading assignments, homework, quizzes, research, presentation, pre-laboratory activities, laboratory experimentation, laboratory reports

Students are expected to spend time outside of class each week reading, reviewing, and participating in assigned activities for successful completion of this course.

Major Assignments/Assessments

The following items are assigned and assessed during the semester and used to calculate the student's final grade.

Course Grade

The grading scale for this course is as follows:

1. Homework and lecture activities 20%
2. Labs 25%
3. Unit Exams 40%
4. Final Exam 15%

Letter Grades are as Follows:

A	90 – 100
B	80 - 89
C	70 – 79
D	60 – 69
F	Below 60

Other

- Courses conducted via video conferencing may be recorded and shared for instructional purposes by the instructor.
- For current texts and materials, use the following link to access bookstore listings: https://www.panolacollegestore.com.
- For testing services, use the following link: https://www.panola.edu/student-services/studentsupport/academic-testing-center.
- If any student in this class has special classroom or testing needs because of a physical learning or emotional condition, please contact the ADA Student Coordinator in Support Services located in the Charles C. Matthews Student Center or go to https://www.panola.edu/studentservices/student-support/disability-support-services for more information.
- Withdrawing from a course is the student's responsibility. Students who do not attend class and who do not withdraw will receive the grade earned for the course.
- Student Handbook: https://www.panola.edu/ (located on at the bottom under student)