Current Inorganic Chemistry Topics
CHEM 409 Syllabus (Online)
Dr Brian J. Bellott
Section 101 – Spring 2019

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Instructor Information

**Instructor**  
Dr. Brian J. Bellott

**Email**  
b-bellott@wiu.edu

**Online Office Hours**
I will be available to meet via video conference (zoom, skype, google, etc; just let me know your preferred method) 4 hours per week. If you cannot make any of the times listed below, please email me at b-bellott@wiu.edu and I will setup a time to meet with you. If you would prefer to meet face to face I will be in my office (Currens 332B) at these times as well. As in all my courses if you would like to meet during office hours I would appreciate an email ahead of time so I am prepared and waiting for you.

Monday 07:00 – 08:00 pm  
Wednesday 08:00 – 10:00 am  
Friday 02:00 – 03:00 pm

**Communication Statement**
Please use my WIU Gmail address above to contact me. Include the Course title in the Subject field. I will respond to email within 24 hours.

**General Course Information**

**Course Description**
From the WIU Undergraduate catalog: Selected topics in inorganic chemistry which include current chemical bonding models, acid-base and redox approaches to inorganic chemistry, materials chemistry, and special topics related to current research are discussed. Cannot be applied toward the Chemistry minor. 2 hrs lect.

The title of the course is Current Topics in Inorganic Chemistry, CHEM 409, section I01, and meets entirely online at http://www.westernonline.wiu.edu.

**Pre/Co Requisites**
CHEM 202 or permission of the instructor

**Course Goals**
- Prepare students to be enrolled in graduate inorganic chemistry courses.
- Develop student confidence in their scientific ability.
- Expand the scope of the students knowledge base to help them see beyond what content they have already learned in other courses.

**Course Learning Objectives**
After completing this course students will be able to:
- classify redox agents as either reducing or oxidizing.
- categorize chemicals via molecular symmetry.
- summarize the determining factors when assigning point groups.
- apply different bonding models to see which fit the experimental result best.
- critique the bonding models which do not fit the experimental results.
- distinguish between materials chemistry and inorganic chemistry.

**Required Materials**

**Text**

Inorganic Chemistry (5th Edition)  
by Catherine Housecroft  

**LockDown Browser + Webcam Requirement**

This course requires the use of LockDown Browser and a webcam for online exams. The webcam can be the type that's built into your computer or one that plugs in with a USB cable. Watch this brief video to get a basic understanding of LockDown Browser and the webcam feature.


There is a $10 fee for the webcam feature that's used with LockDown Browser (sometimes referred to as Respondus Monitor). This is a one-time fee that covers the entire course. You will be prompted to make the purchase the first time an exam requires the use of LockDown Browser's webcam feature. Payment can be made with PayPal, Visa or Mastercard.

**Download Instructions**

- Select the exam in the course  
- Under Exam Requirements you will see "To take this exam you must use the Respondus LockDown Browser"  
- Below this will appear: "You can use the button below if you have not already downloaded LockDown Browser". Click the button to go to the download page and then follow the instructions  
- Use the link to download Respondus LockDown Browser to your computer; follow the installation instructions  
- Return to the Quiz page in Brightspace (it may still be open in another tab) and select the quiz  
- Select "Launch LockDown Browser"  
- The quiz will now start  
- Note: LockDown Browser only needs to be installed once to a computer or device. It will start automatically from that point forward when a quiz requires it.

**Guidelines**

When taking an online quiz, follow these guidelines:

- Ensure you're in a location where you won't be interrupted
• Turn off all other devices (e.g. tablets, phones, second computers) and place them outside of your reach
• Before starting the test, know how much time is available for it, and also that you've allotted sufficient time to complete it
• Clear your desk or workspace of all external materials not permitted - books, papers, other devices
• Remain at your computer for the duration of the test
• If the computer, Wi-Fi, or location is different than what was used previously with the "Webcam Check" and "System & Network Check" in LockDown Browser, run the checks again prior to the exam
• To produce a good webcam video, do the following:
  • Avoid wearing baseball caps or hats with brims
  • Ensure your computer or device is on a firm surface (a desk or table). Do NOT have the computer on your lap, a bed, or other surface where the device (or you) are likely to move
  • If using a built-in webcam, avoid readjusting the tilt of the screen after the webcam setup is complete
  • Take the exam in a well-lit room, but avoid backlighting (such as sitting with your back to a window)
• Remember that LockDown Browser will prevent you from accessing other websites or applications; you will be unable to exit the test until all questions are completed and submitted

Optional Materials

Supplemental Textbooks (not required):

• Inorganic Chemistry (4th Edition)
  by James H. Huheey, Ellen A. Keiter, and Richard L. Keiter

• Advanced Inorganic Chemistry (6th Edition)
  by F. A Cotton, C. A. Murillo, and M. Bochmann

• Chemical Applications of Group Theory
  by F. A. Cotton

Other Materials:

• Molecular Model Set- ensure that the set has 4-coordinate atoms, 5-coordinate atoms, and 6-coordinate atoms. If you have questions please send me an email of what you intend on buying and I can let you know if it has all the required pieces.

• Scientific Calculator
• WIU libraries http://www.wiu.edu/libraries/
• **Software**
  You will need a word processor for this course capable of saving a document in MS Word Format. Because you are a Western Illinois University student, you automatically have free access to Google Docs and a Microsoft 365 account which will both meet this requirement. Learn more about these at the following websites.
  – Google Apps for Education at WIU:  
    http://www.wiu.edu/googleapps/
  – Microsoft Office 365:  
    http://www.wiu.edu/university_technology/office_365/
  – You will also need to create a free Zoom account - https://zoom.us

• **Hardware**
  Additionally, you will need to have a web camera and microphone for use in the live video conferencing portions of the course. Today, many computers come equipped with these. If yours does not, we recommend the following camera/microphone combo for this course. However, this model is not required as long as you have a functional webcam and microphone for participation.
  – Logitech C922 Pro Stream Webcam

**Online Activities Participation Requirements and Netiquette**

The entire course is conducted online. You will be expected to conduct the weekly readings prior to completing any of the activities posted online. The activities online include weekly homework sets, a weekly discussion post, weekly responses to classmates posts, a weekly journal post, and online exams. Each topic will be described in through detail on the page for which the assignment is assigned. If have any questions please contact me as soon as possible.

As a part of this course you will be expected to log in to the course several times throughout the week. It is expected you will communicate in this course with proper netiquette. This is different than communicating in a face-to-face manner in that you cannot see your fellow classmates faces or gestures. I expect to everyone to follow the “golden rule” treat everyone as you would like to be treated.

Below is a website which guides you through standard “Netiquette”

http://www.albion.com/netiquette/corerules.html

**Absences**

Absence due to illness, personal emergency or technical difficulties should be reported to the faculty member the same day that the absence occurs. If technical difficulties are the reasoning for an extended absence it is the student’s responsibility to find another source for Internet service, such as a Public Library, Internet Café, or a family member’s/friend’s computer. Failure to notify the faculty member will be considered a missed student deadline.
Course Work
I expect students to complete all the weekly readings, weekly homework assignments (10 points each week), post an item on the weekly discussion post (10 points each week), respond to at least two classmates’ weekly discussion posts (10 points each week), and submit a weekly journal item (5 points each week). I expect you to treat this online course as you would a face-to-face course. For example a three credit hour course has 2.5 hours of lecture and 9 hours of outside time devoted to the course for a total of 11.5 hours per week. I expect students to spend between 7-8 hours per week on this 2 credit hour course.

Graded Activities
• Weekly Homework Assignments (10 points)
• Weekly Discussion Posts (10 Points)
• Responses to Weekly Discussion Posts (10 points)
• Weekly Journals (5 points)
• Hour Exam (100 points)
• Total Points (Weekly Activities 455 points and Exams 300 points)
• No late work will be accepted unless a documented excuse is provided to the instructor via email within 24 hours of the due date for the assignment.
• No extra credit will be provided.

Grading Scale
Grades will be posted 5 days after the assignment due date. Your grade will be determined using the following grading scale.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+</td>
<td>100%</td>
</tr>
<tr>
<td>A</td>
<td>99-93%</td>
</tr>
<tr>
<td>A-</td>
<td>93-90%</td>
</tr>
<tr>
<td>B+</td>
<td>89-87%</td>
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<tr>
<td>B</td>
<td>86-83%</td>
</tr>
<tr>
<td>B-</td>
<td>82-80%</td>
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<tr>
<td>C+</td>
<td>79-77%</td>
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<tr>
<td>C</td>
<td>76-73%</td>
</tr>
<tr>
<td>C-</td>
<td>72-70%</td>
</tr>
<tr>
<td>D+</td>
<td>69-67%</td>
</tr>
<tr>
<td>D</td>
<td>66-63%</td>
</tr>
<tr>
<td>D-</td>
<td>62-60%</td>
</tr>
<tr>
<td>F</td>
<td>Less than 59%</td>
</tr>
</tbody>
</table>

Instructor Feedback Statement
All feedback will be provided to students within 48 hours of the deadline for submission of the assignment. For example if the assignment is due at 11:30 pm on Sunday then feedback will be provided by Tuesday evening at 11:30 pm.
<table>
<thead>
<tr>
<th>Week</th>
<th>Topic(s)</th>
<th>Reading</th>
<th>Activities</th>
</tr>
</thead>
</table>
| Week 1   | • Inorganic Basics  
           • Atomic Structure  
           • Periodic Table  
           • Ionization Energies and Electron Affinities | 1-27    | Week 1 Discussion Post  
                                Week 1 Response to Discussion Post  
                                Week 1 Homework  
                                Week 1 Journal Post |
|          | Week 1 Discussion Post  
           Week 1 Response to Discussion Post  
           Week 1 Homework  
           Week 1 Journal Post |
| Week 2   | • Lewis Structures  
           • Valence Bond Model  
           • MO Theory  
           • VSEPR | 32-58   | Week 2 Discussion Post  
                                Week 2 Response to Discussion Post  
                                Week 2 Homework  
                                Week 2 Journal Post |
|          | Week 2 Discussion Post  
                                Week 2 Response to Discussion Post  
                                Week 2 Homework  
                                Week 2 Journal Post |
| Week 3   | • Symmetry Operations  
           • Point Groups | 62-74   | Week 3 Discussion Post  
                                Week 3 Response to Discussion Post  
                                Week 3 Homework  
                                Week 3 Journal Post |
|          | Week 3 Discussion Post  
                                Week 3 Response to Discussion Post  
                                Week 3 Homework  
                                Week 3 Journal Post |
| Week 4   | • Vibrational Spectroscopy  
           • Chiral Molecules | 74-85   | Week 4 Discussion Post  
                                Week 4 Response to Discussion Post  
                                Week 4 Homework  
                                Week 4 Journal Post |
|          | Week 4 Discussion Post  
                                Week 4 Response to Discussion Post  
                                Week 4 Homework  
                                Week 4 Journal Post |
| Week 5   | • Hour Exam over Weeks 1-4 | 1-85    | Hour Exam 1                                      |
|          | Hour Exam 1                                                            |
| Week 6   | • Separation Techniques  
           • Elemental Analysis  
           • Compositional Analysis  
           • Mass Spectrometry  
           • Infrared/Raman Spectroscopy  
           • Electronic Spectroscopy | 90-110  | Week 6 Discussion Post  
                                Week 6 Response to Discussion Post  
                                Week 6 Homework  
                                Week 6 Journal Post |
|          | Week 6 Discussion Post  
                                Week 6 Response to Discussion Post  
                                Week 6 Homework  
                                Week 6 Journal Post |
| Week 7   | • NMR Spectroscopy  
           • EPR Spectroscopy  
           • Mössbauer Spectroscopy | 110-132 | Week 7 Discussion Post  
                                Week 7 Response to Discussion Post  
                                Week 7 Homework  
                                Week 7 Journal Post |
|          | Week 7 Discussion Post  
                                Week 7 Response to Discussion Post  
                                Week 7 Homework  
                                Week 7 Journal Post |
<table>
<thead>
<tr>
<th>Week 8</th>
<th>Mar 4-8</th>
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<tbody>
<tr>
<td>- Hybridization of atomic orbitals</td>
<td></td>
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<tr>
<td>- Natural Bond Orders</td>
<td></td>
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<tr>
<td>- More MO Theory</td>
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<tr>
<td>144-171</td>
<td>Week 8 Discussion Post</td>
</tr>
<tr>
<td></td>
<td>Week 8 Response to Discussion Post</td>
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<tr>
<td></td>
<td>Week 8 Homework</td>
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<td>Week 8 Journal Post</td>
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<thead>
<tr>
<th>Week 9</th>
<th>Mar 18 to Mar 24</th>
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<tbody>
<tr>
<td>- Packing models and Sizes</td>
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<tr>
<td>- Ionic lattices</td>
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<tr>
<td>- Semiconductors</td>
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<tr>
<td>- Lattice Energy</td>
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<tr>
<td>- Defects in the Solid State</td>
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<tr>
<td>177-212</td>
<td>Week 9 Discussion Post</td>
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<tr>
<td></td>
<td>Week 9 Response to Discussion Post</td>
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<td></td>
<td>Week 9 Homework</td>
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<td>Week 9 Journal Post</td>
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<thead>
<tr>
<th>Week 10</th>
<th>Mar 25 to Mar 29</th>
</tr>
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<tbody>
<tr>
<td>- Hour Exam over weeks 6-9</td>
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</tr>
<tr>
<td>90-212</td>
<td>Hour Exam 2</td>
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<table>
<thead>
<tr>
<th>Week 11</th>
<th>Apr 1 to Apr 7</th>
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<tbody>
<tr>
<td>- Introduction to Acids and Bases</td>
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<tr>
<td>- Properties of Water</td>
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<td>- Trends with oxoacids</td>
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<tr>
<td>- Aquation cations</td>
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<tr>
<td>218-230</td>
<td>Week 11 Discussion Post</td>
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<tr>
<td></td>
<td>Week 11 Response to Discussion Post</td>
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<td></td>
<td>Week 11 Homework</td>
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<td>Week 11 Journal Post</td>
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<table>
<thead>
<tr>
<th>Week 12</th>
<th>Apr 8 to Apr 14</th>
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<tbody>
<tr>
<td>- Amphoteric oxides and hydroxides</td>
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<tr>
<td>- Solubilities</td>
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<tr>
<td>- Common Ion Effect</td>
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<tr>
<td>- Introduction to Coordination Complexes</td>
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<tr>
<td>231-246</td>
<td>Week 12 Discussion Post</td>
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<tr>
<td></td>
<td>Week 12 Response to Discussion Post</td>
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<td>Week 12 Homework</td>
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<td>Week 12 Journal Post</td>
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<table>
<thead>
<tr>
<th>Week 13</th>
<th>Apr 15-21</th>
</tr>
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<tbody>
<tr>
<td>- Redox Chemistry</td>
<td></td>
</tr>
<tr>
<td>255-277</td>
<td>Week 13 Discussion Post</td>
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<tr>
<td></td>
<td>Week 13 Response to Discussion Post</td>
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<td>Week 13 Homework</td>
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<td>Week 13 Journal Post</td>
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<table>
<thead>
<tr>
<th>Week 14</th>
<th>Apr 22 to Apr 28</th>
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<tbody>
<tr>
<td>- Non-aqueous media</td>
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<tr>
<td>- Acid-Base behavior</td>
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<tr>
<td>- Superacids</td>
<td></td>
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<tr>
<td>- Ionic Liquids</td>
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<tr>
<td>283-309</td>
<td>Week 14 Discussion Post</td>
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<tr>
<td></td>
<td>Week 14 Response to Discussion Post</td>
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<td></td>
<td>Week 14 Homework</td>
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<td>Week 14 Journal Post</td>
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<table>
<thead>
<tr>
<th>Week 15</th>
<th>Apr 29 to May 5</th>
</tr>
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<tbody>
<tr>
<td>- Hydrogen</td>
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<tr>
<td>314-336</td>
<td>Week 15 Discussion Post</td>
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<tr>
<td></td>
<td>Week 15 Response to Discussion Post</td>
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<td></td>
<td>Week 15 Homework</td>
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<tr>
<td></td>
<td>Week 15 Journal Post</td>
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<tr>
<td>Final Exam Week</td>
<td>Hour Exam 3 over Weeks 11-15</td>
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<tr>
<td>-----------------</td>
<td>-----------------------------</td>
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<tr>
<td>May 6 - 10</td>
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Western Online Technical Requirements

All requirements listed at http://www.wiu.edu/CITR/resources/wo_tech_requirements.php must met prior to beginning this course.

Technical Support

Technical support is available through the University Technology (uTech) Support Center.

- Phone: (309)-298-2704
- Email: support@wiu.edu

Website: http://www.wiu.edu/university_technology/

Students Rights and Responsibilities

http://www.wiu.edu/provost/students.php

Academic Integrity

Academic dishonesty includes the use of illegally obtained notes and exams, submission of work completed by another person, the sharing of exam answers with others, and similar activities. Such dishonesty will not be tolerated and will lead to penalties depending on the severity of the infraction. Please see http://www.wiu.edu/policies/acintegrity.php for more information.

Accessibility Statement

Students with disabilities: In accordance with University values and disability law, students with disabilities may request academic accommodations where there are aspects of a course that result in barriers to inclusion or accurate assessment of achievement. To file an official request for disability-related accommodations, please contact the Disability Resource Center at 309-298-2512, disability@wiu.edu or in 143 Memorial Hall. Please notify the instructor as soon as possible to ensure that this course is accessible to you in a timely manner.

Disability Resources Center

http://www.wiu.edu/student_services/disability_resource_center/

Students with Disabilities

http://www.wiu.edu/student_services/career_development_center/studentsWithDisabilities.php

Title IX

University values, Title IX, and other federal and state laws prohibit sex discrimination, including sexual assault/misconduct, dating/domestic violence, and stalking. If you, or someone you know, has been the victim of any of these offenses, we encourage you to report this to the Title IX Coordinator at 309-298-1977 or anonymously online at: http://www.wiu.edu/equal_opportunity_and_access/request_form/index.php. If you disclose an incident to a faculty member, the faculty member must notify the Title IX Coordinator. The complete Title IX policy is available at: http://www.wiu.edu/vpas/policies/titleIX.php.