

Georgia State University – Perimeter College
Syllabus and Course Policies
Chemistry 1212 – summer 2024
Date: 28 May 2024

Course: Chem 1212 – 008 (#53499) Principles of Chemistry II
This is a Face-to-Face course – I look forward to seeing you each week 😊

Professor: Maureen Burkart, Ph.D. Office: NE-2222, 770-274-5053
e-mail: mburkart@gsu.edu
Physical Science Department Office: NE-2614, 770-274-5105
*Note – The instructor checks GSU email at least once a day, Mon – Thurs.
GSU email is the best way to contact Dr. Burkart.

Classroom: NE-1420

Lecture Time: Monday and Wednesday 11:00am – 1:45pm

Tutoring/Advising: **Mon 4:45pm – 7:45pm; Wed 4:45pm – 7:45pm.**

Website: <http://sites.gsu.edu/mburkart/>

Chem 1212-008: Principles of Chemistry II

This is a Core IMPACTS course that is part of the STEM area.

Core IMPACTS refers to the core curriculum, which provides students with essential knowledge in foundational academic areas. This course will help master course content, and support students' broad academic and career goals.

This course should direct students toward a broad Orienting Question:

- How do I ask scientific questions or use data, mathematics, or technology to understand the universe?

Completion of this course should enable students to meet the following Learning Outcomes:

- Students will use the scientific method and laboratory procedures or mathematical and computational methods to analyze data, solve problems, and explain natural phenomena.

Course content, activities and exercises in this course should help students develop the following Career-Ready Competencies:

- Inquiry and Analysis
- Problem-Solving
- Teamwork
- Information Literacy (for Mathematics)

Description: This is the second course in a two-semester sequence covering the fundamental principles and applications of chemistry for science majors. Topics to be covered include properties of solids and liquids, solutions, chemical kinetics, acid/base reactions, oxidation/reduction reactions, chemical equilibrium, thermodynamics, and electrochemistry.

Calendar:

| | |
|----------------|---|
| June 03 | Classes begin |
| June 19 | Holiday, Juneteenth – No classes, No Tutoring hours |
| June 28 | Midpoint, last day for student-initiated withdrawal |
| July 04 | Holiday, Independence Day – No classes, No Tutoring hours |
| July 23 | Last day of classes |
| July 24 | Final exam – Wednesday, <u>10:00am</u> |

Prerequisites: Chem 1211/1211L or Chem 1211K and Math 1113, each with a C or better.

Corequisite: Chem 1212L

Required Materials:

- The OWLv2 program (Online Web Learning version 2) is required to complete the online homework assignments. I will send instructions for Cengage – OWL registration via GSU email. Use your GSU email address when registering for the OWL program.
- The suggested text is *Chemistry*, authors Zumdahl & Zumdahl, 10th edition – Brooks/Cole Cengage Learning. *Note, an electronic copy of this text is available through the OWL program, so it is not necessary to purchase a textbook.
- A scientific non-programmable calculator is required. An example of an acceptable calculator is the Texas Instruments **TI-30Xa**.
- Scantron forms (4 green and 1 red) are also required; they will be used as answer forms for exams.

| | |
|--|--|
| <p>Expectations for Students:</p> <ul style="list-style-type: none">✧ Please be active and participate in class 😊✧ Listen and respect others.✧ Complete all assignments.✧ Turn off cell phones.✧ Be punctual for class.✧ Discuss class concerns with the instructor after class or during tutoring hours.✧ Be prepared for class by reading the textbook prior to class discussion. | <p>Expectations for Instructor:</p> <ul style="list-style-type: none">✧ Be active and enthusiastic to facilitate student learning.✧ Listen and respect others.✧ Make sure the classroom is a safe space for everyone.✧ Turn off cell phone.✧ Be punctual for class.✧ Grade objectively, consistently, and in a timely manner.✧ Be prepared for class. |
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Please remember, if you have any questions, concerns, or comments, to let me know right away. I welcome any feedback you're willing to offer.

Attendance/Enrollment Verification: **Any student who does not attend one class meeting prior to June 07 at 11:59pm** will be reported as **never attended**, which will result in them being removed from the class roll and also from any co-requisite lecture and lab course. Students must also access the iCollege course to complete the Syllabus quiz with 100% score. It is recommended that you check GSU email daily throughout the semester for announcements. It is each student's responsibility to attend class regularly and complete all assignments on time. If you do not do so your grade will be penalized as stated elsewhere in this syllabus. Students are responsible for formally dropping or withdrawing from courses using the online registration system, PAWS at paws.gsu.edu. The instructor will not withdraw or drop students from the class. Students who do not withdraw themselves by the term midpoint will receive a final grade in the course calculated with penalties or grades of zeroes for all late or un-submitted work. Perimeter College students are limited to a maximum of 3 course withdrawals (lecture and lab count as one withdrawal since they are co-requisites). Any withdrawals above 3 are recorded as WF on the student transcript. Please see the college catalog for more information.

<https://enrollment.gsu.edu/catalogs/>

<https://catalog.gsu.edu/associate20202021/>

Department Attendance Policy

[1332.10 Dropping Classes and Voluntary Withdrawal \(Student Initiated\)](#)

[1332.30 Involuntary Withdrawal](#)

[Perimeter College Undergraduate Catalog Associate Level](#)

<https://codeofconduct.gsu.edu/>

POLICY ON CLASS ATTENDANCE

Students are expected to attend classes in order to gain command of the concepts and materials of their courses of study. The specific class attendance policies for each class are at the discretion of the instructor, in accordance with the policies of the department and college.

All matters related to student absences, including making up work missed, are to be arranged between the student and the instructor before the semester begins or on the first week of classes. All instructors will, at the beginning of each semester, make a clear statement in the course syllabus for each of their classes, describing their policies for handling absences. Students are obligated to adhere to the requirements of each course and of each instructor. Instructors are encouraged to provide avenues for students to make up examinations and other work missed due to an excused absence.

Excused absences are recognized in the following cases: [University-Sponsored Events](#), [Legal Obligations](#), [Religious Observances](#), [Class Attendance by Veterans](#)

In addition, it is suggested that the faculty give due consideration to absences relating to the following events:

- A. Death or major illness in student's [immediate family](#)
- B. Illness of a dependent family member
- C. Illness that is too severe or contagious for students to attend class

An immediate family member means spouse, parent, or child in accordance with the definition used for GSU employees.

If you are removed from the class for non-payment and are working to get reinstated by paying/setting up a payment plan, you may continue attending lecture class for up to 4 class meetings after your removal from the roll. You are expected to complete classwork and/or tests as scheduled during that time, but work will not be graded until after your reinstatement. You will not have access to iCollege but will be given 3 days after you are reinstated to complete iCollege assignments without a grading penalty. You will not be given makeup work for any classes that you miss during the time you are unenrolled. In addition, you are not allowed to makeup work for missed classes if your time of unenrollment goes beyond four class meetings.

Note: Students are expected to attend all class meetings. There will be no excused absences. *In the event of absence, it is the responsibility of the student to obtain assignments and information covered during the absence.* An attendance sheet will be circulated during class. Anyone who does not sign the attendance sheet will be counted absent. Signing the attendance sheet for someone else is falsifying the official record and is grounds for dismissal from the class. GSU Attendance Policy information may be found using the following link: <http://codeofconduct.gsu.edu> .

Withdrawal Policy: Voluntary withdrawals by the student are allowed through midpoint, **June 28**. Note that, depending on the total number of withdrawals on the student's record, this may result in a W or a WF on the student's record. Students are allowed to withdraw with a grade of W a maximum of **three** times in their undergraduate associate level careers at Georgia State; after receiving three W grades, the student will be assigned WF for any withdrawal. **Students are responsible for formally dropping or withdrawing from courses using the online registration system, PAWS at paws.gsu.edu.** The instructor will not withdraw or drop students from the class. If a student withdraws from Chem 1212 lecture, the student is advised to withdraw from Chem 1212 laboratory as well; if a student withdraws from Chem 1212 laboratory, the student is advised to withdraw from Chem 1212 lecture as well. The GSU Withdrawal Policy may be found using the following link: <http://advisement.gsu.edu/self-service/policies/withdrawal-policy/> .

Academic Honesty Policy: Cheating includes any attempt to defraud, deceive or mislead the instructor in arriving at an honest grade assessment. Plagiarism is a form of cheating that involves presenting as one's own the ideas or work of another. All portions of any test, project (lab report, homework assignment, etc.), or final exam submitted by you for a grade must be your own work unless you are instructed to work collaboratively. Specific requirements will be described for collaborative projects, but all work presented must be the work of members of that group. Research materials used must be properly cited.

Violation of the Academic Honesty Policy will result in a grade of zero for that test, project or exam. The second offense will result in assignment of a grade of "F" for the course, and a formal charge of Academic Dishonesty will be lodged with the College Dean.

The GSU Academic Honesty Policy may be found using the following link: <http://codeofconduct.gsu.edu> .

In this course, the rules for **AI usage** are as follows: *Only with Advanced Instructor Permission:* Please contact me in advance for permission to interact with generative AI tools at any stage of your work in this course, from early idea generation to putting the finishing touches on drafts and projects. Use of AI without instructor permission is not allowed. Any unapproved use within the course might be considered a breach of academic honesty. While exercising responsible and ethical engagement with AI is a skill you may hone over time, your unique human insights, critical thinking, and creative contributions remain pivotal to your learning experiences and success.

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**Course Grade:** The course grade will be determined from student work as follows.

|                                    |      |                                                            |
|------------------------------------|------|------------------------------------------------------------|
| Online homework (all count)        | 33 % | Online homework (OWLv2 program)                            |
| Class Exams (highest 3)            | 33 % | Periodic exams, each covering 2 – 3 chapters from the text |
| Administrative quizzes (all count) | 2 %  | (2 admin quizzes) Syllabus quiz, OWL Verification quiz     |
| Formative assessments (all count)  | 7 %  | In-class assignments spread throughout the semester        |
| Final Exam (mandatory)             | 25 % | Comprehensive departmental exam(s)                         |

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Exams: There will be four class exams and a final exam. The final exam is mandatory.

*******THERE ARE NO MAKE-UP EXAMS*******

The final course average is obtained by averaging the **three** highest class exam scores to determine 33% of the course grade. If one of the class exams is missed, that exam becomes the dropped exam. The intent of this grading scheme is to accommodate instances of sickness, accident, or other emergency circumstance for which a student might miss a scheduled exam. If a second exam is missed, that exam grade will be recorded as zero. It is the student's responsibility to be on time for the administration of exams. **No extra time will be given to those who show up late for the exam.** The grading scale is the standard scale with the following cutoffs:

| | | | | |
|----------|---------|---------|---------|----------|
| 100 - 90 | 89 - 80 | 79 - 70 | 69 - 60 | below 60 |
| A | B | C | D | F |

The final exam includes a standardized ACS exam that covers the entire course.

Note: Dr. Burkart does not reveal grades via email or phone due to privacy issues.

The only electronic device allowed during exams is a scientific non-programmable calculator.

Students are *not* allowed to use the following devices during exams:

- **Computers**
- **Cell phones**
- **Computerized dictionaries**
- **Molecular models**
- **Electronic tablets**
- **Smart watches**
- **Earbuds**
- **Programmable calculators**

OWLv2 Homework: There will be ~ten required OWLv2 homework assignments during the term. Each assignment has a specific due date that is related to the class exam date covering that material.

*******THERE ARE NO LATE SUBMISSIONS FOR OWLv2*******

The final course average is obtained by averaging all of the OWLv2 homework scores to determine 33% of the course grade. None of the OWLv2 homework scores will be dropped; all count toward the course grade. Use your GSU email address when registering for the OWL program.

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GSU policy for course grades: ( <https://registrar.gsu.edu/academic-records/grading/> )

**Important Note:** The course syllabus provides a general plan for the course; deviations may be necessary.

I encourage you to make a **daily schedule for chemistry** class so that you can accomplish the following:

1. Review the course schedule in the syllabus.
2. View the lecture videos in icollege, as needed.
3. Read the e-text to fill in the background details.
4. Write down questions to go over during class meetings.
5. Do all in-chapter questions and problems, and then complete the online homework assignments (OWL program).
6. Visit GSU Learning & Tutoring Center for tutoring and assistance.
7. Check your GSU email for announcements.

### **USEFUL STUDY HINTS**

- Take Notes (Write notes with pen and paper when reviewing material, watching videos, and doing homework problems.)
- Request a meeting with the instructor whenever you have questions or do not understand a concept.
- Enlist in the free tutoring services of the Learning and Tutoring Center.
- Follow the schedule and be aware of changes.

### **Diversity and Inclusion Statement**

As your instructor, I affirm my commitment to diversity and inclusion; I consider them essential elements of a vibrant learning community and integral to the GSU institutional mission. I am determined to foster an environment of inclusion, diversity, openness, and respect for the many differences that will enrich the college community, including race, ethnicity, religion, gender, age, socioeconomic status, national origin, language, sexual orientation, disability.

**Americans with Disabilities Act Policy:** Students who wish to request accommodation for a disability may do so by registering with the Access and Accommodation Center. Students may only be accommodated upon issuance by the Access and Accommodation Center of a signed **Accommodation Plan** and are responsible for providing a copy of that plan to instructors of all classes in which accommodations are sought.

**Equal Opportunity and Affirmative Action Policy:** It continues to be the policy of Georgia State University to implement affirmative action and equal opportunity for all employees, students and applicants for employment or admission without regard to race, color, religion, national origin, sex, age, sexual orientation, veteran status or disability. Information on the GSU Equal Opportunity and Affirmative Action Policy may be found using the following link: <https://belonging.gsu.edu/resource/equal-opportunity-and-affirmative-action-policy-at-georgia-state-university/>

**Incomplete:** The grade of "I" (Incomplete) may be given to a student who for nonacademic reasons beyond his or her control is unable to meet the full requirements of a course. In order to qualify for an "I," a student must:

**a)** have completed most of the major assignments of the course (generally all but one)

**and**

**b)** be passing the course (aside from the assignments not completed) in the judgment of the instructor.

When a student has a nonacademic reason for not completing one or more of the assignments for a course (including examinations) and wishes to receive an "I" for the course, it is the student's responsibility to inform the instructor in person or in writing of the reason.

**Veterans and Serving Military:** At Georgia State University, we respect the commitment our service men and women make to our country and we work to make our military and veteran students feel comfortable as they earn their college degrees.

The Military Outreach Center on each campus assists eligible veterans, active duty military, Reservists & National Guard members, and dependents with the support and services they need to reach their academic goals. There is a Military Outreach Center on every campus with a staff of advocates, all of whom are military veterans or dependents prepared to *Serve Those Who Have Served*.

Information on the GSU Military Outreach Centers may be found using the following link:

<http://veterans.gsu.edu/military-outreach-centers/> .

**Inclement Weather Policy:** In the event that inclement weather strikes the Atlanta metro area, students are expected to tune into WSB radio (750 am) or WSB television (Channel 2) to determine if Perimeter College has closed or not. If the school is open, class will meet as regularly scheduled. If the school is closed, students will not be allowed on campus. If an exam is scheduled on a day that the college is closed, students should come to the next class meeting prepared to take the exam that was scheduled for the cancelled day.

**Email Communication:** Students must use GSU email for email communication with Dr. Burkart. Specifically, if students wish to contact Dr. Burkart via email, they must send the email to Dr. Burkart (at [mburkart@gsu.edu](mailto:mburkart@gsu.edu)) using their GSU email account ([zzz@student.gsu.edu](mailto:zzz@student.gsu.edu)). Any email sent from a domain other than gsu.edu may go into "Junk Email"; such email will not be visible and thus will not receive a reply. Note also that Dr. Burkart does not check icollege email and therefore does not use icollege email except for special circumstances.

**Tobacco and Smoke-Free Campus Policy:** Smoking and tobacco use of any kind are prohibited on all GSU owned and/or leased locations/premises, on all internal and external areas, parking garages, and parking lots, in all GSU owned and/or leased vehicles. Smoking is also prohibited within 25-feet of all GSU building entrances and exits.

**Perimeter College seeks to provide an environment that is free of bias, discrimination, and harassment. If you have been the victim of sexual harassment/misconduct/assault, we encourage you to report this. If you report this to a faculty member, he or she must notify one of our college's Assistant Title IX Coordinators / Student Deans about the basic facts of the incident (you may choose whether you or anyone involved is identified by name). For more information please refer to our Title IX website – <http://deanofstudents.gsu.edu/title-ix/>**

**Removal Policy for Non-attendance:**

Any student who does not attend this class at least once during the first two weeks of the academic term will be reported as not having attended, which will result in them being removed from the class roll and also from any co-requisite lecture and lab course. Once students who've not attended during the first two weeks have been reported for removal, I will not be doing any instructor initiated withdrawals during the remainder of the term. It is each student's responsibility to attend class regularly and complete all assignments on time. If you do not do so your grade will be penalized as stated elsewhere in this syllabus. It is also each student's responsibility to complete and submit a withdrawal form before the term midpoint (see GSU academic calendar) if they do not want to receive a final grade in this course. Students who do not withdraw themselves by the term midpoint will receive a final grade in the course calculated

with penalties or grades of zeroes for all late or un-submitted work. Perimeter College students are limited to a maximum of 3 course withdrawals (lecture and lab count as one withdrawal since they are co-requisites). Any withdrawals above 3 are recorded as WF on the student transcript.

<https://catalog.gsu.edu/associate20162017/university-academic-regulations/#dropping-classes-and-voluntary-withdrawal>

### **Learning and Tutoring Center**

The LTC offers FREE, walk-in tutoring and academic support at FIVE Perimeter College campuses. The LTC provides a variety of other resources and services to accommodate student needs. All LTCs are equipped with computers, instructional software and internet access. Please visit the LTC's website (i.e. [success.students.gsu.edu/ltc](https://success.students.gsu.edu/ltc)) to find information about locations, hours of operation, tutoring and workshop schedules, handouts, online tutoring and links to online practice resources.

Contacts:

Alpharetta Campus: Dr. Lizann Gibson, [lgibson@gsu.edu](mailto:lgibson@gsu.edu)

Clarkston Campus: Mary Hamilton, [mhamilton@gsu.edu](mailto:mhamilton@gsu.edu)

Decatur Campus: Sohayla Mohebbi, [smohebbi@gsu.edu](mailto:smohebbi@gsu.edu)

Dunwoody Campus: Nancy McDaniel, [nmcdaniel@gsu.edu](mailto:nmcdaniel@gsu.edu)

Newton Campus: Arne Paulsen, [apaulsen@gsu.edu](mailto:apaulsen@gsu.edu)

For more information on accessing online tutoring and supplemental resources for writing, math, and science, use the link:

<https://success.students.gsu.edu/ltc>

LTC main phone line: **(678) 891-3596**



**Chemistry 1212 Tentative schedule - subject to change**

**Homework:** Read each major topic/chapter. Do all in-chapter questions and problems, and then complete the online homework assignments (OWLv2). Next, answer the blue colored end-of-chapter "Exercises." The more practice you get, the easier it will be for you! {Note: The only homework assignments that will be graded are the online OWLv2 homework assignments. However, students may also work the end-of-chapter homework problems in order to prepare for exams.}

Chapter outlines and supplemental handouts are available on the web: <http://sites.gsu.edu/mburkart/> .

Unit 1:           **Chapter 10 Liquids and Solids**

**Chapter 11 Properties of Solutions**

**Exam 1** : Unit 1   Wednesday, 12 June

Unit 2:           **Chapter 12 Chemical Kinetics**

**Chapter 13 Chemical Equilibrium**

**Chapter 14 Acids and Bases**

**Exam 2** : Unit 2   Wednesday, 26 June

Unit 3:           **Chapter 14 Acids and Bases**

**Chapter 15 Acid – Base Equilibria**

**Chapter 16 Solubility and Complex Ion Equilibria**

**Exam 3** : Unit 3   Wednesday, 10 July

Unit 4:           **Chapter 17 Spontaneity, Entropy, and Free Energy**

**Chapter 18 Electrochemistry**

**Chapter 19 The Nucleus (Based on remaining time)**

**Exam 4** : Unit 4   Monday, 22 July

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**Final Exam - Comprehensive – Wednesday, 24 July at 10:00am**  
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**Website:**       <http://sites.gsu.edu/mburkart/>

\*Note: The course syllabus provides a general plan for the course; deviations may be necessary.

## Expected Educational Results

**Intermolecular Forces, Liquids, and Solids** – at the completion of the lecture course, students should be able to:

- Define and identify the various types of adhesive and cohesive intermolecular forces and rank them in order of increasing strength
- Define and perform calculations involving the energy changes accompanying various phase changes.
- Write and interpret a Temperature-Pressure phase diagram for a one component system, define and identify the triple and critical point.
- Define vapor pressure, and boiling point. Explain how vapor pressure is affected by the types of intermolecular forces involved and temperature, both qualitatively and quantitatively using the Clausius-Clayron equation.
- Explain properties of liquids including surface tension, viscosity, and solubility.
- Distinguish between various solids by type of bonding (metallic, ionic, and molecular), and be familiar with characteristic properties of these various solids.

**Properties of Solutions** – at the completion of the lecture course, students should be able to:

- Predict whether a solution will form based on the types of cohesive and adhesive intermolecular forces involved, and the enthalpy changes involved.
- Explain saturation in terms of an equilibrium process between dissolution and recrystallization of the solute
- Explain how solute-solvent interactions, temperature, and pressure affect the solubility of liquid/liquid, solid/liquid, and gas/liquid solutions.
- Quantitatively express solution concentration in terms of percent composition, molarity, molality, and mole fraction; be able to convert between these units.
- Apply Raoult's Law to calculate the vapor pressure of a solution containing either a volatile or nonvolatile solute.
- Explain how the amount of an electrolytic or nonelectrolytic solute affects the freezing point, boiling point, and osmotic pressure of a solvent; and perform calculations involving these colligative properties including determination of molar mass.

**Chemical Kinetics** – at the completion of the lecture course, students should be able to:

- Calculate the rate of a chemical reaction from the rate change of reactants or products, and the initial rate from concentration versus time data.
- Generate a rate law from initial rate-data, calculate the rate constant and assign appropriate units.
- Determine reactant concentration as a function of time, and determine the half-life for a first-order reaction using the correct integrated rate law
- Explain how a reacting species must collide with sufficient energy and with correct orientation for a successful reaction event to occur, and explain how temperature, number of reactants, and a catalyst affect the odds of a successful event.
- Draw and interpret a simple reaction coordinate diagram for a chemical reaction.
- Apply the Arrhenius equation to calculate the rate constant at various temperatures, and to determine the activation energy for a chemical reaction.
- Interpret an elementary or multi-step mechanism, state the molecularity of an elementary step, state the significance of the rate determining step for a multi step mechanism

**Chemical Equilibrium** – at the completion of the lecture course, students should be able to:

- Define and explain chemical equilibrium as a dynamic process.
- (Optional) Calculate the equilibrium constant, forward rate constant, or reverse rate constant, given values for the other two parameters.
- Calculate a new equilibrium constant when a reaction is reversed and/or the coefficients are changed, or when two or more reactions with known equilibrium constants are combined.

- Generate an equilibrium mass balance expression in terms of concentration or pressure for both homogeneous and heterogeneous chemical reactions; and apply it to calculate between the equilibrium constant and equilibrium concentrations (or pressures).
- Predict whether reactants or products are favored based on the magnitude of the equilibrium constant, and the direction a reaction will proceed to reach equilibrium by comparison of the equilibrium constant and reaction quotient.
- Apply Le Châtelier's principle to predict how a reversible chemical reaction will respond to changes in concentration, temperature, volume, or pressure.
- Calculate equilibrium concentrations (or pressures) given initial concentrations (or pressures) and the equilibrium constant.

**Chemical Thermodynamics** – at the completion of the lecture course, students should be able to:

- Define entropy, calculate the enthalpy change for a chemical reaction, and state the second law of thermodynamics.
- Calculate Gibbs free energy for a chemical reaction from either standard free energy changes or from  $\Delta G = \Delta H - T\Delta S$ , and based on the sign of  $\Delta G$  state if the reaction is spontaneous, nonspontaneous, or at equilibrium.
- Calculate the equilibrium constant for a chemical reaction given the standard free energy change, and vice versa.

**Acid-Base Equilibria** – at the completion of the lecture course, students should be able to:

- Define and distinguish between an acid and a base for an aqueous system applying the Arrhenius, Bronsted-Lowry, and Lewis definitions
- Define and identify conjugate acids, bases, and conjugate acid base pairs.
- State the molecular factors determining acid/base strength for binary and oxoacids, and salt solutions.
- Utilize the autoionization equation for water to determine the  $H^+$  concentration given the  $OH^-$  concentration and vice versa.
- Determine the pH of a strong acid (or base), a weak acid (or base), and a salt solution.

**Additional Aspects of Aqueous Equilibria** – at the completion of the lecture course, students should be able to:

- Calculate the pH of a weak acid or base in the presence of a common ion.
- Define a buffer and buffer capacity, measure the pH of a buffer solution, determine the ratio of conjugates needed to produce a buffer of a given pH, and calculate the change in pH for a buffer upon addition of a strong acid or base
- Sketch and interpret titration curves for mono and polyprotic acids, identifying the end point and equivalence regions
- Determine the pH during the titration between an acid and base when both are strong, and when one is weak.
- Compute the solubility product constant of a salt given its solubility and vice versa
- Determine if a precipitate will form in a solution based on  $K_{sp}$ , and in the presence of a common or uncommon ion

**Electrochemistry** – at the completion of the lecture course, students should be able to:

- Write and balance a redox equation, identify the reducing and oxidizing agent.
- Determine the cell potential from standard reduction potentials.
- Write and read cell notation for an electrochemical cell
- Apply the Nernst equation to relate cell potential to free energy and the equilibrium constant, and to calculate nonstandard cell potentials.

### **Unauthorized Public Posting and Distribution of Course Materials**

All content created in this course, including videos, handouts, etc., may be used only by students enrolled in the course for purposes relating to the course. No materials may be shared with students outside of the

class or posted in any external forum. Failure to abide by these limitations constitutes a violation of the Policy on Academic Honesty and will be treated accordingly.

### Copyright License Summary

Your course materials are protected by copyright.

Your instructor is the owner of the copyright.

Under this copyright:

You are NOT free to copy, distribute, display, and/or perform the work.

You may NOT use this work for commercial purposes.

You may NOT alter, transform, and/or build upon this work.

### **Do Not share Instructor-generated Materials**

The selling, sharing, publishing, presenting, or distributing of instructor-prepared course lecture notes, videos, audio recordings, or any other instructor-produced materials from any course for any commercial purpose is strictly prohibited unless explicit written permission is granted in advance by the course instructor. This includes posting any materials on websites such as Chegg, Course Hero, OneClass, Stuvia, StuDocu, and other similar sites. The unauthorized sale or commercial distribution of such material is a violation of the instructor's intellectual property and the privacy rights of students attending the class and is prohibited.

### **Computer Requirements** Minimum recommended computer and internet configurations for courses.

Some content for this course is available online through iCollege, Georgia State University's learning management system (LMS). For more information about iCollege and related tools, visit the [Center for Excellence in Teaching and Learning \(CETL\)](#). You will use your iCollege account to login to the course from the [icollege.gsu.edu](http://icollege.gsu.edu). Once you have activated your iCollege account, you may search for your course and pin it.

**First-time users:** Perform a [System Check](#) before you log in.

To access this course on D2L you will need access to the Internet and a supported Web browser (Chrome, Firefox, Safari). To ensure that you are using the recommended personal computer configurations, please contact icollege helpdesk [help@gsu.edu](mailto:help@gsu.edu)

New students or those who would like a quick refresh on features of the iCollege environment can review the [Student Orientation](#) video.

### Technical Assistance

Visit the [IIT Technology Service Desk](#) or call 404-413-HELP(4357) for technical assistance. For additional and after-hours support, contact the [GeorgiaVIEW D2L Help Center](#)

\*\*\*If you experience any issues with iCollege, please reach out to your instructor as the primary source of support. However, below is also a second contact to be sure that your issues are addressed.

For this course, the primary contact person is your instructor:

**Dr. Maureen Burkart**

**Email: [mburkart@gsu.edu](mailto:mburkart@gsu.edu)**

770.274.5053

NE-2222

An additional contact person is the Interim Associate Chair of the Dunwoody Physical Sciences Department:

**Dr. Jay Dunn**

**Email: [jdunn1@gsu.edu](mailto:jdunn1@gsu.edu)**

770.274.5068

NE-2612

**Face coverings:**

Students are encouraged to wear an appropriate face covering while inside campus facilities (classrooms, hallways, elevators, labs and in all other public spaces) because six feet of social distancing may not always be possible.

**Covid19- University System of Georgia Policy**

Please visit the following link: <https://covidinfo.gsu.edu/>

**Campus carry information:** For information on House Bill 280, commonly known as the “campus carry” legislation, follow the link below.

<https://www.usg.edu/weaponscarry>

\*\*\*Your constructive assessment of this course plays an indispensable role in shaping education at Georgia State. Upon completing the course, please take the time to fill out the online course evaluation.\*\*\*