

Fall 2023

## CHEM F103X: Introduction to Basic Chemistry

Instructor: Dr. Lawrence K Duffy

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Office Hours: MWF 10:15am-11:15am

**Lecture Schedule:** MWF 9:15am-10:15am

**Lab Schedule:** Section 901 - R 11:30am-2:30pm, Section 902 - R 2:45pm-5:45pm

### Course Description:

Fundamentals of chemistry including historical and descriptive aspects. Fulfills the laboratory part of the natural science requirement and prepares the student for CHEM 105X and CHEM 104X.

### Philosophy:

At the same time health scientists and policy experts worry about a social system which faces an increasingly technological world, university=ites work to show students the role of basic chemical and biochemical sciences as they function within the context of complex medical systems. Chemistry and biochemistry are central to the world around us and it is not that difficult to understand them or their importance to our social and economic systems.

### Course Objectives:

The overall objectives of this course are to provide each of you with an understanding of some chemical principles, an appreciation of how chemistry pervades our society, the historical aspects of its concept development, an ability to understand some of the scientific issues which confront us as citizens, and an appreciation of how, and the extent of which, science is able to solve our problems (or create them).

#### Goals:

1. Become familiar with the methods of science used by chemists and biochemists
2. The role of experimentation and hypothesis testing
3. Major concepts of chemistry such as conservation of matter, catalysts, pH, etc...
4. The role of chemistry in society and medicine as evidenced by readings or magazine reports

### Learning Objectives:

1. What is the difference between matter and energy?
2. What feature of the atom determines its density?
3. What are the fundamental types of chemical bonds, and how are they formed?
4. What is a chemical reaction? How does one balance a reaction? What is the definition of a mole? And how does it allow for the determination of mass-mass relationships in chemical reactions?

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5. What are the states (phases) of matter and how do intermolecular forces affect the phase at a given temperature?
6. What is a solvent, and what general feature of the solvent determines the types of solutes that will dissolve?
7. What is the activation energy for reaction, and how does this energy influence the rate of a reaction?
8. What is the definition of an acid? A base?

**Grading:**

3 Exams	300
Final Exam	100
Lab	100
Total	500

The grades will not be curved and I reserve the ability to adjust grades upward. Individual effort will be noted. Letter grades will be assigned with the following approximate cutoffs: A = 450, B = 400, C = 300, D = 200. Plus and minus grades will be used:

**Exams:**

The hour exams will cover material from the textbook chapters as well as associated concepts from the laboratory. The final will cover the whole course, but the major component of the exam will focus on material covered following the third exam.

**Lab:**

Each experiment will require a report (generally to be turned in before you leave). You will be graded on the quality of your personal results (where appropriate), your report, and your level of participation in group activities will be noted. Your teaching assistant will be responsible for assigning lab grades, and he/she will explain how your point total for the lab will be determined. Some lab activities may be reviewed for exams, videos of issues in modern chemistry, safety instruction, and assessment exercises.

**Lab Section:**

Be aware of what lab section and time you are registered for. Contact your teaching assistant if you are going to miss a lab. If you ignore the teaching assistants lab safety rules, you will be dismissed from the lab.

**Homework:**

Doing homework problems is the key to success, I will suggest problems in the *exercises* section at the end of each chapter. The solutions to the problems can be found in the back of the book. You do not need to turn in any of this work. However, if you have questions, please bring them up in class. Working with these exercises is part of what you must do to prepare for exams.

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**Lecture Text:**

This year we are using a classic text that is organized by sections and is based on current issues related to biomedicine. The first part is structure of matter and some chemical concepts. Other chapters are related to organic chemistry and biochemistry.

**Department Policy on Cheating:**

The Department of Chemistry & Biochemistry Policy of Cheating is: "Any student caught cheating will be assigned a course grade of F. The student's academic advisor will be notified of this failing grade and the student will not be allowed to drop the course." The Department considers performing unauthorized "dry labs" as cheating.

Partnering during the lab may be acceptable but lab reports must show your own calculations and ideas.

**Semester Schedule:** *\*Schedule is subject to change*

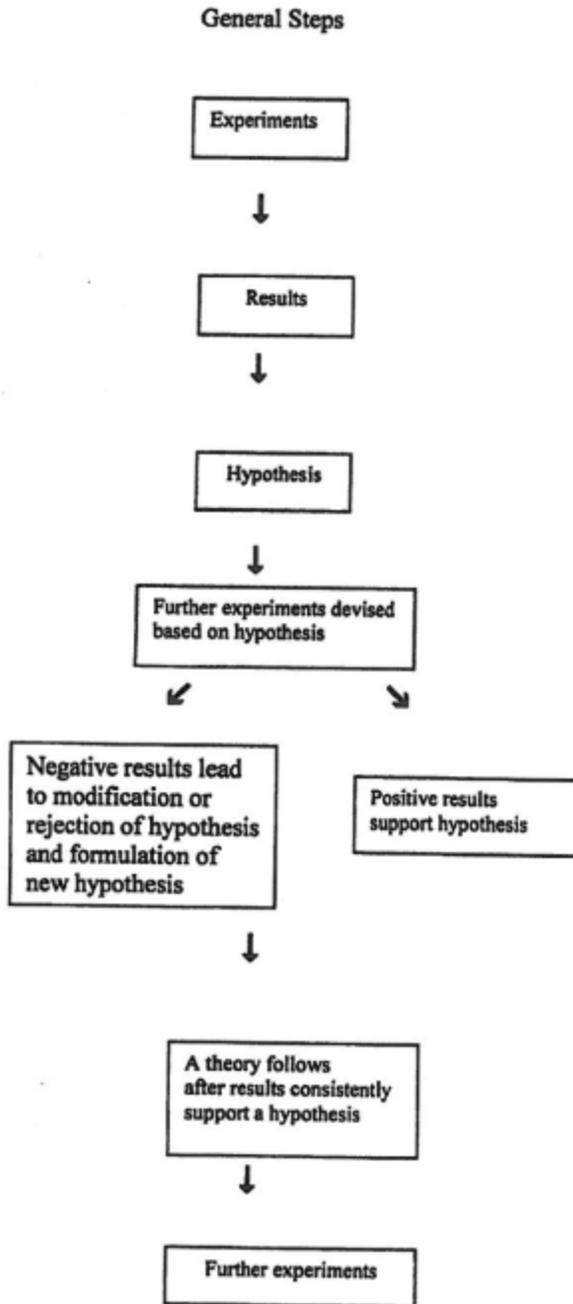
<b>Week</b>	<b>Chapter/Description</b>
August 28	<ul style="list-style-type: none"><li>• Intro - Ch 1</li></ul>
Sept 4 - No Class Monday	<ul style="list-style-type: none"><li>• Scientific Method - Ch 1</li><li>• Matter - Ch 1</li></ul>
Sept 11	<ul style="list-style-type: none"><li>• Measurements and Unit Conversions - Ch 1</li><li>• Structure of the Atom - Ch 2</li><li>• Electron Orbitals and Periodic Table - Ch 2</li></ul>
Sept 18	<ul style="list-style-type: none"><li>• Exam 1</li><li>• Octet Rule and Chemical Bonds - Ch 3</li><li>• Ionic and Covalent Compounds - Ch 3</li></ul>
Sept 25	<ul style="list-style-type: none"><li>• Naming of Simple Covalent Compounds - Ch 3</li><li>• Shapes and Properties - Ch 3</li></ul>
Oct 2	<ul style="list-style-type: none"><li>• Exam 2</li><li>• Mass Relationships - Ch 4</li></ul>
Oct 9	<ul style="list-style-type: none"><li>• Balancing Chemical Reactions - Ch 4</li><li>• Oxidation Reduction/Heat of Reaction - Ch 4</li></ul>
Oct 16	<ul style="list-style-type: none"><li>• Kinetic Molecular Theory - CH 5</li><li>• Gas Laws/Liquids/Solids - Ch 5</li></ul>

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Oct 23	<ul style="list-style-type: none"><li>• Solutions - Ch 6</li><li>• Water as a Solvent - Ch 6</li></ul>
Oct 30	<ul style="list-style-type: none"><li>• Colligative Properties - Ch 6</li></ul>
Nov 6	<ul style="list-style-type: none"><li>• Reaction Rates - Ch 7</li><li>• Equilibrium - Ch 7</li></ul>
Nov 13	<ul style="list-style-type: none"><li>• Acid and Bases - Ch 8</li></ul>
Nov 20	<ul style="list-style-type: none"><li>• Ionization Constants - Ch 8</li></ul>
Nov 27 - No class Friday	<ul style="list-style-type: none"><li>• Exam 3</li></ul>
Dec 4	<ul style="list-style-type: none"><li>• pH Scales/Buffer - Ch 8</li><li>• Radioactivity and Half-Life - Ch 9</li></ul>
Dec 11 - Finals Week	<ul style="list-style-type: none"><li>• Final Exam</li></ul>

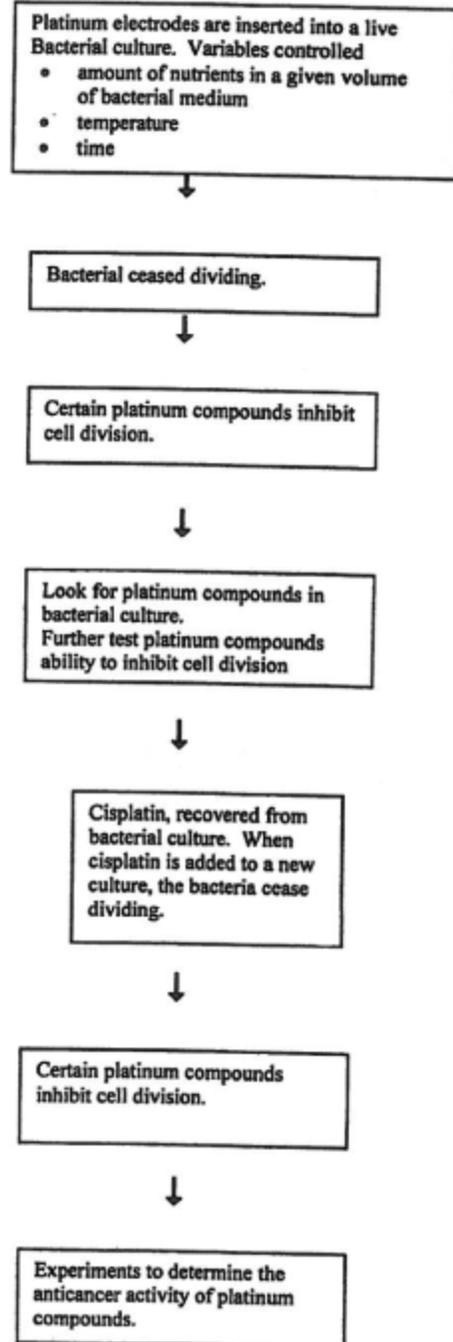
### SCIENTIFIC METHOD

A representation of the scientific method



An Example:

Rosenberg's Work



**Student protections statement:** UAF embraces and grows a culture of respect, diversity, inclusion, and caring. Students at this university are protected against sexual harassment and

discrimination (Title IX). Faculty members are designated as responsible employees which means they are required to report sexual misconduct. Graduate teaching assistants do not share the same reporting obligations. For more information on your rights as a student and the resources available to you to resolve problems, please go to the following site:

<https://catalog.uaf.edu/academics-regulations/students-rights-responsibilities/>.

**Disability services statement:** I will work with the Office of Disability Services to provide reasonable accommodation to students with disabilities.

**ASUAF advocacy statement:** The Associated Students of the University of Alaska Fairbanks, the student government of UAF, offers advocacy services to students who feel they are facing issues with staff, faculty, and/or other students specifically if these issues are hindering the ability of the student to succeed in their academics or go about their lives at the university. Students who wish to utilize these services can contact the Student Advocacy Director by visiting the ASUAF office or emailing [asuaf.office@alaska.edu](mailto:asuaf.office@alaska.edu).

**Student Academic Support:**

- Communication Center (907-474-5470, [uaf-speakingcenter@alaska.edu](mailto:uaf-speakingcenter@alaska.edu), Gruening 507)
- Writing Center (907-474-5314, [uaf-writing-center@alaska.edu](mailto:uaf-writing-center@alaska.edu), Gruening 801)
- UAF Math Services, [uaf-traccloud@alaska.edu](mailto:uaf-traccloud@alaska.edu), Chapman 305 (<https://www.uaf.edu/dms/mathlab/>, for math fee paying students only)
- Developmental Math Lab (Gruening 406, <https://www.uaf.edu/deved/math/>)
- The Debbie Moses Learning Center at CTC (907-455-2860, 604 Barnette St, Room 120, <https://www.ctc.uaf.edu/student-services/student-success-center/>)
- For more information and resources, please see the Academic Advising Resource List <https://www.uaf.edu/advising/students/index.php>

**Student Resources:**

- Disability Services (907-474-5655, [uaf-disability-services@alaska.edu](mailto:uaf-disability-services@alaska.edu), Whitaker 208)
- Student Health & Counseling [6 free counseling sessions] (907-474-7043, <https://www.uaf.edu/chc/appointments.php>, Gruening 215)
- Office of Rights, Compliance and Accountability (907-474-7300, [uaf-orca@alaska.edu](mailto:uaf-orca@alaska.edu), 3rd Floor, Constitution Hall)
- Associated Students of the University of Alaska Fairbanks (ASUAF) or ASUAF Student Government (907-474-7355, [asuaf.office@alaska.edu](mailto:asuaf.office@alaska.edu), Wood Center 119)

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discrimination, applies to students, employees, and applicants for admission and employment. Contact information, applicable laws, and complaint procedures are included on UA's statement

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of nondiscrimination available at [www.alaska.edu/nondiscrimination](http://www.alaska.edu/nondiscrimination). For more information, contact: UAF Office of Rights, Compliance and Accountability  
1692 Tok Lane, 3rd floor, Constitution Hall, Fairbanks, AK 99775  
907-474-7300

[uaf-orca@alaska.edu](mailto:uaf-orca@alaska.edu)

Additional syllabus statement for courses that include off-campus programs and research activities:

University Sponsored Off-Campus Programs and Research Activities

**We want you to know that:**

1. UA is an AA/EO employer and educational institution and prohibits illegal discrimination against

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2. Incidents can be reported to your university's Equity and Compliance office (listed below) or online reporting portal. University of Alaska takes immediate, effective, and appropriate action to respond to reported acts of discrimination and harassment.

3. There are supportive measures available to individuals that may have experienced discrimination.

4. University of Alaska's Board of Regents' Policy & University Regulations (UA BoR P&R) 01.02.020

Nondiscrimination and 01.04 Sex and Gender-Based Discrimination Under Title IX, go to: <http://alaska.edu/bor/policy-regulations/>.

5. UA BoR P&R apply at all university owned or operated sites, university sanctioned events, clinical

sites and during all academic or research related travel that are university sponsored.

For further information on your rights and resources [click here](#).