

CHEM F100X UX1
Chemistry in Complex Systems, 4 cr
Fall 2020

Instructor: Chris L. Whittle, Ph.D.

Office Hours: Fridays 5:30-6:30 p.m.

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I will be available at this number and by email during office hours, but you are welcome to contact me via email at other times and I will respond as soon as possible. When contacting me by email, include: Chem 100X and the subject (e.g., Lab 1) in the subject line.

Course Description

This class explores the fundamentals of chemistry with an emphasis on the molecular activity driving global phenomena and place-based connections drawn to Alaska. Principles such as molar ratio and feedback are illustrated as chemistry is applied to understanding the essential ecosystem services of air, water, food, materials, and energy. Prerequisites: placement in ENGL F111X or higher; placement in DEVM F105 or higher; or permission of instructor.

Course Philosophy

As we attempt to navigate toward sustainability in an increasingly technological world, citizens need to understand basic chemical and biochemical sciences within the context of complex natural systems. Chemistry and biochemistry are central to resilience and sustainable development, and the essentials are not that difficult to understand. The text book and other course materials are designed to engage you in chemistry by studying the real world issues of pollution, climate change, combustion, natural resources, and drug and food technology. We will focus on what you need to know to understand and evaluate the implications of the chemistry

Course Objectives

The overall objective of this class is to provide you with a basic literacy of chemical and biochemical principles, which requires: knowledge of historical aspects of chemistry; an essential understanding of the structure of matter and molecular activity that underlie and help explain complex systems; an appreciation for the similarities and differences between science and other ways of knowing; an ability to describe and explain essential scientific issues that confront us as citizens, including the limitations of science.

The specific goals are for you to become familiar with: 1) the methods and principles of science used by chemists and biochemists; 2) major concepts of chemistry such as conservation of matter, chemical reactions, pH, carbon chemistry, nutritional biochemistry, etc.; 3) the role of uncertainty, hypothesis testing, and weight of evidence in environmental issues; 4) the scientific value of traditional knowledge.

We want you to be able to discuss the following, using the language of general chemistry:

- < Context and action relating science to policy on real issues;
- < The scientific method, including study design and uncertainty;
- < Sustainability;
- < The structure of matter;
- < Guiding principles of chemical behavior, such as solubility, valence, and molarity.

Core Science Class

This is a Natural Science course approved for inclusion in the UAF Core Curriculum, where "The overall goal of the Natural Sciences component of the Core Curriculum is to prepare students for lifelong learning in the natural sciences..." [Faculty Senate Guidelines, 1990]. In partial fulfillment of this objective and in addition to the specific course program outlined in this syllabus and the UAF Catalog, you will receive instruction in two areas. The first is on what is generically known as the "scientific method," for which you can experience alternate approaches within different academic departments. A good primer can be found in Wikipedia's introductory paragraph on the "scientific method." Second, you will discuss within the course examples where there is interplay between scientific knowledge and public policy, where knowledge and policy can be established and/or developed. A short title could be "Science and Society." These examples should sharpen your abilities to recognize when scientific knowledge is applicable to a public/societal issue and to broaden your understanding of the scientific contributions. By way of a recent local example, how does the scientific literature concerning health effects of fluoridated water affect decisions to alter the fluoride content of municipal water? The "scientific method" and "science and society" are the two Core expectations identified for the Core Natural Science courses and are the expectations for which this course is assessed as part of the mandatory Student Learning Outcomes Assessment.

Required Materials

Lab Kit

Lab Manual and supplementary readings are contained within Blackboard.

Chemistry in Context, 10th Edition (

6 labs	15	90	9
3 labs	30	90	9
14 homework	10	140	14
14 discussion posts	10	140	14

Readings should be done early in the week. The discussion board posting and pre-lab (usually a preview of the lab materials and a short preparatory activity) are due Thursdays by 11:59 p.m. Most work is due on the Monday of the week by 11:59 p.m. Check the Course Calendar for special due dates that are notated in blue.

You are expected to spend at least 12 hours a week on this class. If you do, and you plan and use that time well, you will almost certainly pass the class. It will probably take more like 15 hours a week to earn an A.

Reading the content!

It is critical to passing online classes that you read the text. When you sit down to read, look over the writing before you begin. Read the first page, and then through the headings and captions. Think about the tables and what you think they mean. Read the summary at the end. Then read the chapter, taking notes and trying the examples and problems in the margins or your notebook

event being counted or measured.

Additional resources (usually websites) will be offered in the weekly screen-casts to provide additional context for the material. Optional links will always be labeled with **IYW** (if you want). More are offered than you are expected to explore so that you can pick and choose among them. The IYW links provide additional information that might be of interest or be useful as an example in essay questions. **If a link is not labeled IYW, you are expected to 'go there' and the material may appear on a quiz or exam.**

Homework (1

Points	Original Post (7 pts)
3	demonstrates your understanding of a chemical concept under study
2	local (to global) examples / relevance / manifestations / perceptions of the concept
2	clear concise writing
	Comments and additional Responses (3 pts)
3	contributes to others' understanding with a new idea or a good resource (include descriptive text, not just a link)

Self-Assessment (3 x 10 = 30 points)

You are asked to assess your performance in the class 5 times during the semester: one or two sentences will not earn full points. This is an opportunity for you to make sure that you are on-track and reaching the goals that you have set for this class, as well as, your academic and professional careers.

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Reflect on how you are applying what you are learning to your own experiences, interests, profession, job, or to the things you do in daily life. You may also reflect on how much time you are spending on the class materials and how much you are participating in the

Lab (6 x 15 = 90 points + 3 x 30 = 180 points)

You will be asked to purchase a take-home chemistry kit.

Each week that there is a lab, there is usually a pre-lab. Watching an introductory podcast that will help you complete the lab is part of the pre-lab, which also includes reading the lab,

Read the NPR article and write a 1-page (double-spaced) summary that addresses one of the topic paragraphs from the article that expresses your perspective. Provide at least one reference that supports your stance.

Instructor Responsibilities

Electronic mail is usually the best method of communicating for all. When contacting me by email, include: Chem 100X and the subject (e.g., Lab 1) in the subject line. Inquiries from students will be acknowledged promptly usually in less than 24 hours. If you have not received a response within 2 working days (48 hours) you may contact the Chemistry Department for assistance. Graded assignments will be returned within a week of their due date. Pre-labs that require feedback will be returned by Saturday. Office hours are a time when I will be available by the contact methods listed at the top of this syllabus. Assignments and tests will be graded and returned with any feedback within one week after the due date.

Checking Grades

To check your grades and find comments from your instructor, click on the My Grades link in the sidebar menu. All the assignments and their due dates are listed. To see details of your grades, click on the green check mark or the underlined score in the grade column. If the score is for a test or quiz, you will see a View Attempt page where you can click on the check mark or your score to see results and feedback. If the score is for an assignment, this will take you to a Review Submission History page where you will see all your work turned in and graded to that point.

Pacing Expectations

Assignments / Evaluation of Sat

Incomplete (I)

authorities. For more information on your rights as a student and the resources available to you to resolve problems, please go the following site: www.uaf.edu/handbook.

Support Services

Go to the Student Handbook (www.uaf.edu/handbook) for things like: academic advising, tutoring, library and academic support, disability services, computing and technology, veteran

unauthorized collaboration with another person in preparing written work for fulfillment of any course requirement. Scholastic dishonesty is punishable by removal from the course and a grade of F. For more information <https://uaf.edu/student-affairs/student-resources/conduct>.

Department Policy on Cheating

The Chemistry & Biochemistry Department Policy on Cheating is: If a student caught cheating will be assigned a course grade of F. The academic advisor will be notified of this the the