Syllabus

Course Information:

*All class materials will be posted on eCampus

Course Number:	CHEM 362
Course Title:	Descriptive Inorganic Chemistry
Section:	500, 200
Time:	TR 1:30 - 2:45 PM
Location:	Chemistry 2104
Credit Hours:	3

ZOOM: https://tamu.zoom.us/j/93956653244

Instructor Details

Instructor:	Marcetta Y. Darensbourg
Office:	408 CHEM
Phone:	(979) 845-5417
E-Mail:	marcetta@chem.tamu.edu

Teaching Assistant/Recitations

TA: Xuemei Yang
Office: 409 CHEM
Phone: (979) 845-5417
E-Mail: xuemeiyang@tamu.edu
ZOOM: Meeting ID: 511 166 8914
Office Hours (Recitation):
M 9-10 am & T 4-5 pm

TA: Kyle Burns
Office: 416 CHEM
Phone: (979)845-5417
E-Mail: burnsk8@tamu.edu
ZOOM: Meeting ID: 916 0232 0723
Office Hours (Recitation):
W 4-5 pm

TA: Paulina Guerrero
Office: 420 CHEM
Phone: (979) 845-5417
E-Mail: paulinague@tamu.edu
ZOOM: Meeting ID: 990 1838 5303
Office Hours (Recitation):
R 6:30 pm-7:30 pm

PLTL Leader Availability

PLTL Leader:	Kevin Liu (A-K)
E-Mail:	kaiyang@tamu.edu
ZOOM:	Meeting ID: 985 0443 4351 Passcode: 914458
1st Session:	Wednesday: 5:00 – 7:00 pm
2nd Session:	Friday: 3:00 – 5:00 pm
3rd Session:	Saturday: 2:00 – 4:00 pm

PLTL Leader:	Chris Garcia (L-Z)
E-Mail:	chrisgar21@tamu.edu
ZOOM:	Meeting ID: 952 609 9196
1st Session:	Tuesday: 6:00 – 8:00 pm
2nd Session:	Friday: 5:00 – 7:00 pm
3rd Session:	Saturday: 1:30 – 3:30 pm

Course Description

Introduction to inorganic chemistry with a focus on fundamentals of atomic/molecular structure and descriptive inorganic chemistry (on understanding the electronic properties of the elements and how they are combined in inorganic compounds; the observable properties of those compounds), structure/geometries of small molecules, bonding theories both in inorganic molecules and in the solid state. Survey of main group and transition metal chemistry; overview of roles of transition metals in organometallic chemistry and bioinorganic chemistry, as time permits.

Course Prerequisites

Chem 103, 104 or equivalent; at least one semester of Organic Chemistry is strongly advised.

Course Learning Outcomes

At the end of the course success will be judged by the student's ability to:

- Explain the position of elements in the Periodic Table and the relation of the elements' physical and chemical properties based on electronic structure.
- Predict the formulation of main group inorganic molecules, their electronic and molecular structures, and their geometries. Predict reactivity properties based on structure and reactive centers, including redox reactions.
- Account for extended structures and both ionic and molecular interactions between molecules.
- Be familiar with first row transition metals, their coordination complexes and a few applications to bioinorganic and catalytic chemistry.

Textbook and/or Resource Materials

"Inorganic Chemistry", W.H. Freeman and Company
7th Edition, Weller, Overton, Rourke (ISBN-10: 0-1987-6812-5 | ISBN-13: 978-0-1987-68128)
6th Edition, Shriver & Atkins (ISBN-10: 1-4292-9906-1 | ISBN-13: 978-1-4292-9906-0)

Grading Policy*

SCHEDULE		
EXAM 1	20%	September 17
EXAM 2	20%	October 20
FINAL EXAM	25%	Virtual TBD
PROJECTS**	15%	(Power Point Presentations AND Advance Preparations)
QUIZZES:	15%	

PLTL/Teaching Assistants OFFICE Hours Attendance 5% (full 5% given if you attend at least once per week.)

*Exams and quizzes will be conducted virtually and monitored by Zoom. Students will be provided these tests on the 362 eCampus website at specific times, and return of the answers must be uploaded within a certain time.
** Projects will be described separately.

Graded Class Participation – *Class participation noted by lecture attendance as well as TA and PLTL office hours. The expectation is attendance (virtual/Zoom) at least one recitation and/or PLTL session per week.*

Graded Attendance – *The class attendance policy will conform to University guidelines. The TA's will monitor face to face and virtual attendance. Penalty for unexcused absences is one point removed from final grade (based on 100% overall) per absence.*

Late Work Policy

- *Exams and quizzes must be returned in specified times. Makeups for excused absences will be handled by TA's (i.e., Yang, Burns, Guerrero) in individual study/recitation sessions.*
- *Points (10% of the project total) will be taken off for each late day for non-excused absences.*

PowerPoint PRESENTATION

The Presentation topics and assignment sheet, and guidelines, will be given to you on a separate document. You should plan to present a topic that you and a partner have researched in PowerPoint, probably using 12 – 15 slides. We will offer you several templates to follow. If you would like to be imaginative and prepare a video of your presentation, go for it. Just work with your Peer Leader and Teaching Assistant. You may select a partner from someone you know or we will assign one who has selected the same topic. Working together is a part of the exercise.

Course Schedule

Special	Day	Date	Ch	Topic
	R	8/20	1/**1**	Overview – Expectations – Projects – The Atom – Nuclear Properties
	T	8/25	1/**1**	Electrons in atoms. Energy Levels. Quantum Numbers. Radial Electron Distributions. Electron Configurations.
	R	8/27	1/**1**	Slater's Rules. Z_{eff} control of Periodic Properties. Magnetism. Ground State Term Symbols.
Quiz #1	T	9/1	2.1/**2**	Electrons in Molecules: Valence; Covalence; Polar Molecules. The Chemical Bond. Lewis Structures.
	R	9/3	2/**2**	Lone Pair Repulsions. (VSEPR as Guide to Geometries of Molecules). Shapes of Molecules and Valence Bonds.
Quiz #2	T	9/8	6/**3**	Symmetry in Molecules: Elements and Operations. Symmetry Operations and Point Group Classification
	R	9/10	6/**3**	Applications of Group Theory Selections from Ch. 6 or 3
Quiz #3	T	9/15	2/**2**	M.O. Theory: Diatomics. Catch up and Review
Exam I	R	9/17		**Examination I**
	T	9/22	2/**2**	Molecular Orbitals and Diatomics; Energy Levels. Molecular Orbitals and Assignments; Bond Properties.
	R	9/24	2/**2**	Molecular Orbitals in Polar Diatomics—Heteronuclear diatomics. Electronegativity defined by MO theory: Bond dipoles and molecular dipole moments
Poster Outline due	T	9/29	2/**2**	MO's in Polyatomics. Structures of Simple Solids, Metals, and alloys.
Quiz #4	R	10/1	3/**4**	Ionic Solids. Energetics of ionic bonding.
	T	10/6	4/**5**	Acids and Bases
	R	10/8	4/**5**	Acids and Bases
	T	10/13	4/**5**	Acids and Bases
Quiz #5	R	10/15	9/10	Main Group Element Chemistry
Exam II	T	10/20		**Examination II**
	R	10/22	9/10	Hydrogen
	T	10/27	5/**6**	Redox processes
Quiz #6	R	10/29	5/**6**	Redox processes
	T	11/3		**Power Point Virtual Presentations**
	R	11/5		**Power Point Virtual Presentations**
	T	11/10	7/**7**	Transition Metals/Coordination Chemistry
	R	11/12		Transition Metals/Organometallics
Exam III	T	11/17		Transition Metals--Catalysis
	R	11/19		Coordination Chemistry—Bioinorganic TBA
	T	11/24		Coordination Chemistry—Bioinorganic TBA
		11/30		**NO CLASS** – Reading Day
FINAL				**FINAL EXAM – Virtual TBD**

Class Expectations:

Section 1. Mostly Fundamentals of (Inorganic) Chemistry

The first part of this material you have seen in high school chemistry/physics and in your first year of University Chemistry. Some I will not discuss in class so as not to bore you and I encourage you to review/read on your own. This short "review" will assure you have the following information securely in your mind and at your disposal. If you are lost, please ask for help. We can schedule reviews that specifically address the needed material. Specifically, you should be familiar/know the subjects outlined below regarding atomic structure and bonding. The odd quiz here and there will keep you on your toes. The scheduled examinations will separate the men from the boys and the women from the girls and identify those who might one day wear a lab jacket with pride. I cannot stress enough that if you read the chapter in advance and check on Wiki or elsewhere (MIT open courseware, Chemical Science 5.111 before the lecture, you will be ahead of the game!

The Periodic Table

- Memorize the names, symbols, and atomic numbers of the first 36 elements.
- Components of the Periodic Table
    - Blocks: s-block, p-block, d-block, f-block
    - Groups: alkali, alkaline-earth, chalcogens, halogens, noble gases
    - Lanthanoids and Actanoids

Electron Configuration: Orbitals; Quantum Numbers: n, l, m_l, m_s
Outershell/Valence Shell

Magnetism: Paramagnetic, Diamagnetic, Ferro-magnetism, Ground State Term Symbols, Spin-only Magnetic Moment.

Nuclear Charge; Effective Nuclear Charge, ***and how it affects =>*** Periodic Properties: Atomic Radii, Ionization Enthalpies, Electron Affinities, Electronegativities; ***and how these atomic properties control =>***

Structure & Bonding in Molecules: Octet Rule, Lewis Dot-Structures
Formal Charge and Oxidation States
Valence Shell Electron Pair Repulsion (VSEPR) Approach to predicting geometries
Molecular Orbital Theory: Diatomic Molecules and Larger

Symmetry Operations Required for Specifying Molecular Symmetry

Section 2. Acids and Bases and Salts and Structures in the Solid State. General Trends in main group element chemistry. Coordination Chemistry as a subset of Acid/Base interactions.

Section 3. Electronic structure as related to properties of transition metal complexes. Overview of T. M. organometallic /catalytic reactions. Thumbnail sketch of Bioinorganic Chemistry.

Cell Phones, Tablets, and Other Electronic Devices – Use of cell phones and other electronic devices in class is strictly limited to course-related activities (e.g., taking notes). Students violating this policy will be required to leave immediately. If you have an emergency, please be courteous and step outside.

Learning Resources

- Wikipedia
- WebElements: http://www.webelements.com/
- *Instant Notes – Inorganic Chemistry*, Second Edition by P.A. Cox
- *Inorganic Chemistry,* by Miessler and Tarr, any edition
- *MIT open courseware: MIT Course No. 5.111 Principles of Chemical Science*
- *Youtube: Periodic Table of Videos http://www.periodicvideos.com/index.htm*

University Policies

Attendance Policy

The university views class attendance and participation as an individual student responsibility. Students are expected to attend class (either virtually or face to face) and to complete all assignments.

Please refer to Student Rule 7 in its entirety for information about excused absences, including definitions, and related documentation and timelines.

Makeup Work Policy

Students will be excused from attending class on the day of a graded activity or when attendance contributes to a student's grade, for the reasons stated in Student Rule 7, or other reason deemed appropriate by the instructor.

Please refer to Student Rule 7 in its entirety for information about makeup work, including definitions, and related documentation and timelines.

Absences related to Title IX of the Education Amendments of 1972 may necessitate a period of more than 30 days for make-up work, and the timeframe for make-up work should be agreed upon by the student and instructor" (Student Rule 7, Section 7.4.1).

"The instructor is under no obligation to provide an opportunity for the student to make up work missed because of an unexcused absence" (Student Rule 7, Section 7.4.2).

Students who request an excused absence are expected to uphold the Aggie Honor Code and Student Conduct Code. (See Student Rule 24.)

Academic Integrity Statement and Policy

"An Aggie does not lie, cheat or steal, or tolerate those who do."

"Texas A&M University students are responsible for authenticating all work submitted to an instructor. If asked, students must be able to produce proof that the item submitted is indeed the work of that student. Students must keep appropriate records at all times. The inability to authenticate one's work, should the instructor request it, may be sufficient grounds to initiate an academic misconduct case" (Section 20.1.2.3, Student Rule 20).

You can learn more about the Aggie Honor System Office Rules and Procedures, academic integrity, and your rights and responsibilities at aggiehonor.tamu.edu.

Americans with Disabilities Act (ADA) Policy

Texas A&M University is committed to providing equitable access to learning opportunities for all students. If you experience barriers to your education due to a disability or think you may have a disability, please contact Disability Resources in the Student Services Building or at (979) 845-1637 or visit disability.tamu.edu. Disabilities may include, but are not limited to attentional, learning, mental health, sensory, physical, or chronic health conditions. All students are encouraged to discuss their disability related needs with Disability Resources and their instructors as soon as possible.

Title IX and Statement on Limits to Confidentiality

Texas A&M University is committed to fostering a learning environment that is safe and productive for all. University policies and federal and state laws prohibit gender-based discrimination and sexual harassment, including sexual assault, sexual exploitation, domestic violence, dating violence, and stalking.

With the exception of some medical and mental health providers, all university employees (including full and part-time faculty, staff, paid graduate assistants, student workers, etc.) are Mandatory Reporters and must report to the Title IX Office if the employee experiences, observes, or becomes aware of an incident that meets the following conditions (see University Rule 08.01.01.M1):

- The incident is reasonably believed to be discrimination or harassment.
- The incident is alleged to have been committed by or against a person who, at the time of the incident, was (1) a student enrolled at the University or (2) an employee of the University.

Mandatory Reporters must file a report regardless of how the information comes to their attention – including but not limited to face-to-face conversations, a written class assignment or paper, class discussion, email, text, or social media post. Although Mandatory Reporters must file a report, in most instances, you will be able to control how the report is handled, including whether or not to pursue a formal investigation. The University's goal is to make sure you are aware of the range of options available to you and to ensure access to the resources you need.

Students wishing to discuss concerns in a confidential setting are encouraged to make an appointment with Counseling and Psychological Services (CAPS).

Students can learn more about filing a report, accessing supportive resources, and navigating the Title IX investigation and resolution process on the University's Title IX webpage.

Statement on Mental Health and Wellness

Texas A&M University recognizes that mental health and wellness are critical factors that influence a student's academic success and overall wellbeing. Students are encouraged to engage in proper self-care by utilizing the resources and services available from Counseling & Psychological Services (CAPS). Students who need someone to talk to can call the TAMU Helpline (979-845-2700) from 4:00 p.m. to 8:00 a.m. weekdays and 24 hours on weekends. 24-hour emergency help is also available through the National Suicide Prevention Hotline (800-273-8255) or at suicidepreventionlifeline.org.

COVID-19 Temporary Amendment to Minimum Syllabus Requirements

The Faculty Senate temporarily added the following statements to the minimum syllabus requirements in Fall 2020 as part of the university's COVID-19 response.

Campus Safety Measures

To promote public safety and protect students, faculty, and staff during the coronavirus pandemic, Texas A&M University has adopted policies and practices for the Fall 2020 academic term to limit virus transmission. Students must observe the following practices while participating in face-to-face courses

and course-related activities (office hours, help sessions, transitioning to and between classes, study spaces, academic services, etc.):

- Self-monitoring—Students should follow CDC recommendations for self-monitoring. **Students who have a fever or exhibit symptoms of COVID-19 should participate in class remotely and should not participate in face-to-face instruction.**
- Face Coverings—Face coverings (cloth face covering, surgical mask, etc.) must be properly worn in all non-private spaces including classrooms, teaching laboratories, common spaces such as lobbies and hallways, public study spaces, libraries, academic resource and support offices, and outdoor spaces where 6 feet of physical distancing is difficult to reliably maintain. Description of face coverings and additional guidance are provided in the Face Covering policy and Frequently Asked Questions (FAQ) available on the Provost website.
- Physical Distancing—Physical distancing must be maintained between students, instructors, and others in course and course-related activities.
- Classroom Ingress/Egress—Students must follow marked pathways for entering and exiting classrooms and other teaching spaces. Leave classrooms promptly after course activities have concluded. Do not congregate in hallways and maintain 6-foot physical distancing when waiting to enter classrooms and other instructional spaces.
- To attend a face-to-face class, students must wear a face covering (or a face shield if they have an exemption letter). If a student refuses to wear a face covering, the instructor should ask the student to leave and join the class remotely. If the student does not leave the class, the faculty member should report that student to the Student Conduct office for sanctions. Additionally, the faculty member may choose to teach that day's class remotely for all students.

Personal Illness and Quarantine

Students required to quarantine must participate in courses and course-related activities remotely and **must not attend face-to-face course activities**. Students should notify their instructors of the quarantine requirement. Students under quarantine are expected to participate in courses and complete graded work unless they have symptoms that are too severe to participate in course activities.

Students experiencing personal injury or Illness that is too severe for the student to attend class qualify for an excused absence (See Student Rule 7, Section 7.2.2.) To receive an excused absence, students must comply with the documentation and notification guidelines outlined in Student Rule 7. While Student Rule 7, Section 7.3.2.1, indicates a medical confirmation note from the student's medical provider is preferred, **for Fall 2020 only, students may use the Explanatory Statement for Absence from Class form in lieu of a medical confirmation. Students must submit the Explanatory Statement for Absence from Class within two business days after the last date of absence.**

Operational Details for Fall 2020 Courses

For additional information, please review the FAQ on Fall 2020 courses at Texas A&M University.