Instructor:
Dr. Ralph Zehnder
Email: Ralph.Zehnder@angelo.edu
Phone: 486-6662
Office: CAV 204B
Office Hours: W 2:30-5, F 11-1:30, or by appointment

Class Meeting Times

<table>
<thead>
<tr>
<th>Sec</th>
<th>Days</th>
<th>Time</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>010</td>
<td>MWF</td>
<td>9:00 am - 9:50 am</td>
<td>CAV 200</td>
</tr>
</tbody>
</table>

Recommended Textbooks

This course will be primarily based on:


Other excellent textbooks are:

Course Description
Chem 3301 Descriptive Inorganic Chemistry.
The study of structure, symmetry, bonding and reactivity, fundamental to inorganic molecular compounds, solid lattices, and coordination complexes. Further the discussion of nuclear properties, descriptive chemistry of the main group elements, the transition metals, the lanthanides and actinides.

Prerequisites:
Chemistry 1412 is to be completed with a grade of C or better before Chemistry 3301. Having completed at least 1 semester of organic chemistry is highly recommended.

Technology Requirements
Respondus Lockdown & Respondus Monitor Access through Blackboard. Make sure that your computer/laptop is compatible with Respondus software. Respondus Monitor requires a webcam. Lockddown and Monitor will be used for the administration of exams in the event the course will go completely online throughout the fall semester.

In this instance, access to exams and quizzes will be through Respondus Lockdown Browser and will be video recorded via Respondus Monitor. Respondus requires a desktop computer or laptop (not a Chromebook) and a webcam. For best results, use an ethernet cable to connect to your Internet source instead of relying on Wifi. Refer to the Blackboard course for Respondus installation instructions.
Click here for more information:
https://www.youtube.com/watch?time_continue=9&v=XuX8WoeAycs&feature=emb_title

Attendance
You are expected to attend all class meetings. You are expected to arrive on time and to stay until the end of the lecture. You will not be automatically dropped if you stop attending class.
If you feel sick, please stay home. Keep your professor informed as to your status by email (preferred) or telephone (if necessary). Your faculty will work with you to keep up to date in the class.
Grading

Evaluation and Grades

<table>
<thead>
<tr>
<th>Category</th>
<th>Points Possible</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exams (3×110 pts)</td>
<td>330 pts</td>
</tr>
<tr>
<td>Final exam</td>
<td>150 pts</td>
</tr>
<tr>
<td>Mandatory self study assignment: Simple Bonding Theory</td>
<td>20 pts</td>
</tr>
<tr>
<td>Homework (optional)</td>
<td>Average homework score replaces lowest score on one of the first three exams</td>
</tr>
<tr>
<td>Total</td>
<td>500 pts</td>
</tr>
</tbody>
</table>

Grading System
Course grades will be dependent upon completing course requirements and meeting the student learning outcomes.

The following grading scale will be used for this course:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percent</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>87.5-100%</td>
<td>437.5-500 pts</td>
</tr>
<tr>
<td>B</td>
<td>75.0-87.499%</td>
<td>375-437 pts</td>
</tr>
<tr>
<td>C</td>
<td>62.5-74.999%</td>
<td>312.75-436.5 pts</td>
</tr>
<tr>
<td>D</td>
<td>50-62.499%</td>
<td>250-312.5 pts</td>
</tr>
<tr>
<td>F</td>
<td>&lt;50%</td>
<td>0-249 pts</td>
</tr>
</tbody>
</table>

Exams
The exams will be given as part of the regular class time on the dates listed in the table below:

<table>
<thead>
<tr>
<th>Exam</th>
<th>Date</th>
<th>Room</th>
<th>Time</th>
<th>Point Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exam 1</td>
<td>Wednesday, September 16</td>
<td>CAV 219</td>
<td>9:00 am</td>
<td>115 pts</td>
</tr>
<tr>
<td>Exam 2</td>
<td>Wednesday, October 14</td>
<td>CAV 219</td>
<td>9:00 am</td>
<td>115 pts</td>
</tr>
<tr>
<td>Exam 3</td>
<td>Wednesday, November 11</td>
<td>CAV 219</td>
<td>9:00 am</td>
<td>115 pts</td>
</tr>
</tbody>
</table>

NOTE: These times are tentative and subject to change!
Absences from exams
If the absence is unexcused, the grade on the examination is a zero. If the absence is excused, you will be given the opportunity to make up for the missed test. Excuses for missed examinations must be submitted to the instructor within one week before the examination date unless you are physically unable to do so. In case you are physically unable to get in contact with the instructor by the examination date you have to inform him within three days including the day of the exam in order to be eligible for a make-up exam. After that deadline the exam will be graded as zero. Any examination missed due to an excused absence must be made up at the end of the semester by taking a comprehensive make-up examination (The date for makeup exams will be announced during the semester). To obtain permission to make up an examination, prior to the next class meeting you must verify with the course instructor whether or not an absence is excused according to the ASU Student handbook (www.angelo.edu/cstudent/). (This handbook also provides information concerning academic integrity and student services.)

Final Exam
The final exam is scheduled for Monday, November 23 at 8:00 am.
The complete final exam schedule is also available on the ASU web page.¹

Blackboard
Grades will be posted on Blackboard.² Information, handouts, homework assignments, and other course documents will be posted on Blackboard.

Last Day to Drop
The last day to drop the course with a grade of “W” is Tuesday, November 10, 2020.
General Policies Related to This Course

All students are required to follow the policies and procedures presented in these documents:

- [Angelo State University Student Handbook](#)
- [Angelo State University Catalog](#)

Academic Integrity

Students are expected to maintain complete honesty and integrity in all work. Any student found guilty of any form of dishonesty in academic work is subject of disciplinary action and possible expulsion from ASU.

The College of Science and Engineering adheres to the university’s [Statement of Academic Integrity](#).

Accommodations for Students with Disabilities

ASU is committed to the principle that no qualified individual with a disability shall, on the basis of disability, be excluded from participation in or be denied the benefits of the services, programs or activities of the university, or be subjected to discrimination by the university, as provided by the Americans with Disabilities Act of 1990 (ADA), the Americans with Disabilities Act Amendments of 2008 (ADAAA) and subsequent legislation.

Student Disability Services is located in the Office of Student Affairs, and is the designated campus department charged with the responsibility of reviewing and authorizing requests for reasonable accommodations based on a disability. It is the student’s responsibility to initiate such a request by contacting an employee of the Office of Student Affairs, in the Houston Harte University Center, Room 112, or contacting the department via email at [ADA@angelo.edu](mailto:ADA@angelo.edu). For more information about the application process and requirements, visit the [Student Disability Services website](#).

The employee charged with the responsibility of reviewing and authorizing accommodation requests is:

Dallas Swafford  
Director of Student Disability Services  
Office of Student Affairs  
325-942-2047  
dallas.swafford@angelo.edu  
Houston Harte University Center, Room 112
E-mails
For conducting official ASU business please use your official ASU e-mail account. Please make sure that you check your ASU.EDU account on a regular basis. The instructor may send important announcements regarding this course, homework, and/or exams to your ASU e-mail account. You will not be able to use the excuse of not checking your e-mail with regard to assignments, tasks, or exams you missed. Any submitted e-mails are expected to be written in a professional format and impeccable English. For more information how to communicate by e-mail please see: https://www.wikihow.com/Email-a-Professor
The instructor will refuse to read and/or respond to any messages that do not comply with such requirements.
The instructor will respond to legitimate e-mails within 24 - 48 hours during the week and may not respond until after weekends or holidays if messages are received on any of such days.
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Virtual communication
Office hours and/or advising may be done with the assistance of the telephone, Collaborate, Skype, etc.

Incomplete Grade Policy
It is policy that incomplete grades be reserved for student illness or personal misfortune. Please contact faculty if you have serious illness or a personal misfortune that would keep you from completing course work. Documentation may be required. See ASU Operating Policy 10.11 Grading Procedures for more information.

Plagiarism
Plagiarism is a serious topic covered in ASU’s Academic Integrity policy in the Student Handbook. Plagiarism is the action or practice of taking someone else’s work, idea, etc., and passing it off as one’s own. Plagiarism is literary theft.

In your discussions and/or your papers, it is unacceptable to copy word-for-word without quotation marks and the source of the quotation. It is expected that you will summarize or paraphrase ideas giving appropriate credit to the source both in the body of your paper and the reference list.

Papers are subject to be evaluated for originality. Resources to help you understand this policy better are available at the ASU Writing Center.
Student Absence for Observance of Religious Holy Days
A student who intends to observe a religious holy day should make that intention known in writing to the instructor prior to the absence. See ASU Operating Policy 10.19 Student Absence for Observance of Religious Holy Day\textsuperscript{10} for more information.

Title IX Statement
Angelo State University is committed to providing and strengthening an educational, working, and living environment where students, faculty, staff, and visitors are free from sex discrimination of any kind. In accordance with Title VII, Title IX, the Violence Against Women Act (VAWA), the Campus Sexual Violence Elimination Act (SaVE), and other federal and state laws, the University prohibits discrimination based on sex, which includes pregnancy, and other types of Sexual Misconduct. Sexual Misconduct is a broad term encompassing all forms of gender-based harassment or discrimination and unwelcome behavior of a sexual nature. The term includes sexual harassment, nonconsensual sexual contact, nonconsensual sexual intercourse, sexual assault, sexual exploitation, stalking, public indecency, interpersonal violence (domestic violence or dating violence), sexual violence, and any other misconduct based on sex.
You are encouraged to report any incidents involving sexual misconduct to the Office of Title IX Compliance and the Director of Title IX Compliance/Title IX Coordinator, Michelle Boone, J.D. You may submit reports in the following manner:
Online: www.angelo.edu/incident-form
Face to Face: Mayer Administration Building, Room 210
Phone: 325-942-2022
Email: michelle.boone@angelo.edu
Note, as a faculty member at Angelo State, I am a mandatory reporter and must report incidents involving sexual misconduct to the Title IX Coordinator. Should you wish to speak to someone in confidence about an issue, you may contact the University Counseling Center (325-942-2371), the 24-Hour Crisis Helpline (325-486-6345), or the University Health Clinic (325-942-2171).
For more information about resources related to sexual misconduct, Title IX, or Angelo State’s policy please visit: www.angelo.edu/title-ix.

Required Use of Masks/Facial Coverings: As a member of the Texas Tech University System, Angelo State University has adopted the mandatory Facial Covering Policy to ensure a safe and healthy classroom experience. Current research on the COVID-19 virus suggests there is a significant reduction in the potential for transmission of the virus from person to person by wearing a mask/facial covering that covers the nose and mouth areas. Therefore, in compliance with the university policy students in this class are required to wear a mask/facial covering before, during, and after class. Faculty members may also ask you to display your daily screening badge as a prerequisite to enter the classroom. You are also asked to maintain safe distancing practices to the best of your ability. For the safety of everyone, any student not appropriately wearing a mask/facial covering will be asked to leave the classroom immediately. The student will be responsible to make up any missed class content or work. Continued non-
Modifications to the Syllabus
This syllabus, including grade evaluation and course schedule, is subject to modification. In particular, the COVID-19 pandemic may require significant changes in course delivery and content on potentially short notice.

Lecture Schedule Fall 2020

<table>
<thead>
<tr>
<th>Week of</th>
<th>Lecture</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 8/17</td>
<td><strong>Introduction to Inorganic Chemistry</strong> — Basic concepts, composition of matter, inorganic compounds, creation of the elements</td>
</tr>
<tr>
<td>2 8/24</td>
<td><strong>Atomic Structure</strong> — Electromagnetic Radiation, dualism of light, Bohr model, quantum model of the atom, atomic orbitals, electron configurations of atoms and ions, ionization energies, VSEPR, geometry of molecules, hybridization</td>
</tr>
<tr>
<td>3 8/31</td>
<td><strong>Chemical Bonds and Molecular Geometry</strong> (Review to be done in form of a self-study and homework assignment) — Lewis Structures, Covalent Bond, Polar Bonds, Resonance, Exceptions to the Octet Rule, VSEPR, geometry of molecules, hybridization, polar and non-polar compounds</td>
</tr>
<tr>
<td>4 9/07</td>
<td><strong>d-Block Metal Chemistry: Coordination Complexes</strong> — Bonding in d-block metal complexes, valence bond theory, ligand field theory, spectral series and electronic spectra</td>
</tr>
<tr>
<td>5 9/14</td>
<td><strong>Symmetry and Group Theory</strong> — Symmetry operations and symmetry elements, molecular symmetry, point groups</td>
</tr>
<tr>
<td>6 9/21</td>
<td><strong>Vibrational Spectroscopy</strong> — Fundamentals of vibrational spectroscopy, selection rules, infrared spectroscopy, Raman spectroscopy, vibrational modes and degrees of freedom, IR-bands</td>
</tr>
<tr>
<td>7 9/28</td>
<td><strong>Molecular Orbitals (MOs)</strong> — Fundamentals of molecular orbital theory, symmetry adaptation of atomic orbitals, ligand group orbitals (LGOs), symmetry groups, molecular orbital diagrams</td>
</tr>
<tr>
<td>8 10/05</td>
<td><strong>Molecular Orbitals (MOs)</strong> — Continued</td>
</tr>
<tr>
<td>Week of</td>
<td>Lecture</td>
</tr>
<tr>
<td>---------</td>
<td>---------</td>
</tr>
<tr>
<td>9 10/12</td>
<td>Molecular Orbitals (MOs) — Continued Exam#2 on 10/14</td>
</tr>
<tr>
<td>10 10/19</td>
<td>Solid State Chemistry — Metal bonding, ionic bonding, packing of atoms and ions, lattice structures, structure types, lattice energy, band theory, semi-conductors, fundamentals of crystallography</td>
</tr>
<tr>
<td>11 10/26</td>
<td>Solid State Chemistry — Continued</td>
</tr>
<tr>
<td>12 11/02</td>
<td>Main Group Chemistry — Alkali metals, group 2 metals, group 13 elements, group 14 elements, group 15 elements, chalcogens, halogens, the noble gases</td>
</tr>
<tr>
<td>13 11/09</td>
<td>d-Block Metal Chemistry: the first-row metals — Occurrence, extraction and uses, physical properties</td>
</tr>
<tr>
<td>14 11/16</td>
<td>d-Block Metal Chemistry: the second and third row metals — Occurrence, extraction and uses, physical properties</td>
</tr>
<tr>
<td>15 11/23</td>
<td>Monday Nov. 23 Final Exam at 8:00 am</td>
</tr>
</tbody>
</table>
STUDENT LEARNING OUTCOMES

• **Learning Goal 1:** Students will be able to analyze complex chemical problems and draw logical conclusions.
  o Students will be able to use an understanding of atomic structure at the basic and atomic levels to analyze the structure and reactivity of substances and chemical species.
  o Students will be able to use an understanding of how molecules assemble and to predict stable chemical species, and perform calculations describing the energetics of crystal lattices.

• **Learning Goal 2:** Students will be able to understand and apply scientific reasoning in the chemical sciences.
  o Students will be able to use an understanding of ions and molecules at the microscopic level to predict the structure and chemical properties on the macroscopic scale.
  o Students will be able to use the basic ideas of quantum mechanics to describe how molecular bonds form and to predict molecular shape and polarity. Molecular structure and polarity will be used to predict the forces between molecules and relate those forces to the states of matter and phase changes.

• **Learning Goal 3:** Students will be able to demonstrate technical and analytical skills in chemistry.
  o Students will be able to use the periodic table to determine basic atomic information and to predict trends in atomic properties.
  o Students will be able to interconvert between chemical names and formulas to the extent that they can work problems given only one of those pieces of information.

**Evaluation of Student Learning Outcomes**
Student learning outcomes will be evaluated by test questions and by the grading of homework and possible in-classroom activities, as described by your instructor.