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Correspondence: The best way to contact me is by email or by the Remind app (see below). If you send me e-mails, you must use your MyMav e-mail AND you must put the course number "3317" into the subject line. This will allow me to filter your e-mail into the right box. If 3317 is not used, your email may get buried by other incoming messages. As with any correspondence, please address me as "Dr. Macaluso".

Phone App: You will be given separate information to register for the Remind app account. This account will enable you to receive class announcements and to contact the instructor with text messages. Keep in mind that text messages sent in the evenings may not be answered until the next business day.

Office Hours: 1:00-2:00 Mondays and Wednesdays or by appointment

Section Information: 11:00-12:20 Tuesdays and Thursdays, Meets in Science Hall 332

Course Description: An overview of descriptive main group chemistry, solid state structures and the energetics of ionic, metallic, and covalent solids, acid-base chemistry and the coordination chemistry of the transition metals. The course is intended to explore and describe the role of inorganic chemistry in other natural sciences with an emphasis on the biological and geological sciences. Important compounds and reactions in industrial chemistry are also covered. Intended for both chemistry and non-chemistry majors. Prerequisite: Grade of C or better in CHEM 2322 or concurrent enrollment.

Required Textbook: *Inorganic Chemistry* by Miessler, Fischer and Tarr, 5th Edition, 2014.
(ISBN-13: 978-0321811059 ISBN-10: 0321811054)

Required Materials: *Non-programmable* calculator

Supplemental Texts: Any general chemistry textbook and
Concise Inorganic Chemistry by J.D. Lee, 5th ed. (ISBN: 978-0-632-05293-6)

Learning Outcomes:

By the end of the semester, student will be able to:

Atomic Structure and the Periodic Table

- 1) compare and contrast covalent, ionic and metallic solids.
- 2) State the boundary conditions of a particle in a box model.
- 3) Relate the particle in a box model to quantum numbers.
- 4) Sketch a radial probability function of an atomic orbital.
- 5) Compare radial probability functions of atomic orbitals.
- 6) Calculate effective nuclear charge.
- 7) Predict periodic trends and electron configurations using effective nuclear charge.
- 8) Apply concepts from quantum theory to periodic trends in atomic properties such as atomic size, ionization energy, electronegativity and electron affinity

Bonding Theory

- 9) Draw Lewis structures of atoms and molecules.
- 10) Discriminate between Lewis structures for one molecule.
- 11) Predict electronic structure and properties of diatomic molecules given a molecular orbital theory.

- 12) Draw a molecular orbital diagram of homonuclear and heteronuclear molecular orbitals.
- 13) Debate the limitations of Lewis structures, molecular orbital diagrams, and hybridized orbitals.

Symmetry

- 1) Know that symmetry is prevalent to all areas of science and culture.
- 2) identify symmetry operations and the point group of a molecule or any physical object.
- 3) predict the structure of a molecule using theoretical chemical models and periodic trends.

Solids

- 4) name and draw unique layers that compose common structure types of ionic solids.
- 5) identify the closest packing system of a structure type by visual inspection.
- 6) construct a three-dimensional model of a unit cell of a common structure type.
- 7) visually identify tetrahedral holes and octahedral holes of each structure type.
- 8) predict whether or not a cation will occupy the tetrahedral or octahedral hole.
- 9) Use polyhedral views of crystal structures to describe electronic interactions.
- 10) Build a crystal structure of any molecule using structure drawing software.
- 11) Identify symmetry elements in a crystal structure.
- 12) describe how X-rays are produced in a laboratory setting.
- 13) evaluate when diffraction is appropriate for studying structure of matter.
- 14) Label Miller indices in a unit cell.
- 15) interpret X-ray diffraction data to obtain information about unit cells of solid-state materials.
- 16) Define metals, semiconductors and insulators in terms of band structure.
- 17) Discuss the general trends in conductivity of metals, semiconductors and insulators.
- 18) Analyze conductivity behavior to predict whether a material is metallic or insulating.
- 19) Define superconductivity.
- 20) Articulate the close relationship between structure and physical properties.

Descriptive Chemistry of the Rare Earths

- 21) Write electron configurations of lanthanides and actinides.
- 22) Define lanthanide contraction and explain it using effective nuclear charge.
- 23) Assess whether or not rare earths are rare in nature.
- 24) Calculate theoretical effective moments of lanthanides.
- 25) Cite examples of the use of lanthanides and actinides in society.

Professional Learning Skills

- 26) search library databases to identify literature on a chemical topic.
- 27) Collaborate with peers.
- 28) Write technical and scientific discussions.
- 29) Read and critique current literature in inorganic chemistry.
- 30) Present and defend his or her own positions on chemistry literature.
- 31) Know how to interact and network professionally.

Attendance: At The University of Texas at Arlington, taking attendance is not required but attendance is a critical indicator in student success. Each faculty member is free to develop his or her own methods of evaluating students' academic performance, which includes establishing course-specific policies on attendance. As the instructor of this section, I do not officially record attendance. However, while UT Arlington does not require instructors to take attendance in their courses, the U.S. Department of Education requires that the University have a mechanism in place to mark when Federal Student Aid recipients "begin attendance in a course." UT Arlington instructors will report when students begin attendance in a course as part of the final grading process. Specifically, when assigning a student a grade of F, faculty report the last date a student attended their class based on evidence such as a test, participation in a class project or presentation, or an engagement online via Blackboard. This date is reported to the Department of Education for federal financial aid recipients.

Grading:	Participation (Collaborative group work)	30%
	Individual Quizzes	20%
	In class exams	30%
	Comprehensive Final Exam	20%

Three in-class exams will be given. These exams will cover the reading, lecture material, and assigned problems. The final exam will be comprehensive and will be given on **Thursday, December 6, 11:00 AM – 1:30 PM**. Grades will be assigned according to the following scale:

<u>Total Numerical Grade</u>	<u>Letter Grade</u>
90-100	A
80-89	B
70-79	C
60-69	D
Below 60	F

There is no policy to “curve” grades during or at the end of the semester.

Students have 5 business days after receiving their graded exams to request reconsideration of grades. No grade changes will be considered after the 5th business day.

Students are expected to keep track of their performance throughout the semester and seek guidance from available sources (including the instructor) if their performance drops below satisfactory levels; see “Student Support Services,” below.

Homework: *Working through problems is the best way to learn the material in this course, so homework assignments will be given. In addition to the assigned homework problems, each student is expected to work homework problems found in the textbook. Although these problems will not be collected or graded, you are responsible for working through them. Be advised that just doing the simple drill problems is not adequate preparation; you should do the longer problem-solving type of questions as this really addresses whether you adequately understand the material.*

Collaborative Group Work: Collaborative group work will be assigned frequently. You will be graded on the *quality and frequency* of your contribution to the group task.

Group Quizzes: Unannounced quizzes will occasionally be given. These quizzes may cover assigned reading and homework, previous lecture material, or material given in lecture on that day. The quizzes will be take no more than 10 minutes of class time and will be randomly be given at the beginning, middle or end of the class period. **No make-up quizzes will be given.** The lowest quiz grade will be dropped at the end of the semester. If you encounter a serious long-term medical issue during the semester that will likely result in more than 1 missed quiz, you must contact me as soon as you are aware of the situation to discuss how the quiz grades will be handled.

Final Exam: The final exam is a standardized Inorganic Chemistry exam written by the American Chemical Society.

Make-up Policy: *No make-up exams will be given, and any missed exams will result in a grade of zero. Exams will NOT be rescheduled unless there is a valid medical or family emergency.*

Drop Policy: Students may drop or swap (adding and dropping a class concurrently) classes through self-service in MyMav from the beginning of the registration period through the late registration period. After the late registration period, students must see their academic advisor to drop a class or withdraw. Undeclared students must see an advisor in the University Advising Center. Drops can continue through a point two-thirds of the way through the term or session. It is the student's responsibility to officially withdraw if they do not plan to attend after registering.

Students will not be automatically dropped for non-attendance. Repayment of certain types of financial aid administered through the University may be required as the result of dropping classes or withdrawing. For more information, contact the Office of Financial Aid and Scholarships (<http://wweb.uta.edu/aao/fao/>).

Disability Accommodations: UT Arlington is on record as being committed to both the spirit and letter of all federal equal opportunity legislation, including *The Americans with Disabilities Act (ADA)*, *The Americans with Disabilities Amendments Act (ADAAA)*, and *Section 504 of the Rehabilitation Act*. All instructors at UT Arlington are required by law to provide “reasonable accommodations” to students with disabilities, so as not to discriminate on the basis of disability. Students are responsible for providing the instructor with official notification in the form of a **letter certified** by the Office for Students with Disabilities (OSD). Only those students who have officially documented a need for an accommodation will have their request honored. Students experiencing a range of conditions (Physical, Learning, Chronic Health, Mental Health, and Sensory) that may cause diminished academic performance or other barriers to learning may seek services and/or accommodations by contacting: **The Office for Students with Disabilities, (OSD)** <http://www.uta.edu/disability/> or calling 817-272-3364. Information regarding diagnostic criteria and policies for obtaining disability-based academic accommodations can be found at www.uta.edu/disability.

Counseling and Psychological Services (CAPS) www.uta.edu/caps/ or calling 817-272-3671 is also available to all students to help increase their understanding of personal issues, address mental and behavioral health problems and make positive changes in their lives.

Non-Discrimination Policy: The University of Texas at Arlington does not discriminate on the basis of race, color, national origin, religion, age, gender, sexual orientation, disabilities, genetic information, and/or veteran status in its educational programs or activities it operates. For more information, visit uta.edu/eos.

Title IX Policy: The University of Texas at Arlington (“University”) is committed to maintaining a learning and working environment that is free from discrimination based on sex in accordance with Title IX of the Higher Education Amendments of 1972 (Title IX), which prohibits discrimination on the basis of sex in educational programs or activities; Title VII of the Civil Rights Act of 1964 (Title VII), which prohibits sex discrimination in employment; and the Campus Sexual Violence Elimination Act (SaVE Act). Sexual misconduct is a form of sex discrimination and will not be tolerated. *For information regarding Title IX, visit www.uta.edu/titleIX or contact Ms. Michelle Willbanks, Title IX Coordinator at (817) 272-4585 or titleix@uta.edu*

Academic Integrity: Students enrolled all UT Arlington courses are expected to adhere to the UT Arlington Honor Code:

I pledge, on my honor, to uphold UT Arlington’s tradition of academic integrity, a tradition that values hard work and honest effort in the pursuit of academic excellence.

I promise that I will submit only work that I personally create or contribute to group collaborations, and I will appropriately reference any work from other sources. I will follow the highest standards of integrity and uphold the spirit of the Honor Code.

UT Arlington faculty members may employ the Honor Code in their courses by having students acknowledge the honor code as part of an examination or requiring students to incorporate the honor code into any work submitted. Per UT System *Regents’ Rule 50101, §2.2*, suspected violations of university’s standards for academic integrity (including the Honor Code) will be referred to the Office of Student Conduct. Violators will be disciplined in accordance with University policy, which may result in the student’s suspension or expulsion from the University. Additional information is available at <https://www.uta.edu/conduct/>. Faculty are encouraged to discuss plagiarism and share the following library tutorials <http://libguides.uta.edu/copyright/plagiarism> and <http://library.uta.edu/plagiarism/>

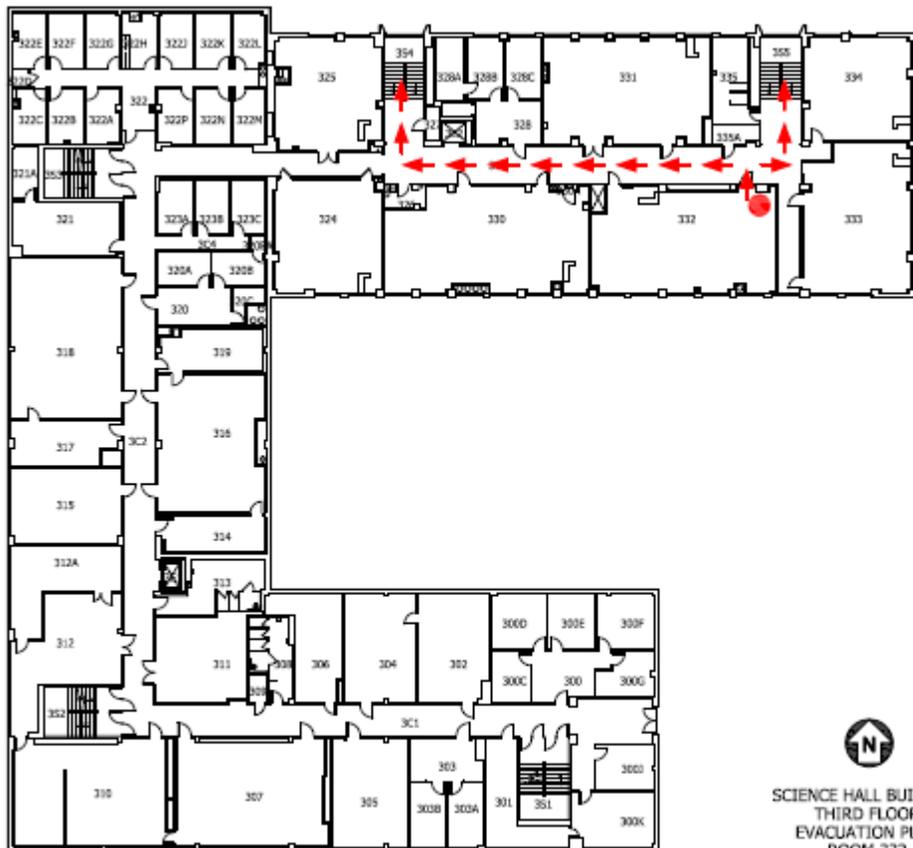
Electronic Communication: UT Arlington has adopted MavMail as its official means to communicate with students about important deadlines and events, as well as to transact university-related business regarding financial aid, tuition, grades, graduation, etc. All students are assigned a MavMail account and are responsible for checking the inbox regularly. There is no additional charge to students for using this account, which remains active even after graduation. Information about activating and using MavMail is available at <http://www.uta.edu/oit/cs/email/mavmail.php>.

Campus Carry: Effective August 1, 2016, the Campus Carry law (Senate Bill 11) allows those licensed individuals to carry a concealed handgun in buildings on public university campuses, except in locations the University establishes as prohibited. Under the new law, openly carrying handguns is not allowed on college campuses. For more information, visit <http://www.uta.edu/news/info/campus-carry/>

Student Feedback Survey: At the end of each term, students enrolled in face-to-face and online classes categorized as “lecture,” “seminar,” or “laboratory” are directed to complete an online Student Feedback Survey (SFS). Instructions on how to access the SFS for this course will be sent directly to each student through MavMail approximately 10 days before the end of the term. Each student’s feedback via the SFS database is aggregated with that of other students enrolled in the course. Students’ anonymity will be protected to the extent that the law allows. UT Arlington’s effort to solicit, gather, tabulate, and publish student feedback is required by state law and aggregate results are posted online. Data from SFS is also used for faculty and program evaluations. For more information, visit <http://www.uta.edu/sfs>.

Final Review Week: for semester-long courses, a period of five class days prior to the first day of final examinations in the long sessions shall be designated as Final Review Week. The purpose of this week is to allow students sufficient time to prepare for final examinations. During this week, there shall be no scheduled activities such as required field trips or performances; and no instructor shall assign any themes, research problems or exercises of similar scope that have a completion date during or following this week *unless specified in the class syllabus*. During Final Review Week, an instructor shall not give any examinations constituting 10% or more of the final grade, except makeup tests and laboratory examinations. In addition, no instructor shall give any portion of the final examination during Final Review Week. During this week, classes are held as scheduled. In addition, instructors are not required to limit content to topics that have been previously covered; they may introduce new concepts as appropriate.

Emergency Exit Procedures: we experience an emergency event that requires us to vacate the building, students should exit the room and move toward the nearest exit, which is located immediately to the right upon exiting the room. When exiting the building during an emergency, one should never take an elevator but should use the stairwells. Faculty members and instructional staff will assist students in selecting the safest route for evacuation and will make arrangements to assist individuals with disabilities.



SCIENCE HALL BUILDING
THIRD FLOOR
EVACUATION PLAN
ROOM 332
SCALE: N.T.S.

● YOU ARE HERE

Students are encouraged to subscribe to the MavAlert system that will send information in case of an emergency to their cell phones or email accounts. Anyone can subscribe at <https://mavalert.uta.edu/> or <https://mavalert.uta.edu/register.php>

Student Support Services: UT Arlington provides a variety of resources and programs designed to help students develop academic skills, deal with personal situations, and better understand concepts and information related to their courses. Resources include [tutoring](#), [major-based learning centers](#), developmental education, [advising and mentoring](#), personal counseling, and [federally funded programs](#). For individualized referrals, students may visit the reception desk at University College (Ransom Hall), call the Maverick Resource Hotline at 817-272-6107, send a message to resources@uta.edu, or view the information at <http://www.uta.edu/studentsuccess/success-programs/programs/resource-hotline.php>

The IDEAS Center (2nd Floor of Central Library) offers **FREE tutoring** to all students with a focus on transfer students, sophomores, veterans and others undergoing a transition to UT Arlington. Students can drop in, or check the schedule of available peer tutors at www.uta.edu/IDEAS, or call (817) 272-6593. The Library's 2nd floor Academic Plaza offers students a central hub of support services, including IDEAS Center, University Advising Services, Transfer UTA and various college/school advising hours. Services are available during the library's hours of operation. <http://library.uta.edu/academic-plaza>

Course Schedule

Week #	Week of	Reading	Topics
1	8/22	Ch 1	Introductions and Ch. 1
2	8/27	Ch 2	Atomic Structure and the Periodic Table
3	9/3	Ch 2	Atomic Structure and the Periodic Table
4	9/10	Ch 3	Bonding Theory
5	9/17	Ch 3	Bonding Theory (Tues) Exam 1 (Thurs)
6	9/24	Ch 3/ Ch 4	Bonding Theory/Symmetry
7	10/1		Symmetry
8	10/8	Ch 4	
8	10/8	Ch 5	Molecular Orbital Theory
9	10/15	Ch 7	Exam 2 (Tues) Solid State Structure (Thurs)
10	10/22	Ch 7	Solid State Structure (Tues) Literature Search Techniques (Thurs) (Guest Lecturer: Ms. Antoinette Nelson)
11	10/29	Ch 7	Solid State Structure
12	11/5	XRD	X-ray Diffraction
13	11/12	XRD	X-Ray Diffraction
14	11/19	Ch 7	Solid State Properties 11/21 Literature Search Assignment Due 11/23 Fall Break
15	11/26	Ch 7	Exam 3 Solid State Properties
16	12/3	Ch 9	Coordination Chemistry 12/4 Last day of classes
17	12/6		FINAL EXAM 11:00 am – 1:30 pm

As the instructor for this course, I reserve the right to adjust this schedule in any way that serves the educational needs of the students enrolled in this course.

<p>Emergency Phone Numbers: In case of an on-campus emergency, call the UT Arlington Police Department at 817-272-3003 (non-campus phone), 2-3003 (campus phone). You may also dial 911. Non-emergency number 817-272-3381</p>
