Instructor: Dr. Jason Overby  
Office: SSMB 318  
Office Hours: MW 10-12; TTh 9:30-10:30; others by arrangement (contact me directly, by email or by phone)  
e-mail: overbyj@cofc.edu  
Phone: 953-8098

**Description of Course**

A study of advanced methods for synthesis, separation and identification of inorganic compounds.

**Overview of Course**

In this course, you will prepare a variety of transition metal complexes and conduct various characterizations of them (e.g., IR, \(^1\text{H} \) NMR, \(^{31}\text{P} \) NMR, etc). Further, you will spend considerable time engaged in scientific writing of the results to help you develop this vital skill of scientific communication.

**Co-requisites and prerequisites**

Chem 311

**Text**

There is no required text for this course. Procedures will be given from the literature and posted on OAKS.

**Learning Outcomes**

- Conduct syntheses of a variety of inorganic compounds
- Construct journal articles to relate experimental results to a scientific audience

**Class policies**

Attendance is REQUIRED at all laboratory periods. If you are ill or have a family emergency, you need to talk to me ASAP so that we can make suitable arrangements.

**Grading Scale**

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>A</td>
<td>92-100</td>
</tr>
<tr>
<td>A–</td>
<td>90-91</td>
</tr>
<tr>
<td>B+</td>
<td>88-89</td>
</tr>
<tr>
<td>B</td>
<td>82-87</td>
</tr>
<tr>
<td>B–</td>
<td>80-81</td>
</tr>
<tr>
<td>C+</td>
<td>78-79</td>
</tr>
<tr>
<td>C</td>
<td>72-77</td>
</tr>
<tr>
<td>C–</td>
<td>70-71</td>
</tr>
<tr>
<td>D+</td>
<td>68-69</td>
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<tr>
<td>D</td>
<td>62-67</td>
</tr>
<tr>
<td>D–</td>
<td>60-61</td>
</tr>
<tr>
<td>F</td>
<td>below 60</td>
</tr>
</tbody>
</table>
Grading Scheme

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laboratory Notebook</td>
<td>10%</td>
</tr>
<tr>
<td>Laboratory Report Submission</td>
<td>5%</td>
</tr>
<tr>
<td>Laboratory Reports</td>
<td>70%</td>
</tr>
<tr>
<td>Laboratory Technique</td>
<td>5%</td>
</tr>
<tr>
<td>Final Project</td>
<td>10%</td>
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Grading Policy

Journal articles (laboratory reports) are due at the beginning of lab. Journal articles turned in within a 24-hour window after the due date will be penalized 50%. Journal articles will not be accepted after 24 hours of the due date and a grade of zero will be assigned for that report.

Journal articles will be graded using a system based on the actual practice of submitting scientific research articles for the review process and ultimately publication. Each article will be graded and returned. You may then decide to resubmit your article after making revisions. For the first two articles, resubmission allows you to potentially earn all of the deducted points back. For the next two articles, resubmission can earn you up to 50% of the deducted points back. For any articles after that, resubmission does not earn any deducted points back.

Further, journal articles are weighted greater as we progress through the semester. The first two journal articles count as one article each. The next two journal articles count as two articles each. Any articles after that count as three articles each.

Another component of the Laboratory Reports grade (5%) is based on timely submission of your electronic copies of the article to the appropriate dropbox on OAKS. You must submit a pdf copy of your initial article by the required deadlines as indicated in OAKS. All of these points are based solely on compliance by the specified deadline and the proper file format.

The laboratory technique grade is a subjective assignment and is cumulative over the course of the semester. A major factor influencing the laboratory technique grade is cleanliness.

The final project is in lieu of a written final exam. Details about the requirements of the final project will be given after spring break. The final project will be due during the last meeting of the class.

The Honor system is in effect in all your efforts for this course. Cheating will not be tolerated. If you are caught cheating, a grade of “F” will automatically be given and you will be brought before the Honor Board. Please refer to the Department’s policy on Scientific Integrity for more information. By enrolling in this course, you are agreeing to abide by the Departmental policy on Scientific Integrity.

Laboratory Notebook

Your laboratory notebook will serve as a complete record of your work for the semester. Keep in mind that your notebook can serve as a legal document. Scientists in both industry and academia periodically must submit evidence in the form of their notebook to resolve patent disputes. An experiment should be understandable and repeatable based solely on information contained in the notebook. The following notebook guidelines will be useful
• The first few pages should be used for a table of contents.
• Each experiment should start on a new right-handed page. If more than one page is needed, include the page number where the experiment is continued and note on the new page where the experiment is continued from. Do not skip pages to leave space to finish.
• Each page will include the date and a title of the experiment at the top.
• Each page should include pertinent references, a balanced equation for the reaction to be studied and a list of reagents to be used including quantities (grams, molar mass, moles, etc.)
• All information should be recorded directly into the notebook. No scratch sheets of paper are allowed. The left hand page can be used for notes or calculations but it cannot be relied on for completeness.
• Use ink only. Corrections should be made by drawing a single line through an entry. Intentionally scribbling over something so that it cannot be read means that you have something to hide.

Before lab, prepare you notebook by writing the date, title, references, reaction equation and any other important information.

During lab, record the procedure and data together as you work. Do not make judgment calls about the importance of data. If the referenced procedure was kept at 80 °C and your experiment was kept at 75 °C, this is important. It is better to write too much than too little. Include spectroscopic data collected during the lab and be sure to write comments before leaving that include suggestions or warnings to anyone that will use your book to repeat an experiment.

After lab, if you have followed these procedures, your notebook will contain all the information that you need to write a comprehensive lab report of high quality.

**Syntheses**

Procedure 1: synthesis and characterization of a copper amino acid complex (2 weeks)
Procedure 2: synthesis and characterization of a cobalt diethyldithiocarbamate compex (2 weeks)
Procedure 3: synthesis and characterization of a transition metal (cobalt or copper) saccharin complex (2 weeks)
Procedure 4: synthesis, characterization, and reactivity of a molybdenum diethyldithiocarbamate complex (3 weeks)
Procedure 5: synthesis and characterization of a model complex for dinitrogen fixation (molybdenum sulfur complex with hydrazine derivative) (2 weeks)
Procedure 6: synthesis, characterization, and reactivity of a vanadium acetylacetonate complex (3 weeks)

**Accommodations for Students with Disabilities**

If there is a student in this class who has a documented disability and has been approved to receive accommodations through the Center for Disability Services/SNAP (Students Needing Access Parity), please come and discuss this with me.
Important Dates

January 15 – Martin Luther King, Jr. Holiday
March 13 – Last day to withdraw from classes with the grade of “W”
March 18-24 – Spring Break
April 23 – Last day of classes