

# C H e m I s t r y o f t h e E l e m e n t s

Spring 2020

Chem 2131

Instructor- Dr. Debbie Gale Mitchell (Please call me "Dr. Mitchell")

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Virtual office on Zoom: link on canvas

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**SECTION 2:M/W** noon-2PM **SECTION 3: T/R** noon-2PM

## Text:

- 1.) **Text:** Connect Chemistry with LearnSmart and eBook - *Chemistry: The Molecular Nature of Matter and Change, 8<sup>th</sup> Edition, Silberberg, McGraw-Hill Publishers* No paper text is required but you can buy a used copy of the 5<sup>th</sup> or 6<sup>th</sup> editions of the Silberberg text if you wish. Used copies cost about \$15 – 50 on Amazon
- 2.) **Supplemental:** *Descriptive Inorganic Chemistry, Glen E. Rodgers, 3<sup>rd</sup> Edition*. This is the textbook that I have used previously for this class. There will be a couple copies in the Science and Engineering Center for your reference. Some of the images in the PowerPoints will be from this text.
- 3.) **Supplemental (continued):** I will also provide many resources through canvas including *Napoleon's Buttons* by Penny Le Courtier, *Atomic Romances*, *Molecular Dances* by Mala Radhakrishnan, and many other resources. Please stay up-to-date on Canvas to get access to all resources required for this class.

## Other required materials:

- 1.) **Calculator:** You must have a scientific calculator for this class. It should be able to perform basic log and exponential functions.

**Course Objectives:** Each student will learn principles such as coordination chemistry, descriptive chemistry, solid-state chemistry, nuclear chemistry and information literacy. Students will use their knowledge of these concepts to address chemical problems. Associated goals are to sharpen critical thinking and develop a solid basis for future study in molecular sciences.

**Grading:** We are living through unprecedented uncertainty. I understand that all of you are going through a tremendous amount of stress. Because of these circumstances, every assignment & assessment that you submit will be pass/fail. You must give an 80% effort to receive full credit. You will either receive full points or zero points on each assignment. I will give you the opportunity to resubmit if you do not pass the assignment on the first attempt. There will 1000 total points in this class. To get an A you must get 930 points, 900 for an A-, 870 for a B+, 830 for a B, 800 for a B-.... Etc. The point breakdown is below.

**Information Literacy/Community Based Project (200 points):** This quarter, you will be asked to create a creative work & video (with an elementary school audience) that features one of the elements on the periodic table. We will create a youtube channel for this assignment so that kids all around the world can benefit from your videos! Through this project, you will learn principles of information literacy (how to find, evaluate, and communicate good information). This assignment is designed to be complimentary with your WRIT 1133 course. For this project you will work in teams of 4. The details of this assignment can be found on canvas.

**Exams (350 points):**

- a) There will be 5 one-hour midterm exams (50 points each) and one final exam (100 points).
- b) There are 5 modules (each two weeks long). You will take a midterm at the end of each module. The final exam will be two hours long.
- c) Your final exam grade may double count for one of the midterm exam scores if you do better on the final.
- d) All exams will be cumulative because the class naturally builds on previous material. However, each midterm will focus more heavily on the content from that module.
- e) If you do not “pass” an assessment you will be given the opportunity to retake the assessment or a similar assessment.

**Homework (200 points):** Each week you will complete a homework assignment. Homework will be due on Saturday night of each week. (Week 1 assignment will be due Saturday April 4<sup>th</sup> @11:59 PM). Each homework assignment will be worth 20 points, with a total of 200 points over 10 weeks.

**Information Literacy Scaffolding Assignments (100 points):** You will have several assignments to help you learn principles of information literacy. These assignments are designed to compliment what you are learning in your Writ 1133 course.

**Participation (150 points):** Each week you will have several ways to participate & engage with the class: reflections, discussion boards, etc. Participation will be critical in this online setting.

**Grading:**

The breakdown of the course grades is as follows:

Video Project	200 points
Exams	350 points
Homework	200 points
Information Literacy	100 points
Participation	150 points
<b>TOTAL</b>	<b>1000 points</b>

Grades will be based on the following approximate grade scale:

930 pnts	A	730	C
900	A-	700	C-
870	B+	670	D+
830	B	630	D
800	B-	600	D-
770	C+	<600	F

## Help

Students who need help in this class have several options:

**(1)** The Science and Engineering Center, is remote this quarter through Zoom! A schedule is available on canvas and on the Science and Engineering Center portfolio site:

<http://portfolio.du.edu/sec>

**(2)** The instructor has office hours for consultation. If you cannot make the set office hours, you can schedule an appointment.

**(3)** Peers (Study Groups): Even though we are all working remotely, take opportunities to use Zoom to work with the peers in your classes. You can learn a lot you're your fellow classmates.

Your best help may come from your fellow students. Meeting regularly on Zoom with a study group, for discussing ideas and working together on homework will be one of the best helps in learning and understanding the material. Even if you don't think you need the help from others, you will often find that teachers learn more than the students.

## Academic Honesty in Chemistry of the Elements:

- 1.) You are encouraged to study with other students in preparing for exams and discussing assigned problems to be submitted as homework.
- 2.) However, each student is required to provide their own work on homework and exams. Copying an exam or homework is a violation that will not be tolerated in this class, and a zero will be given for the assignment or exam. Repeated offences will result in failure of the course.

**Tentative Lecture & Homework Schedule:**

<b>Date</b>	<b>Topic</b>	<b>Silberberg</b>
<b>Week 1</b>	Brønsted-Lowry and Lewis Acid-Base Theory, HSAB & Line Drawings	S: 18.1–18.3 & 18.9 Napoleon Buttons Intro
	Introduction to Coordination Chemistry: Coordination, Ligands, and Structure	S: 23.1–23.3
<b>Week 2</b>	Nomenclature of Coordination Compounds	S: 23.1–23.3
	Structure and Isomerism	S: 23.1–23.3
	Information Literacy: Meg Eastwood, DU Science Librarian	
	Structure and Isomerism	S: 23.1–23.3
<b>Week 3</b>	Coordination Bonding Theory	S:23.4
	Crystal Field Splitting, Spectrochemical series	S:23.4
	Magnetic Properties + Absorption Spectroscopy	S:23.4
<b>Week 4</b>	Applications of Coordination Compounds	Supplemental
	Intermolecular Forces (Review)	S: 12.1–12.4
	Properties of Solids: Types of crystals	S: 12.5–12.7
<b>Week 5</b>	Solid-state structures: Crystal Lattices and Unit Cells and Lattice Energy	S: 12.5–12.7
	Periodic Trends: Ionic Radii, Electronegativity, etc.	
	Uniqueness principle, Diagonal Effect, Inert Pair Effect	Supplemental
<b>Week 6</b>	Begin Survey of Periodic Table: Hydrogen Isotopes & Nuclear reactions	S: 14.1 & 24.1
	Nuclear Radiation and Energy	S: 24.2–24.5
	Applications of Nuclear Chemistry	S: 24.2–24.5
<b>Week 7</b>	Oxidation-Reduction Review	S: 21.1
	Electrochemical Cells & Nerst Equation	S: 21.2–21.4
	Redox & Metallurgy	S: 22.3–22.4
<b>Week 8</b>	Group 1A & 2A: Alkali & Alkaline Earth Metals	S: 14.4
	Group 3A Elements	S: 14.5
<b>Week 9</b>	Group 4A Elements & Carbon Cycle	S: 14.6 & 22.2
	Group 5A Elements & Nitrogen and Phosphorous Cycles	S: 14.7 & 22.2
	Group 6A Elements	S: 14.8
<b>Week 10</b>	Halogens	S: 14.9
	Nobel Gases	S: 14.10
	Review	-----