

# Principles of Chemistry II

## CHEM-1212

Spring 2024 Sections 01, 02, 03, 04 3 Credits 01/06/2024 to 05/07/2024 Modified 01/05/2024

### Description

Second course in a two-semester sequence covering the fundamental principles and applications of chemistry for science majors. Topics to be covered include chemical bonding, properties of solids, liquids and gases, solutions, equilibria, acids and bases, solubility, thermodynamics, kinetics and electricity. Corequisite: CHEM 1212L

**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 Outcome*:

- 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

### Requisites

Prerequisites:

(CHEM 1211 Minimum Grade: C and CHEM 1211L Minimum Grade: C) or CHEM 1211K Minimum Grade: C) and (MATH 1113 Minimum Grade: C or (MATH 1111 Minimum Grade: C and MATH 1112

Minimum Grade: C) )

Corequisites:

CHEM 1212L

## Contact Information

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Instructor: Dr. Martin Ross McPhail

Email: [mmcphail@westga.edu](mailto:mmcphail@westga.edu)

Office: TLC 2125

Phone: (678) 839-6019

### Office Hours

Monday, Wednesday, 1:30 PM to 4:30 PM, TLC 2125

Tuesday, Thursday, 10:00 AM to 12:00 PM, TLC 2125

## Meeting Times

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### Lecture

Monday, Wednesday, 11:00 AM to 12:15 PM, TLC 1301

### Workshop

Refer to your online Class Schedule for the meeting time and location of the Workshop for your section.

## Materials

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### Chemistry: Atoms First

**Publisher:** OpenStax

**Edition:** 2nd

**ISBN:** 978-1-947172-63-0

**Availability:** Online

**Price:** Free

This course will use a free online copy of Chemistry: Atoms First available through OpenStax. A link to the textbook can be found in the CourseDen materials. You can inquire with the UWG Bookstore if you would like to order a print copy through the Bookstore.

## Clicker

You will need an iClicker subscription or an iClicker remote to answer in-class questions and earn Clicker points. iClicker subscriptions allow you to answer questions using a phone, laptop, or tablet. These are the recommended way to answer questions in class, but the older iClicker remotes will also be supported.

Please note that a single iClicker subscription can be used across any of your classes that uses iClicker cloud--you do not need to purchase a separate subscription for each class.

iClicker subscriptions come with new iClicker remotes or can be purchased separately.

**Availability:** UWG Bookstore

## Scientific Calculator

You will need a **non-graphing** calculator that can perform logarithms for your exams. Solar-powered scientific calculators sold at office supply stores are a great option. Graphing calculators are not allowed on exams in this course. Calculator apps on other electronic devices will also not be allowed.

**Availability:** UWG Bookstore or Office Supply Stores

## Outcomes

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1. Students will use chemical terminology to describe chemical equilibria, kinetics, and phase behavior.
2. Students will interpret chemical information using logical and mathematical reasoning.
3. Students will interpret experimental observations using chemical principles.
4. Students will draw connections from course material to topics in other fields of study and modern scientific issues.

## Evaluation

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### Criteria

Type	Weight	Topic	Notes
Workshop	10%		A peer-led team-learning workshop accompanies all CHEM 1212 sections. Workshop attendance is mandatory and will include an in-workshop quiz every week. Students will be provided with a workshop manual in their workshop. Refer to this manual for workshop grading policy.

Type	Weight	Topic	Notes
Homework	15%		<p>Homework assignments will be posted on CourseDen as CourseDen Quizzes. One assignment will be posted after each Wednesday class and due at the start of the following lecture.</p> <p>Late homework assignments will not be accepted except in the cases as described in the missed assignment policy below.</p> <p>The lowest homework score will be dropped at the end of the semester.</p>
Clicker Questions	10%		<p>Questions will be posed at various points during lecture to enable interactive feedback between students and instructor. Responses will be tracked and logged through the iClicker system, so it is necessary for you to bring a functioning device that can either use the iClicker app or access the iClicker website to every class period.</p> <p>Students earn 1 point for responding to a clicker question and 1 point for answering the question correctly.</p>
Midterm Exams	50%		<p>Four mid-term exams will be given in-class over the course of the semester. These exams will not be comprehensive; each exam will cover material covered in lecture since the previous exam. <b>Non-graphing calculators will be permitted</b> on each exam, but notes, reference materials, and devices with additional app functionality are not. A periodic table and sheet of equations will be provided with each exam. Sharing of calculators is prohibited.</p>
Final Exam	15%		<p>The final will be the American Chemical Society standardized test, which will cover <b>both Chemistry 1211 and 1212. Non-graphing calculators are permitted on the final.</b> The Final Exam score will replace the single lowest midterm exam score if the final exam score is higher.</p>

## Breakdown

Grade	Range	Notes
A	90 to 100	
B	80 to 89	
C	70 to 79	
D	60 to 69	
F	0 to 59	

## Assignments

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# Homework

To help you maintain a steady pace of practicing the course material, homework assignments will be assigned on a weekly basis. Each homework assignment will be available after the Wednesday lecture each week, except for Wednesdays where an exam is given. Assignments will be due by the start of the lecture following the date they are posted (see schedule above).

Homework assignments can be accessed under the Quiz page of CourseDen.

After submitting your homework responses, you will be shown which responses are incorrect. You can then reattempt questions you got wrong. You will have a total of three attempts on any question. Your final score will be the highest of your attempts.

Assignments submitted after the due date will not be accepted for points. The only exception is if you are given an extension due to a documented excuse (see below).

The single lowest homework assignment score will be dropped from the final grade calculation.

## Schedule

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Topics are listed along with the relevant sections of the 2<sup>nd</sup> edition of Chemistry: Atoms First.

Homework assignments are due at 11:00 am on the days listed.

This schedule is tentative and topics covered each day may change based on student needs.

Week	Monday	Wednesday
1	January 8  10.1  Phases of Matter  Intermolecular Forces	January 10  10.2, 10.3  Properties of Liquids  Phase Transitions
2	January 15  MLK HOLIDAY  NO CLASS	January 17 (1)  Homework 1 Due  10.3, 10.4  Phase Transitions continued  Phase Diagrams

3	<p>January 22</p> <p>Homework 2 Due</p> <p>11.1 – 11.3</p> <p>Solution Energetics &amp; Equilibria</p> <p>Concentration Units</p>	<p>January 24</p> <p>11.4</p> <p>Concentration Units Cntd.</p> <p>Colligative Properties</p>
4	<p>January 29</p> <p>Homework 3 Due</p> <p>11.4</p> <p>Colligative Properties Continued</p>	<p>January 31</p> <p>Exam 1</p>
5	<p>February 5</p> <p>17.1 – 17.3</p> <p>Reaction Rates</p> <p>Differential Rate Laws</p>	<p>February 7</p> <p>17.3, 17.4</p> <p>Differential Rate Laws continued</p> <p>Integrated Rate Laws &amp; Half-Lives</p>
6	<p>February 12</p> <p>Homework 4 Due</p> <p>17.5 – 17.7</p> <p>Arrhenius Theory</p> <p>Reaction Mechanisms &amp; Catalysis</p>	<p>February 14</p> <p>13.1, 13.2</p> <p>Chemical Equilibria</p> <p>Equilibrium Constants</p>
7	<p>February 19</p> <p>Homework 5 Due</p> <p>13.3</p> <p>Le Chatelier's Principle</p>	<p>February 21</p> <p>13.4</p> <p>Equilibrium Calculations</p>

8	February 26  <b>Homework 6 Due</b>  13.4  Equilibrium Calculations Contd.	February 28  <b>Exam 2</b>  <i>March 1 - last day to Withdraw with a W</i>
9	March 4  14.1, 14.2  Acid/Base Definitions & pH/pOH	March 6  14.3  Relative strength of acids; pH calculations of acids

10	March 11  <b>Homework 7 Due</b>  14.4  pH calculations of bases and salts	March 13  14.4, 14.5  pH Calculations continued  Polyprotic acids
11	March 18  <b>SPRING BREAK</b>  <b>NO CLASSES</b>	March 20  <b>SPRING BREAK</b>  <b>NO CLASSES</b>
12	March 25  <b>Homework 8 Due</b>  14.6  Buffers  Henderson-Hasselbalch	March 27  14.7  Acid/Base Titrations

13	<p>April 1</p> <p>Homework 9 Due</p> <p>15.1, 15.2</p> <p>The Solubility Product</p> <p>Lewis Acids and Bases</p>	<p>April 3</p> <p>Exam 3</p>
14	<p>April 8</p> <p>12.1, 12.2</p> <p>Entropy and Spontaneity</p>	<p>April 10</p> <p>12.3</p> <p>The Second Law of Thermodynamics</p>
15	<p>April 15</p> <p>Homework 10 Due</p> <p>12.4</p> <p>Gibbs Free Energy</p>	<p>April 17</p> <p>16.1</p> <p>Identifying and Balancing Redox Reactions</p>
16	<p>April 22</p> <p>Homework 11 Due</p> <p>16.2, 16.3</p> <p>Voltaic Cells</p> <p>Standard Electrode Potentials</p>	<p>April 24</p> <p>16.4 – 16.6</p> <p><math>E^\circ_{\text{cell}}</math>, <math>\Delta G^\circ</math>, and <math>K</math></p> <p>Nernst Equation and Batteries</p>
17	<p>April 29</p> <p>Homework 12 Due</p> <p>Exam 4</p>	

The **Final Exam** will be held at the date and time given in the Exam Schedule provided by the UWG Registrar on their webpage.



## Important Dates:

*Last Day to Drop - Friday, January 12th*

*Last Day to Withdraw with a W - Friday, March 1st*

# \* Course Policies and Resources

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## Missed Classes

Attending class is required to answer in-class clicker questions. No make-up clicker assignments will be given. Clicker points will only be waived in cases where a conflicting school-sponsored activity or documented emergency forces a student to miss class.

In the case of an emergency, the instructor should be contacted within 24 hours if the emergency allows. Clicker points will be waived once documentation verifying the emergency (e.g. doctor's note, mechanic's invoice, obituary) is provided.

Each student will also be allowed **two unexcused absences** to be automatically dropped from their overall Clicker score. This is meant to cover any undocumented emergencies and technical difficulties with personal devices.

In the case of a missed class, the student is expected to contact the instructor to ensure they can stay on pace with the rest of the class.

## Homework Extensions

In general, late homework assignments will not be accepted for a grade. A homework extension may be provided in cases where a documented emergency causes a student to miss an extended period of class. Such extensions will be at the discretion of the instructor. The instructor must be contacted within 24 hours of the original assignment deadline to offer any extensions.

Homework extensions will not be given in cases where a technical issue (e.g. internet connectivity, laptop damage) causes a student to miss a homework deadline. All students are expected to start homework assignments early to preempt last minute problems.

In the case of extended illness, students are expected to work with the instructor and a Patient Advocate to ensure that they maintain progress in the class and turn in assignments in a timely manner.

## Exam Make-up Policy

Make-up exams will only be considered for cases of scheduling conflicts or emergencies where official documentation is provided. In the case of a **scheduling conflict**, the student must report the conflict to the instructor **no later than one week prior** to the date of the exam. In the case of a **documented emergency**, the student should contact the instructor within **24 hours** of the exam. Make-

up exams need to be scheduled before the lecture that follows the original exam. For example, Exam 1 is scheduled for January 31st, so a make-up would have to be scheduled before the following lecture on February 5th.

## 'Curving' Policy

If the average exam grade falls below 75%, exam grades will be adjusted or 'curved' using a linear scale to ensure an average exam grade of 75% and maximum exam grade no higher than 100%.

## Extra Credit Policy

No extra credit will be accepted for this course

## Student Conduct

Students are obligated to abide by conduct guidelines as described in the university catalog. Respect and courtesy of all students while in the classroom is required. The following are also mandatory:

1. Disruptive behavior will result in your expulsion from the room. If disruptive behavior persists you will receive a minimum of a one letter-grade deduction from your overall grade as well as possible additional action depending on the severity of the behavior.
2. All electronic devices must be silenced during lecture. Calls may only be answered in the case of emergencies by stepping out into the hall. Headphones are not permitted to be worn during lecture. **Laptops and tablets are permitted**, but if your use of these devices becomes disruptive their use will be disallowed for the remainder of the semester.

## College/School Policies

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The College of Arts, Culture, and Scientific Inquiry (CACSI) is dedicated to promoting excellence in teaching, scholarship/creative activity, and service. The College aims to provide students with an understanding of contemporary and historical aspects of the various disciplines within the social, physical, and natural sciences and the arts and humanities. It also aims to support the development of skills needed for professional preparation. CACSI is committed to interdisciplinary inquiry and recognizes the transformative power of education. We empower faculty, staff, students, and alumni to engage responsibly and creatively with the complex environment of the 21<sup>st</sup> century, relying on the rich knowledge and skills gained from the study of the sciences, the humanities, and the arts. CACSI teaches its students to research, think, write, communicate, and create, empowering them with adaptability, cultural literacy, and sensitivity, along with the critical thinking skills necessary to contribute to their communities and the public good in meaningful ways. CACSI faculty are committed to positively impacting the community at multiple levels via teacher education, public engagement, entertainment, and outreach.

Students are encouraged to practice the following Big Six college experiences to be successful in CACSI coursework and degree programs:

*(A) Connect with professors, staff, coaches, etc. who care about you as a person:*

1. Connect with a professor(s) who makes you excited to learn;

2. Connect with a mentor(s) who cares about you as a person;
3. Connect with a mentor(s) who pushes you to reach your goals;

*(B) Participate in experiential learning opportunities:*

4. Complete a long-term project such as a capstone project.
5. Participate in a high-impact practice such as study abroad or an internship
6. Get involved in extracurricular activities and groups.

## Institutional Policies

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### Academic Support

UWG is committed to student success, and the following resources will help you be more successful in your classes.

**Center for Academic Success:** The [Center for Academic Success \(http://www.westga.edu/cas/\)](http://www.westga.edu/cas/) provides tutoring, academic coaching, and supplemental instruction to help all undergraduate students succeed academically. For more information, contact them: 678-839-6280 or [cas@westga.edu](mailto:cas@westga.edu).

**University Writing Center:** The [University Writing Center \(https://www.westga.edu/writing/\)](https://www.westga.edu/writing/) assists students with the writing process. For more information, contact them: 678-839-6513 or [writing@westga.edu](mailto:writing@westga.edu).

**Accessibility Services:** Students with a documented disability may work with UWG Accessibility Services to receive essential services specific to their disability. All entitlements to accommodations are based on documentation and USG Board of Regents standards. If a student needs course adaptations or accommodations because of a disability or chronic illness, or if the student needs to make special arrangements in case the building must be evacuated, the student should notify their instructor in writing and provide a copy of his/her Student Accommodations Report (SAR), which is available only from Accessibility Services. Faculty cannot offer accommodations without timely receipt of the SAR; further, no retroactive accommodations will be given. For more information, please contact [Accessibility and Testing Services \(https://www.westga.edu/student-services/accessibility-testing/index.php\)](https://www.westga.edu/student-services/accessibility-testing/index.php).

### Online Course Content

UWG takes students' privacy concerns seriously: technology-enhanced and partially and fully online courses use sites and entities beyond UWG and students have the right to know the privacy policies of these entities. For help with your online classes, additional online tutoring and other student success services, information on privacy and accessibility, and technology requirements, visit this [UWG Online \(https://uwgonline.service-now.com/kb/\)](https://uwgonline.service-now.com/kb/) Help site.

UWG's online virtual tutoring service is Tutor.com, which replaces Smarthinking. Tutor.com provides 24/7, on-demand, 1-to-1 tutoring and homework help in more than 250 subjects. The expert tutors at Tutor.com can help students work through tough homework problems, improve their writing skills, study for a test, review difficult concepts, and so much more! Tutor.com can be accessed in CourseDen under the Resources dropdown menu and is available to all UWG students, regardless of course modality. More information can be found on UWG Online's Tutor.com: [Tutoring Service Knowledge Base article \(https://www.google.com/url?q=https://uwgonline.service-now.com/kb?id%3Dkb\\_article\\_view%26sysparm\\_article%3DKB0010788&sa=D&source=docs&ust=1689091469862762&usg=AOvVaw2vhm-Y9CAGpzHoFZpHngPF\)](https://www.google.com/url?q=https://uwgonline.service-now.com/kb?id%3Dkb_article_view%26sysparm_article%3DKB0010788&sa=D&source=docs&ust=1689091469862762&usg=AOvVaw2vhm-Y9CAGpzHoFZpHngPF).

Students enrolled in online courses can find answers to many of their questions in the [Online/Off-Campus Student Guide \(http://uwgonline.westga.edu/online-student-guide.php\)](http://uwgonline.westga.edu/online-student-guide.php).

## Honor Code

At the University of West Georgia, we believe that academic and personal integrity are based upon honesty, trust, fairness, respect, and responsibility. Students at West Georgia assume responsibility for upholding the Honor Code. West Georgia students pledge to refrain from engaging in acts that do not maintain academic and personal integrity. These include, but are not limited to plagiarism\*, cheating\*, fabrications\*, aid of academic dishonesty, lying, bribery or threats, and stealing. When a student chooses to enroll at the University of West Georgia students pledge the following:

*Having read the honor code of UWG, I understand and accept my responsibility to uphold the values and beliefs described, and to conduct myself in a manner that will reflect the values of the institution in such a way as to respect the rights of all UWG community members. As a UWG student, I will represent myself truthfully and complete all academic assignments honestly.*

*I understand that if I violate this code, I will accept the penalties imposed, should I be found responsible for violations through the processes due to me as a University community member. These penalties may include expulsion from the University. I also recognize that my responsibility includes willingness to confront members of the University community, if I feel there has been a violation of the Honor Code.*

For more information on the University of West Georgia Honor Code, please visit the [Office of Community Standards \(https://www.westga.edu/administration/vpsa/ocs/index.php\)](https://www.westga.edu/administration/vpsa/ocs/index.php) site.

## UWG Email Policy

University of West Georgia students are provided a MyUWG e-mail account. The University considers this account to be an official means of communication between the University and the student. The purpose of the official use of the student e-mail account is to provide an effective means of communicating important university related information to UWG students in a timely manner. It is the student's responsibility to check their email.

# Credit Hour Policy

The University of West Georgia grants one semester hour of credit for work equivalent to a minimum of one hour (50 minutes) of in-class or other direct faculty instruction AND two hours of student work outside of class per week for approximately fifteen weeks. For each course, the course syllabus will document the amount of in-class (or other direct faculty instruction) and out-of-class work required to earn the credit hour(s) assigned to the course. Out-of-class work will include all forms of credit-bearing activity, including but not limited to assignments, readings, observations, and musical practice. Where available, the university grants academic credit for students who verify via competency-based testing, that they have accomplished the learning outcomes associated with a course that would normally meet the requirements outlined above (e.g. AP credit, CLEP, and departmental exams).

## HB 280 (Campus Carry)

UWG follows University System of Georgia (USG)

guidance: <https://www.usg.edu/policymanual/section6/C2675>  
(<https://www.usg.edu/policymanual/section6/C2675>).

You may also visit our website for help with USG Guidance: <https://www.westga.edu/police/campus-carry.php> (<https://www.westga.edu/police/campus-carry.php>).

## Mental Health Support

If you or another student find that you are experiencing a mental health issue, free confidential services are available on campus in the [Counseling Center](https://www.westga.edu/student-services/counseling/). (<https://www.westga.edu/student-services/counseling/>). Students who have experienced sexual or domestic violence may receive confidential medical and advocacy services with the Patient Advocates in [Health Services](https://www.westga.edu/student-services/health/) (<https://www.westga.edu/student-services/health/>). To report a concern anonymously, please go to [UWGcares](https://www.westga.edu/uwgcares/) (<https://www.westga.edu/uwgcares/>).

[Online counseling](https://www.westga.edu/student-services/counseling/index.php) (<https://www.westga.edu/student-services/counseling/index.php>) is also available for online students.

## ELL Resources

If you are a student having difficulty with English language skills, and / or U.S. culture is not your home culture, specialized resources are available to help you succeed. Please visit the [E.L.L. resource page](https://www.westga.edu/isap/ell-resources.php) (<https://www.westga.edu/isap/ell-resources.php>) for more information.

## Additional Items

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