Welcome! Chemistry 208 is the second half of a two-semester sequence designed to introduce the principles of chemistry. We will be covering a range of introductory topics, including acid-base chemistry, thermodynamics in chemical reactions, nuclear chemistry, kinetics of chemical reactions, electrochemistry, descriptive inorganic chemistry, and coordination chemistry.

This is an exciting, complex subject, and makes for a challenging course. Our emphasis is on solving chemical problems, not just memorizing aspects of chemical behavior. This requires practice, strong mathematical skills, and the correct use of the ideas introduced in the course. The result can be a deeper understanding of the underlying logic, beauty, and simplicity of the natural world.

Pre-requisite: CHEM 103

NOTE: A complementary laboratory course (CHEM 254 or CHEM 256) is offered separately

REQUIRED MATERIALS:

- “Chemistry: Atoms First” by OpenStax College
  Free Textbook Online: https://openstax.org/details/books/chemistry-atoms-first
  (You may also choose to purchase a hard-copy for $65 on Amazon.)

- Paid access to the “Sapling Learning” online homework system
  Registration instructions can be found on our course website on Blackboard. Access can be purchased online for $42, and a 14-Day Free Trial is available.

- Scientific Calculator
  Capable of handling scientific notation, logarithms, and exponents, e.g., TI-30XA.
  (Note: Other electronic devices are NOT allowed during exams or quizzes)

GRADING

There are 3 midterm exams and one cumulative final in this course. In addition, there will be multiple graded quizzes, online homework, and in-class participation activities. The weighting for each of these categories is shown in the pie chart on the right. A general guide for a typical overall grade % → Letter Grade conversion is shown below. However, depending on overall class performance, final class grades may be curved and this scale would then be adjusted as necessary.
COURSE GOALS

A student who has completed the requirements for CHEM 208 will have:

1. Studied the content, principles & methods of chemistry
2. Developed an appreciation for the relevance of chemistry in our daily lives
3. Improved analytical and problem solving skills

These objectives will be accomplished by participation in class discussions, rigorous data analysis, and participation in exercises based upon reading material from the assigned text.

LECTURES

An approximate schedule for the chapters to be covered each week is included in this document. You are responsible for material covered in class AND in the textbook (whether or not it was covered in lecture). Lectures will cover only highlights of the assigned textbook reading material.

Lecture Etiquette. Out of respect for your classmates, please observe the following rules:

- Arrive on time. If an emergency causes you to arrive late, please enter quietly.
- Be attentive and do not pack up your belongings before the end of class.
- Keep side conversations to a minimum and refrain from activities that would distract other students in the class.
- Keep mobile devices on silent, and refrain from sending or reading text messages not related to class.
- Do not browse or read materials that are unrelated to the lecture. This includes – but is not limited to – newspapers, books, magazines, and the internet.

The dates for the exams are provided in the course schedule included in this document. Chemistry knowledge is cumulative so questions will often depend on knowledge from earlier chapters.

What happens if I fail an exam or quiz?
- Missed exam/quiz = score of zero on that exam/quiz
- No make-up exams/quizzes.
- Your lowest midterm exam score will be dropped.
- Your lowest quiz score will be dropped.
- You may arrange for an excused absence to avoid a zero.

What happens if I miss an exam or quiz?

How can I be excused from an exam or quiz?
- You must have proof of either an unavoidable, pre-existing conflict, or a legitimate emergency.
- Prior notice must be given.
  - Check today & tell instructor ASAP.
  - Emergency? E-mail instructor before class.

The final exam is mandatory to pass this course and cannot be excused.

HOMEWORK

This course uses a specialized on-line homework system called Sapling Learning (sign-up instructions can be found on Blackboard.) Homework assignments will be posted by chapter with firm deadlines for each assignment. Once the assignment deadline has passed reduced credit may be available, and the assignment can also still be used for review. Please contact Dr. Thorsen if you complete a homework assignment late and wish to receive partial credit. Additional materials such as textbook readings, videos, and questions will be assigned in class (and on Blackboard) and may also count towards your Homework grade. Students may work together on homework with the understanding that content mastery is an individual responsibility.
Mastering problem solving requires frequent practice and exposure to a variety of different problems and is essential for success in this course.

- Prepare before and review after class by doing suggested reading and practice problems.
- Take chapter notes while reading.
- Practice working quantitative AND conceptual problems.
- Identify problems you don’t understand and seek help from classmates or the instructor.
- Each week expect to spend 3 hours in-class and average 8 hours of studying outside class.
- Maintain a consistent schedule and make sure to get enough sleep.
- Begin reviewing for exams at least a week in advance.

**COURSE POLICIES**

**Blackboard and Course Communication:**

Important information, announcements, and handouts will be posted on Blackboard (https://blackboard.wm.edu). Students should check Blackboard and their W&M email accounts regularly to stay informed, at least daily. Students can email Dr. Thorsen questions or concerns and should typically receive a response within 24 hours on weekdays. (Emails sent over the weekend may not receive a response until Monday.)

**Attendance Policy:**

Class attendance is expected for all scheduled class meetings and required on scheduled exam dates. If a student is absent more than 20 percent of scheduled instructional time, attendance may be defined as unsatisfactory. Attendance will be recorded during the first 10 minutes of class. Students are responsible for everything that is covered during class including demonstrations and other visual aids. Students missing class for any reason are expected to get notes from a peer in the class and check Blackboard for any important announcements they might have missed. If an in-class test or quiz is missed due to an absence, it cannot be made up unless prior arrangements have been made with the instructor. A student who engages in disruptive behavior during class may be asked to leave, and will be counted as absent if sent away.

**Grade Policy:**

When calculating grades, the points for an individual category will be added together and weighted depending upon the percentage of the final grade of each category.

For example, if each quiz is worth 100 points and there are 3 quizzes; the total points for the “Quiz” category is 300 points. If a student scores a 75/100 on the first quiz, an 82/100 on the second quiz, and an 86/100 on the 3rd quiz, they will earn 243/300 points or 81% for the “Quiz” category. The “Quiz” category is weighted as 5% of the final grade, so this student would receive 4.05 points towards their final grade (0.81 x 5 = 4.05).

The weighted points from each category are then summed together to give the final grade out of 100 points. Letter grades will be assigned to final numerical scores according to the scale on the first page of this syllabus. At the instructor’s sole discretion, a higher grade may be awarded if the final average for the entire class is subminimum, and/or if the student exhibits regular attendance and rising test scores or a final exam above their semester average.

Final grades are made available to each student on Blackboard and Banner. Based on the progression of the course, the weighting for each category may change. However, if changes are made, I will notify students in a timely manner and in writing.
This schedule is tentative and subject to change. Any changes will be announced in class and on the course website.

<table>
<thead>
<tr>
<th>Week</th>
<th>Day</th>
<th>Date</th>
<th>Reading</th>
<th>Lecture Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mon</td>
<td>7/1</td>
<td>14.1-14.3</td>
<td>Acids, Bases, pH Scale, Equilibria, Strength</td>
</tr>
<tr>
<td></td>
<td>Tues</td>
<td>7/2</td>
<td>14.4-14.5</td>
<td>Neutralization Reactions, Salts, Multiple Equilibria, Polyprotic Acids</td>
</tr>
<tr>
<td></td>
<td>Wed</td>
<td>7/3</td>
<td>14.6</td>
<td>Buffers, Henderson-Hasselbalch Equation</td>
</tr>
<tr>
<td></td>
<td>Thur</td>
<td>7/4</td>
<td></td>
<td>Independence Day – NO CLASS</td>
</tr>
<tr>
<td></td>
<td>Fri</td>
<td>7/5*</td>
<td></td>
<td>Online Activity – NO CLASS</td>
</tr>
</tbody>
</table>

* last day to Add/Drop

| 2    | Mon | 7/8  | 14.7 | Titration Curves, Indicators |
|      | Tues| 7/9  | 15.1 | Solubility Product, Selective Precipitation, Common Ion Effect |
|      | Wed | 7/10 | 15.2-15.3 | Lewis Acids & Bases, Multiple Equilibria, pH & Precipitation |
|      | Thur| 7/11 | 9.3-9.4 12.1-12.2 | Thermodynamics, Enthalpy, Spontaneity, Entropy |
|      | Fri | 7/12 | 8:00 – 9:00 am | MIDTERM #1 (Chapters 14 & 15) |
|      |     |      | 12.3-12.4 13.4 | Gibb’s Free Energy, Equilibrium & ΔG |
|      |     |      |      | (lecture 9:00 – 10:30am following Midterm #1 in ISC 1280) |

| 3    | Mon | 7/15 | 16.1-16.2 | Electrical Energy, Redox Reactions, Galvanic Cells |
|      | Tues| 7/16 | 16.3-16.4 | Standard Reduction Potentials, Nernst Equation, Concentration Cells |
|      | Wed | 7/17 | 16.6-16.7 | Corrosion, Electrolytic Cells |
|      | Thur| 7/18 | 4.4-4.6 5.1-5.2 | Lewis Structures, VSEPR Theory, Polarity, Valence Bond Theory, Hybridization |
|      | Fri | 7/19*| 8:00 – 9:00 am | MIDTERM #2 (Chapters 12 & 16) |
|      |     |      | 5.3-5.4 | Multiple Bonds, Molecular Orbital Theory, LCAOs, MO Diagrams |
|      |     |      |      | (lecture 9:00 – 10:30am following Midterm #2 in ISC 1280) |

| 4    | Mon | 7/22 | 19.1-19.2 | Transition Metals, Coordination Compounds, Ligands, Isomerism |
|      | Tues| 7/23 | 19.3 | Crystal Field Theory, Magnetism, Absorption & Color |
|      | Wed | 7/24 | 17.1-17.2 | Kinetics, Reaction Rates |
|      | Thur| 7/25 | 17.3-17.4 | Rate Laws, Method of Initial Rates, Integrated Rate Laws, Half-Life |
|      | Fri | 7/26 | 8:00 – 9:00 am | MIDTERM #3 (Chapters 5, 19, & a little of 17) |
|      |     |      | 17.5-17.7 | Collision Theory, Activation Energy, Mechanisms, Rate Limiting Step |
|      |     |      |      | (lecture 9:00 – 10:30am following Midterm #3 in ISC 1280) |

| 5    | Mon | 7/29 | 20.1-20.2 | Strong Nuclear Force, Radioactivity, Nuclear Reactions |
|      | Tues| 7/30 | 20.3-20.4 20.6 | Radioactive Decay, Half-Life, Transmutation, Fission, Fusion |
|      | Wed | 7/31 | Drift/Review |
|      | Thur| 8/1  | Drift/Review |
|      | Fri | 8/2  | 8:00 – 10:30 am | MIDTERM #3 (CUMULATIVE – ALL Chapters above) |
**Academic Integrity:**

Cheating in any form will NOT be tolerated.

You have promised that all submitted material is your own original work and is presented in your own words.

The College of William & Mary has had an honor code since at least 1779. Academic integrity is at the heart of the university, and we all are responsible for upholding the ideals of honor and integrity. The student-led honor system is responsible for resolving any suspected violations of the Honor Code, and I will report all suspected instances of academic dishonesty to the honor system. The Student Handbook ([www.wm.edu/studenthandbook](http://www.wm.edu/studenthandbook)) includes your responsibilities as a student. Your full participation and observance of the Honor Code is expected. To read the Honor Code, see [www.wm.edu/honor](http://www.wm.edu/honor).

Students may work with other students on reading quizzes and homework, but are required to submit their own answers. Exams will be closed book, closed note and independent. Non-emergency use of a cell phone or other unapproved resources during an exam is grounds for Honor Council proceedings, an F on the exam or an F in the class at the discretion of Dr. Thorsen.

**Student Accessibility Services:**

William & Mary accommodates students with disabilities in accordance with federal laws and university policy. Any student who feels they may need an accommodation based on the impact of a learning, psychiatric, physical, or chronic health diagnosis should contact Student Accessibility Services staff at 757-221-2512 or at sas@wm.edu to determine if accommodations are warranted and to obtain an official letter of accommodation. For more information, please see [www.wm.edu/sas](http://www.wm.edu/sas).

If you anticipate requiring specific accommodations based on documented disabilities, please notify me ASAP (by response to the introductory class survey, an email or personal contact) so that I can make adjustments to minimize their impact on your performance in this class.

**Success:**

I want you to succeed in this course and at William & Mary. I encourage you to come see me during office hours or to schedule an appointment to discuss course content or to answer questions you have. If I become concerned about your course performance, attendance, engagement, or well-being, I may speak with you. I also may submit a “CARE Report” through our Care Support Services. The referral will be received by the Dean of Students Office as well as other departments when appropriate. Someone will contact you to help determine what will help you succeed. Please remember that this is a means for me to support you and help foster your success at William & Mary.

**Academic Support:**

The Dean of Students Office offers several Academic Enrichment Programs to assist students. The Tribe TutorZone is a place where peer tutors provide low-fee tutoring services in many subjects. The TutorZone only offers one-on-one tutoring, not group tutoring. Tutoring sessions are held in the Tribe TutorZone on the first floor of Swem Library, and students should register at least 48 hours in advance by using the TutorZone scheduling website ([https://wm.mywconline.com](https://wm.mywconline.com)). Additionally, small-group workshops designed to help students develop study skills to achieve their academic and personal goals are available in the Brown Board Room of Swem Library, and students should register in advance by using the TutorZone scheduling website ([https://wm.mywconline.com](https://wm.mywconline.com)).