

Chemistry 355

Intermediate
Inorganic
Chemistry

Spring 2018

Section 1

University of
Wisconsin-
Stevens Point

PERIODIC TABLE OF THE ELEMENTS

1	2											3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18						
H	He											B	C	N	O	F	Ne																
Li	Be	B	C	N	O	F	Ne	Na	Mg	Al	Si	P	S	Cl	Ar	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr	Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Au	Hg	Tl	Pb	Bi	
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Au	Hg	Tl	Pb	Bi	Po	At	Rn	Cs	Ba	La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er		
55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	
Cs	Ba	La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn		
87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118		
Fr	Ra	Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Mendelevium	Nobelium	Lutetium	Hassium	Meitnerium	Darmstadtium	Roentgenium	Copernicium	Nihonium	Flerovium	Moscovium	Livermorium	Oganesson	(118)	(119)	(120)	(121)			
Lanthanides		59	60	61	62	63	64	65	66	67	68	69	70	71																			
Actinides		89	90	91	92	93	94	95	96	97	98	99	100	101	102	103																	

How many elements are officially on the periodic table?

Course Description and Objectives

If organic chemistry is defined as the chemistry of hydrocarbon compounds and their derivatives, "***inorganic chemistry can be broadly defined as the chemistry of everything else***".

Intermediate inorganic chemistry is an introduction to the chemistry of inorganic compounds and materials. In addition, intermediate inorganic chemistry serves as a "communication in the major"

requirement. Hence we will introduce ways to effectively communicate in chemistry.

Upon completion of Chem 355, a successful student will have:

- mastered the fundamental chemical principles and theories of inorganic chemistry.
- Obtained problem solving skills (both qualitative and quantitative).

- Developed essential communication skills (including reading, writing, and oral communication skills).

Keep an eye out on D2L for Study Guides that correspond to the lecture material. These study guides contain suggested reading and learning outcomes for each unit for the remainder of the semester.

Your Professor: Dr. Mondloch (Dr. M)

Office: Sci D145

Phone Extension: (715) 346-3715

Email: jmondloc@uwsp.edu

Office Hours: T 4-5, W 10-11, Th 4-5.

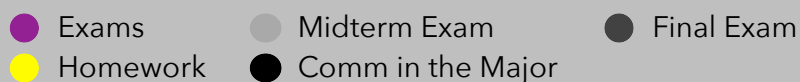
Additional times available by appointment (please email me).

Course Website: Additional information can be found on the course website in D2L (INTERMED INORGNC CHEM).

Required Materials:

Lecture textbook (Required): Shriver, D.; Weller, M.; Overton, T.; Rourke, J.; Armstrong, F. *Inorganic Chemistry* (6th Edition), W.H. Freeman & Company. ISBN: 978-1429299060.

Assignments & Grading



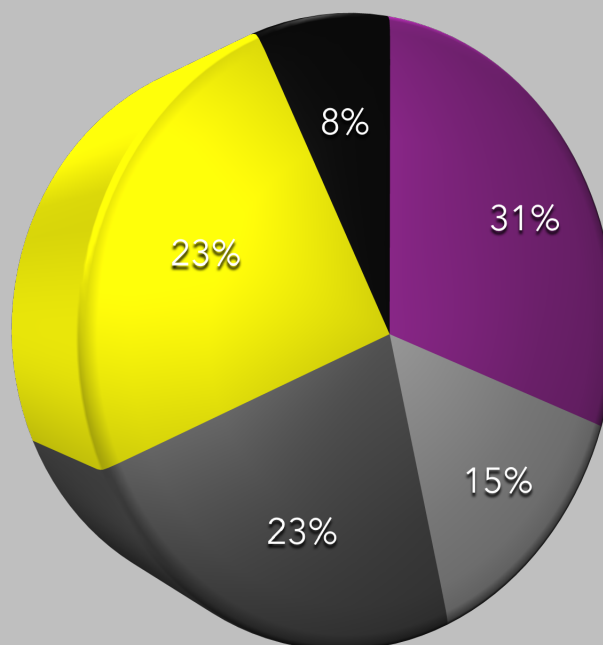
There will be two one-hour **exams. 200 total points.**

Your **midterm** will be cumulative. **100 total points.**

Your **final exam** will be cumulative. **150 total points.**

You will be turning in five **homework** sets (one for each unit). **100 total points.**

You will have five **communication in the major** assignments. **50 total points.** Abstract assignment (Completion), Elevator pitch (Completion), Drawing molecular structures - Chem Draw (Completion), Drawing solid-state structures - Mercury (Completion), Oral presentation (50 pts).



The grading scale is shown below. I will never adjust the grade scale higher. For example, if you obtain 83% in the class, you will receive no less than a B. Please do not ask if I grade on a curve. Your grades will be regularly updated on D2L and it is YOUR responsibility to keep track of them.

Grades: A (100 - 93%); A- (<93 - 90%); B+ (<90 - 87%); B (<87 - 83%); B- (<83 - 80%); C+ (<80 - 77%); C (<77 - 73%); C- (<73 - 70%); D+ (<70 - 67%); D (<67 - 63%); F (<63%).

Homework

Homework sets will be handed out at the start of each unit. I will do my best to return these homework assignments, graded, in a reasonable time frame. If questions arise on the homework problems be sure to seek help from me during office hours or another time.

Exams

There will be a total of four exams over the course of the semester. Two of the exams (Exams 1 & 2) will be 1 h in length and cover the most recent material from lecture. The midterm and final exam will be cumulative in nature. The midterm exam will be one hour in length, while the final exam will be two hours in length. Students who are unable to attend the class the day of the final exam must make arrangements with me prior to the exam; no make-up will be given after the final exam date.

Communication in the Major

Communication in the major assignments will be handed out regularly throughout the semester. Their focus is on getting you to communicate chemistry effectively. These assignments range from reading, writing, and presenting, to being able to use chemistry specific software to communicate about chemistry.

Tentative Lecture Schedule

The following is a list of topics that we will tentatively cover in Chemistry 355 this semester.

Unit 1 - Covalent Bonding & Molecular Structure

- Symmetry considerations
- Homo and heteronuclear diatomics
- Bond properties

Unit 2 - Acid-Base Chemistry

- Lewis acids and bases
- Frustrated Lewis pairs
- Hard and soft acids and bases

Unit 3 - Coordination Chemistry

- Coordination compounds
- Bonding (crystal field theory)
- Reactivity and mechanisms

Unit 4 - Organometallic Chemistry

- Organometallic compounds
- Bonding
- Reactivity and catalysis

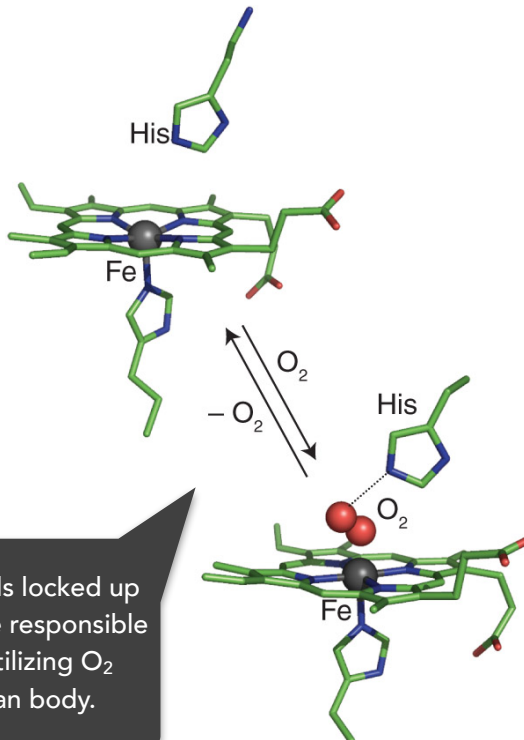
Unit 5 - Solid-State Chemistry

- Solid-state structures
- Ionic and metallic bonding
- Conductivity in solids

Tentative lecture topics are shown above; they may need to be adjusted depending on the pace of the class.

Exam, Homework, and Comm in the Major dates will NOT change. See “the fine print” for details regarding policies for makeup exams.

Other important dates: Drop date no grade (Wednesday 1/31).
Drop date W (Friday 4/6).



Coordination compounds locked up in biological enzymes are responsible for transferring and utilizing O_2 throughout the human body.

Quiz, Exam, & Comm in the Major Schedule

Exams	Date
Exam 1	2/16 (Friday)
Midterm Exam	3/15 (Friday)
Exam 2	4/20 (Friday)
Final Exam	5/17 (Thursday 10:15-12:15)

Homework	Due Date
Unit 1	2/9 (Friday)
Unit 2	3/2 (Tuesday)
Unit 3	3/23 (Friday)
Unit 4	4/13 (Friday)
Unit 5	5/11 (Friday)

Comm In the Major	Due Date
Abstract Writing Assignment	2/7 (Friday)
Elevator Pitch	3/9 (Friday)
Drawing Molecular Structures	4/6 (Friday)
Drawing Solid Structures	5/4 (Friday)
Oral Presentation	5/11 (Friday)

The Fine Print

Attendance

It is in your best interest to attend all lectures. Make up exams are NOT allowed except under the following circumstances:

- (i) UWSP athletic event. Please get written authorization from your coach.
- (ii) Armed forces related training or drills. Please bring me written authorization from your supervising officer.
- (iii) Medical emergency. Please bring me authorization from your physician.
- (iv) Death in the family. Please bring me some sort of documentation.

Disability Services

UWSP is committed to providing reasonable and appropriate accommodations to students with disabilities and temporary impairments. If you have a disability or acquire a condition during the semester where you need assistance, please contact the Disability and Assistive Technology Center on the 6th floor of Albertson Hall (library) as soon as possible. DATC can be reached at DATC@uwsp.edu.

Study Hints

This course will not be easy for most students. Homework sets are designed to alert you to your level of comprehension and encourage you to **seek help** before you are in trouble.

Suggested Study Routine:

- (i) Skim relevant text prior to class.
- (ii) Take notes in class.
- (iii) Be engaged in class and finish worksheets in class.
- (iv) Check answers to worksheets after class (on D2L)
- (v) Keep a running list of potential exam topics.
- (vi) Re-write and organize your notes in conjunction with reading.
- (vii) Work problems daily.

Academic Integrity

Academic misconduct is serious and can follow you throughout your entire academic and professional career. You are a student at the University of Wisconsin-Stevens Point and you should know the student academic standard and disciplinary procedures. More information regarding this topic can be found at the following link <http://www.uwsp.edu/dos/Pages/Academic-Misconduct.aspx>. Look at it, read it, and comprehend the decisions you make regarding your academic integrity!

Media Devices

Use of personal multimedia devices during class meetings is not permitted unless you are using it as a note-taking device. This includes cellular phones, iPods, iPads, computer, PDAs, and other similar devices.

Approximately 70 of the 83 stable elements on the periodic table can be found in smartphones—this accounts for 84% of the stable elements. For example, the elements below can be found in the displays of many of your smart phones. (ACS ChemMatters Teachers Guide *Smartphones: Smart Chemistry*, April 2015)

Al

O

Si

Na

K



Dr. Mondloch's Schedule

	Monday	Tuesday	Wednesday	Thursday	Friday
8 am	Chem 299/399	R,P,G	Chem 299/399	R,P,G	R,P,G
9 am	Chem 299/399	Lecture Prep Please Avoid	Chem 299/399	Lecture Prep Please Avoid	Lecture Prep Please Avoid
10 am	Chem 299/399	Chem 355 Lecture (A112)	Office Hour (D145)	Chem 355 Lecture (A112)	Chem 355 Lecture (A112)
11 am	Chem 299/399	R,P,G	Chem 105 Disc (A111)	R,P,G	Chem 299/399
Noon	Chem 299/399	R,P,G	Chem 105 Disc (A111)	R,P,G	Chem 299/399
1 pm	Chem 299/399	R,P,G	R,P,G	R,P,G	Chem 299/399
2 pm	Lecture Prep Please Avoid	Lecture Prep Please Avoid	Chem 105 Disc (A111)	Lecture Prep Please Avoid	Chem 299/399
3 pm	Chem 105 Lecture (D101)	Chem 105 Lecture (D101)	Chem 105 Disc (A111)	Chem 105 Lecture (D101)	Chem 299/399
4 pm	R,P,G	Office Hour (D145)	R, P, G	Office Hour (D145)	Chem 299/399
5 pm	R,P,G	R,P,G	R,P,G	R,P,G	Chem 299/399

R,P,G stands for Research, Prep, and Grading