San José State University
Department of Chemistry
Inorganic Chemistry, Chem 145, Fall, 2017

Instructor:	Prof. Madalyn Radlauer
Office Location:	DH 517
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Office Hours:	Monday 11am – 12 pm Wednesday 3 pm – 4 pm Friday 1 pm – 2 pm or by appointment
Class Days/Time:	MWF 9:30 am – 10:20 am
Classroom:	DH 415
Prerequisites:	CHEM 112B and CHEM 160 or CHEM 161A (with grades of "C" or better; "C-" not accepted). *Note: Extensive knowledge and thorough understanding of concepts and topics covered in General Chemistry (i.e. CHEM 1A & CHEM 1B) is essential for succeeding in this class.*

Course Website

Course materials such as syllabus, handouts, notes, assignment instructions, etc. can be found on Canvas (https://sjsu.instructure.com/). You are responsible for regularly checking with the messaging system in Canvas to learn any updates.

Course Description (from the course catalog)

Development of unifying principles to understand the chemistry of the elements. An introduction to the chemistry, bonding theories and applications of coordination compounds.

Course Goals and Learning Objectives

The goal of this course is to provide an introduction to inorganic chemistry, specifically regarding periodic trends, bonding theory, molecular symmetry, atomic and molecular orbitals, and coordination compounds.

Program Learning Outcome (PLO)

Upon successful completion of this program, students will be able to:

PLO 1: Demonstrate understanding of core concepts and to effectively solve problems in inorganic chemistry

Course Learning Outcomes (CLO)

Upon successful completion of this course, students will be able to:

CLO 1: To develop the ability to predict the structures of various inorganic complexes.

CLO 2: To develop the ability to predict the properties of various inorganic complexes.

CLO 3: To understand atomic structure and bonding models, including molecular orbitals.

CLO 4: To apply these concepts to organic and biochemistry, and also to many aspects of biology, materials science, and environmental science.

Texts/Readings

Textbook (required for course readings)

Inorganic Chemistry by Gary L. Miessler, Paul J. Fischer, and Donald A. Tarr (5th edition, 2014) ISBN: 9780321811059.

This textbook is available in the SJSU campus bookstore.

Other References (not required, these may provide further clarification of various topics)

Inorganic Chemistry by Catherine E. Housecroft and Alan G. Sharpe

Chemical Applications of Group Theory by F. Albert Cotton

Symmetry and Spectroscopy by Daniel C. Harris and Michael D. Bertolucci

These texts are on reserve at the King Library. They can also be checked out from Professor Radlauer during office hours and borrowed until the next class period.

Technology Requirements

Clicker remote handset or compatible device (see below)

Library Liaison (Optional)

You should have a student library account with the King Library that allows you access the library electronic databases. If you plan to access the library services from off-campus, you may need to obtain a password and/or proxy to do so. Check the Library website for information. The reference Librarian for Chemistry is Yen Tran and her email is **yen.tran@sjsu.edu**.

iClicker Reef

In this course iClicker Reef will be employed at least once during each class period when there is no exam. This software helps me to understand what you know and gives everyone a chance to participate in class. You must have a device every day in class (available at no cost, see options below) to participate. You must also set up your iClicker Reef account (see directions below).

Device Options:

1. **iClicker Reef App for Smartphone or Tablet:** Allows you to use your smart phone or tablet as a clicker to participate. On your smartphone or tablet go to Mac App Store or Google Play and download iClicker Reef (formerly REEF polling).

2. **iClicker Reef Polling Site for Laptop:** If using a laptop, go to the iClicker Reef site at https://app.reef-education.com/#/login.

3. **Clicker Remote Handset:** If you do not have a smart phone, tablet, or laptop, you can request to borrow a Clicker remote handset from eCampus (eCampus@sjsu.edu) for free. Send an email to eCampus@sjsu.edu and request to loan a Clicker remote. Further instructions will be provided to you

by eCampus on scheduling a pickup. Remotes are to be returned to eCampus at the end of the semester. If you already own a clicker, you can use it to respond to polls. *Note: Please let me know if you will be using a clicker remote handset so that I can check out a receiver from eCampus.*

Setting up an iClicker Reef Account and Adding the Course:

1. Create and activate your iClicker account by following the iClicker Account Setup Guide at http://www.sjsu.edu/ecampus/docs/iClicker%20Account%20-%20Setup%20Guide%20-%20Student.pdf. *Note: Please include your 9-digit SJSU ID. This way it will be integrated into Canvas effectively.*

2. To add the course, look for "FA17 CHEM 145". For additional guidance on how to add the course see http://www.sjsu.edu/ecampus/docs/iClicker%20-%20Add%20Your%20Course%20-%20Setup%20Guide%20-%20Student.pdf.

3. You can also access iClicker Reef to set up your account and/or get directed to this course via the assignment called "iClicker Reef" on Canvas (https://sjsu.instructure.com/).

Course Requirements and Assignments

Graded work will include a total of three in-class group activities, three problem sets, three in-class exams, one comprehensive final exam, and a participation score, which all contribute to the course learning outcomes. Dates for the in-class activities and exams and due dates for the problem sets are in the Course Schedule below. In addition, homework problems from the text will be suggested, but not graded. It is assumed that students will do all suggested homework. Working the homework problems is an excellent way to prepare for exams and group activities. Exams and assignments in the course will be weighted as shown below:

Assignments	**Points**
In-Class Group Activities (50 points each)	150
Problem Sets (50 points each)	150
Participation Score (details below)	50
Exam 1	150
Exam 2	150
Exam 3	150
Final Exam	200
Total	**1000**

Success in this course is based on the expectation that students will spend, for each unit of credit, a minimum of 45 hours over the length of the course (normally 3 hours per unit per week with 1 of the hours used for lecture) for instruction or preparation/studying or course related activities including but not limited to internships, labs, clinical practical. Other course structures will have equivalent workload expectations as described in the syllabus.

Final Examination or Evaluation

The Final Exam is comprehensive and will be written in a similar style as Exams 1-3 including both multiple choice and short answer questions.

Grading Information

Determination of Grades

Points will be distributed as described in Course Requirements and Assignments above. I reserve the right to scale exam grades. If scaled, each exam will be given a raw score and a scaled score. The raw score will simply be the number of points earned for correct answers on a particular exam, while the scaled score will reflect your performance on that material as compared with your classmates. The scaled score will be used to calculate your final grade. Scores will never be scaled down from your raw score. Generally, the average score on an exam will be scaled to the C+ range, however, I reserve the right to adjust this in either direction if, in my estimation, the class overall performed differently than a "typical" class. The course grade will be determined from the resulting average of the point total as follows:

Percentage of Total Points	Final Course Grade
96-100	A+
92-95.9	A
88-91.9	A-
84-87.9	B+
80-83.9	B
76-79.9	B-
72-75.9	C+
68-71.9	C
64-67.9	C-
60-63.9	D+
56-59.9	D
52-55.9	D-
< 52	F

Participation Score

The Participation Score will be assessed by collecting iClicker Reef responses. We will be doing various types of clicker questions in class. These questions will be graded for participation, not correctness. If you answer 80% of the clicker questions over the course of the semester, you will earn the full 25 possible points. The 20% buffer is designed to account for days when you forget your clicker, are sick, run out of batteries, excused absences, etc.

Clicker Questions Answered (%)	Score
80-100	25
75-79	20
70-74	15
60-69	10
50-59	5
<50	0

- Keep in mind, different class periods will have a variable number of clicker questions, so that 80% of class days ≠ 80% of the clicker questions.
- You must register your iClicker or accessible device by the second week of class (8/28/17).
- If you have any technical issues, you must notify me by 6 pm of that class day.
- If you are using a smart device, you can click in even if you are out of class. This is cheating and will result in the loss of all participation points (i.e. 0 of 25 total points).

Problem Sets

Problem sets will be due by the beginning of class on their due date, but they will be accepted at the end of the class period as well. Late assignments will not be accepted. Problem sets can be done in groups, but each student must turn in their own individual work. Working in groups does not mean copying down each other's answers. Please do your own work.

Homework

In addition to the three problem sets, carefully study the book and lecture notes and ask questions on any material you do not understand. I have 3 scheduled office hours and I am willing to schedule office hours by appointment if none of these times accommodate your schedule. Recommended problems will be assigned to correspond with the lecture material. Additionally, the recommended problems will be representative of the type of questions you will see on the exams. They will not be collected or graded. Solutions to exercises are at the back of the textbook (Appendix A). Solutions to the problems can be found in the student resources associated with the textbook at https://www.pearsonhighered.com/chemistryresources/index.html, specifically the solution manual pdfs at http://media.pearsoncmg.com/ph/esm/esm_miessler_inorgchem_5/Miessler-Fischer-Tarr5e_SM_CM_Final.zip. While all the solutions are provided to you up front, remember that you will learn more effectively by attempting the problems before looking at the answers.

Missed Exams and Group Activities

If an exam or quiz is missed without a legitimate excuse a scaled score of 0 will be entered for that exam. If an acceptable excuse is provided then the exam grade will be the average of your other two exams. In no case will a make-up exam or in-class activity be given. Contact me ***in advance*** if you will miss a group activity or exam date for a legitimate activity.

Exam Regrades

To qualify for an exam regrade, you must take the exam in ink and not use white-out. Do not write on your exams that are submitted for a regrade. Submitting a modified exam for regrading is a serious breach of academic integrity. Regrades must be submitted within one week of the exam being handed back to you. Regrade requests must include a written description of what you feel was graded incorrectly. One exception to all of the above: if an arithmetic error in your point tally has occurred, simply write "tally error" as your explanation and I will check the point tally.

Classroom Protocol

Be on time to class; class starts at 9:30 am sharp. Device use in class should be limited to clicking in or taking notes. No device use is allowed during exams. In addition to clicking in, students are encouraged to participate during the class period. I hope that the classroom will serve as an environment that will promote learning and the development of new ideas, as well as be a safe and respectful community. Behavior that interferes with the normal academic function in a classroom is unacceptable. Students exhibiting this behavior will be asked to leave the class. The university has a brochure on student conduct that you can view at http://www.sjsu.edu/studentconduct/docs/ENGLISH%20Brochure.pdf

Email policy

I receive a lot of emails, so to be sure that I see your email, all Chem 145 emails should have Chem 145 in the subject line. I will do my best to respond to class-related emails within 1 business day of receiving them, however, keep in mind that this may not always be possible, especially during high volume times (around exams). Please try not to wait until the last minute to ask questions via email. I may also be slower to respond to emails late at night or over the weekends. Office hours are the best way to get timely answers to more complicated questions.

University Policies

Per University Policy S16-9, university-wide policy information relevant to all courses, such as academic integrity, accommodations, etc. will be available on Office of Graduate and Undergraduate Programs' Syllabus Information web page at http://www.sjsu.edu/gup/syllabusinfo/.

Consent for Recording of Class and Public Sharing of Instructor Material

University Policy S12-7, http://www.sjsu.edu/senate/docs/S12-7.pdf, requires students to obtain instructor's permission to record the course. Please come to office hours to discuss this if you feel you need to record anything.

- "You must obtain the instructor's permission to make audio or video recordings in this class. Such permission allows the recordings to be used for your private, study purposes only. The recordings are the intellectual property of the instructor; you have not been given any rights to reproduce or distribute the material."
- "Course material developed by the instructor is the intellectual property of the instructor and cannot be shared publicly without his/her approval. You may not publicly share or upload instructor generated material for this course such as exam questions, lecture notes, or homework solutions without instructor consent."

Dropping and Adding

Students are responsible for understanding the policies and procedures about add/drop, grade forgiveness, etc. Add/drop deadlines can be found on the current academic year calendars document on the Academic Calendars webpage. Students should be aware of the current deadlines and penalties for dropping classes (Late Drop Information). Information about the latest changes and news is available at the Advising Hub.

Accommodation to Students' Religious Holidays

University Policy S14-7 states that San José State University shall provide accommodation on any graded class work or activities for students wishing to observe religious holidays when such observances require students to be absent from class. It is the responsibility of the student to inform the instructor, in writing, about such holidays before the add deadline at the start of each semester. If such holidays occur before the add deadline, the student must notify the instructor, in writing, at least three days before the date that he/she will be absent. It is the responsibility of the instructor to make every reasonable effort to honor the student request without penalty, and of the student to make up the work missed.

Academic Integrity

Your commitment, as a student, to learning is evidenced by your enrollment at San Jose State University. The University Academic Integrity Policy F15-7 requires you to be honest in all your academic course work. Faculty members are required to report all infractions to the office of Student Conduct and Ethical Development. Visit the Student Conduct and Ethical Development website for more information.

Campus Policy in Compliance with the American Disabilities Act

If you need course adaptations or accommodations because of a disability, or if you need to make special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible, or see me during office hours. Presidential Directive 97-03 requires that students with disabilities requesting accommodations must register with the Accessible Education Center (AEC) to establish a record of their disability.

Student Technology Resources

Computer labs and other resources for student use are available in:

- Academic Success Center at http://www.sjsu.edu/at/asc/ located on the 1st floor of Clark Hall
- Academic Technology Computer Center at http://www.sjsu.edu/at/hd/ on the 1st floor of Clark Hall
- Associated Students Computer Services Center at http://as.sjsu.edu/ascsc/ on the 2nd floor of the Student Union
- Student Computing Services at http://library.sjsu.edu/student-computing-services/student-computing-services-center
- Computers at the Martin Luther King Library for public at large at http://library.sjsu.edu/reserve-studymeeting-room/computers-king-library
- Additional computer labs may be available in your department/college
- A wide variety of audio-visual equipment is available for student checkout from Media Services located in IRC 112. These items include DV and HD digital camcorders; digital still cameras; video, slide and overhead projectors; DVD, CD, and audiotape players; sound systems, wireless microphones, projection screens and monitors.

SJSU Peer Connections

Peer Connections' free tutoring and mentoring is designed to assist students in the development of their full academic potential and to inspire them to become independent learners. Peer Connections tutors are trained to provide content-based tutoring in many lower division courses (some upper division) as well as writing and study skills assistance. Small group and individual tutoring are available. Peer Connections mentors are trained to provide support and resources in navigating the college experience. This support includes assistance in learning strategies and techniques on how to be a successful student. Peer Connections has a learning commons, desktop computers, and success workshops on a wide variety of topics. For more information on services, hours, locations, or a list of current workshops, please visit Peer Connections website at http://peerconnections.sjsu.edu for more information.

SJSU Counseling and Psychological Services

The SJSU Counseling and Psychological Services is located on the corner of 7th Street and San Carlos in the new Student Wellness Center, Room 300B. Professional psychologists, social workers, and counselors are available to provide confidential consultations on issues of student mental health, campus climate, or psychological and academic issues on an individual, couple, or group basis. To schedule an appointment or learn more information, visit Counseling and Psychological Services website at http://www.sjsu.edu/counseling

Inorganic Chemistry, Chem 145, Fall 2017, Course Schedule

The tentative course calendar below includes weekly course content, assignment due dates, exam dates, and the date for the final exam. Dates may be subject to change, but prior to this, fair notice will be given during class and through Canvas. Reading and problems listed in the schedule are referencing the primary textbook: *Inorganic Chemistry* by Miessler, Fischer, and Tarr.

Tentative Course Schedule

Class	Week	Date	Topics, Readings, Assignments, Deadlines
1	1	W 8/23	***First day of classes*** In-class survey, introduction to course (Chapters 1-2)
2	1	F 8/25	Lewis structures, periodic trends, and VSEPR (Chapters 2 and 3)
3	2	M 8/28	Symmetry elements (4.1-4.2)
4	2	W 8/30	Symmetry elements + point groups (4.1-4.2)
5	2	F 9/1	**Group activity 1**
	3	M 9/4	***Labor Day – No class***
6	3	W 9/6	Matrices and simple irreducible reps (4.3)
7	3	F 9/8	**Problem Set 1 Due** Character tables – Mulliken symbols (4.3)
8	4	M 9/11	Vibrational spectroscopy (4.4)
9	4	W 9/13	Vibrational spectroscopy (4.4)
10	4	F 9/15	**Exam 1 (coverage Chapters 1-4)**
11	5	M 9/18	Intro to molecular orbitals, diatomics (5.1-5.2)
12	5	W 9/20	Heterodiatomic molecular orbitals (5.3)
13	5	F 9/22	Heterodiatomic molecular orbitals (5.3)
14	6	M 9/25	Multinuclear MOs SALCS/LCAO (5.4)
15	6	W 9/27	Multinuclear MOs Projection operators BH_3, $B(NH_2)_3$ (5.4)
16	6	F 9/29	CH_4 and SF_6 – hybridization is a lie (5.4)
17	7	M 10/2	Coordination chemistry – types of ligands (13.1-13.2)
18	7	W 10/4	Electron counting – d-counts, valence counts (13.3, 13.7)
19	7	F 10/6	**Group Activity 2**
20	8	M 10/9	Octahedral complexes and ligand field theory (10.1-10.4)
21	8	W 10/11	Octahedral complexes and ligand field theory (10.1-10.4)
22	8	F 10/13	**Problem Set 2 Due** Square planar complexes (10.1-10.4)
23	9	M 10/16	Tetrahedral complexes (10.1-10.4)

Class	Week	Date	Topics, Readings, Assignments, Deadlines
24	9	W 10/18	Catch-up/Review
25	9	F 10/20	**Exam 2 (coverage Chapters 4-5, 13.1-13.2, 13.7, 10.1-10.4)**
26	10	M 10/23	Spectrochemical series, more high and low spin (10.4-10.7)
27	10	W 10/25	Magnetic moments, Jahn-Teller distortions (10.4-10.7)
28	10	F 10/27	Electronic Spectra (Chapter 11)
29	11	M 10/30	Electronic Spectra (Chapter 11)
30	11	W 11/1	Electronic Spectra (Chapter 11)
31	11	F 11/3	**Group Activity 3**
32	12	M 11/6	Electronic Spectra (Chapter 11)
33	12	W 11/8	**Problem Set 3 Due** Electronic Spectra (Chapter 11)
	12	F 11/10	***Veteran's Day, observed – No class***
34	13	M 11/13	Charge Transfer: MLCTs, LMCTs, MMCTs (Chapter 11)
35	13	W 11/15	Catch-up/Review
36	13	F 11/17	**Exam 3 (coverage Chapters 10-11)**
37	14	M 11/20	Reactions and Mechanisms (Chapter 12)
	14	W 11/22	***Thanksgiving Break – No class***
	14	F 11/24	***Thanksgiving Break – No class***
38	15	M 11/27	Reactions and Mechanisms (Chapter 12)
39	15	W 11/29	Reactions and Mechanisms (Chapter 12)
40	15	F 12/1	Organometallic Chemistry (Chapters 13 and 14)
41	16	M 12/4	Organometallic Chemistry (Chapters 13 and 14)
42	16	W 12/6	Special topics: Class choice #1
43	16	F 12/8	Special topics: Class choice #2
44	17	M 12/11	***Last day of classes***
	Final Exam	W 12/13	**Coverage is cumulative** 7:15 am – 9:30 am in DH 415 (usual classroom)
		F 12/22	***Grades available***