

# Inorganic Chemistry Laboratory – Spring 2009

## Syllabus: *General Information*

### CHE 320L

**Instructor:** Dr. Isabelle L. Lagadic

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**Office Hours:** Mondays, Wednesdays & Fridays: 10:00-11:30 am, or by appointment.

1- **CLASS**: Thursdays 8:00 am – 12:50 pm, **and other times**. Room SC 461.

2- **PRE-REQUISITE**: A grade of C or better in Organic Chemistry Laboratory, CHE 310L.

3- **CO-REQUISITE**: Inorganic Chemistry, CHE 320.

4- **TEXT & REQUIRED MATERIALS**:

- *Techniques in Organic Chemistry*, Mohrig, J. R.; Hammond, C. N.; Schatz, P. F.; Morrill, T. C. 2<sup>nd</sup> Edition. W. H. Freeman & Co: New York, 2006 (this book was required in the Organic Chemistry course).
- Laboratory Record Book, Hayden-McNeil Publishers, Inc.
- Safety goggles.

5- **STUDENT LEARNING OBJECTIVES**:

- The student will be able to use standard laboratory techniques, vacuum line techniques and glovebox techniques to synthesize and purify inorganic compounds.
- The student will be able to use infrared, nuclear magnetic resonance spectrometers, a magnetic susceptibility balance and a polarimeter to characterize inorganic compounds.
- The student will be able to interpret data in order to characterize compounds and to determine the course and/or mechanism of reactions.
- The student will be able to keep appropriate records of experimental work and write reports using the format used by the American Chemical Society.

6- **INTERNET RESOURCES**: This is a web-enhanced course. Students will need access to the Internet to fulfill the course requirements. Students are expected to be familiar with the use of the following web sites:

*Blackboard*: <http://learnonline.nku.edu/>, where announcements, syllabus, class calendar, experiment handouts, course handouts, and any additional information about the class can be found. Students are responsible for all materials posted on this site.

*NKU Steely Library*: <http://library.nku.edu/>

7- **ELECTRONIC DEVICES**: Students are asked to **turn off their electronic devices (cell phones pagers, etc.)** during class. If you expect an emergency call, please notify your instructor prior to the beginning of the lecture period. Under no circumstances will students be allowed to use their cell phone during a test. **Using a cell phone during a test will be considered cheating.** The use of MP3 players is not allowed during the conduction of any experiments.

**8- CALCULATORS:** Calculators should be brought to lab every week, as they will be needed to perform lab calculations. ONLY **SCIENTIFIC** CALCULATORS will be accepted during a test. You will NOT BE ALLOWED TO USE programmable calculators (even with cleared memories) or cell phones during a test. In no case may calculators be passed from one student to another during a test. The lack of an operable calculator will not excuse a student from having to solve a problem. Make sure you know how to operate your scientific calculator before you use it during a test.

**9- COMMUNICATION WITH THE INSTRUCTOR:** You should always feel free to seek any appropriate out-of-class assistance from the instructor in your efforts to master the class materials. Feel free to contact your instructor, but please:

- ◆ Use the office hours, if possible
- ◆ If the office hours are not convenient for you, make an appointment (preferably by email)
- ◆ Do not expect an instant reply to your email or voicemail messages.
- ◆ Come prepared with specific questions
- ◆ Do not come few minutes before a deadline (report or test). No help will be provided within less than 4 hours of a deadline.

**Emails TO your instructor:**

- ◆ **Must have a subject in the subject line.** Emails with "no subject" in the subject line will automatically be deleted
- ◆ **The subject line must start with CHE 320 L.** Do not use subject such as "Hi" or "Hello" as those messages will automatically be deleted. Example of correct subject: "CHE 320 L: Question on the Cr(acac)<sub>3</sub> Exp."

**Emails FROM your instructor:**

- ◆ Personal communication will be **sent to your nku.edu email account**. Make sure you check out this account on a regular basis or have your messages forwarded to the account you regularly use, and will contain CHE320L in the subject line
- ◆ Communication to the entire class will be posted on the Blackboard site under "Announcements".

**10- LAB POLICIES:**

- Because there are usually more students seeking to enroll in laboratories than can be accommodated, students not present for the first meeting of a chemistry laboratory in which they have enrolled may be dropped from the class immediately, unless they have notified the instructor of the chemistry department at (859) 572-5409 of their expected absence. If the lab they are withdrawn is a co-requisite for a lecture course, the student will be withdrawn from that lecture also.
- **Students in upper division laboratory courses may find that they will need to spend more time in the laboratory than is listed in the schedule.**
- Students not adhering to safety policies for laboratories may be dismissed from lab.

**11- DEPARTMENT OF CHEMISTRY POLICIES:**

- **Academic Honesty:** The work you will do in any course is subject to the Student Honor Code. The honor Code is a commitment to the highest degree of ethical integrity in academic conduct, a commitment that, individually and collectively, the students of Northern Kentucky University will not lie, cheat or plagiarize to gain an academic advantage over fellow students

or avoid academic requirements. The Honor Code can be accessed at [http://www.nku.edu/~deanstudents/students\\_rights/honor\\_code/htm](http://www.nku.edu/~deanstudents/students_rights/honor_code/htm). Cheating will not be tolerated. In accordance with the Code of Student Rights and Responsibilities, faculty members have the right to determine actions to be taken when a student is caught cheating. Students caught cheating or plagiarizing for the first time will receive a grade of zero for that test or assignment. Students caught cheating or plagiarizing for the second time will receive an F for the course and will be reported to the Dean of Students.

- **Making up results or using a classmate's results without prior approval by the instructor will be considered as cheating.**
- Faculty members reserve the right to dismiss or to have removed a disruptive student from their classroom.
- All items on syllabi are subject to change by the instructor.
- **Students are responsible for reading and understanding all items on the syllabus, and recognize this obligation by signing and returning the attached form. Any items not understood must be brought to the attention of the instructor within the first two weeks of class.**
- This is a web-enhanced course. Students meet at regularly scheduled class time and will need access to the Internet to fulfill the course requirements.

**12- STUDENTS WITH DISABILITIES:** Students with disabilities who require accommodations (academic adjustments, auxiliary aids or services) for this course must register with the Disability Services Office. Please contact the Disability Services Office located in the University Center, Suite 320, call (859) 572-6373 or visit their web site at [www.nku.edu/~disability/](http://www.nku.edu/~disability/) for more information. Verification of the student's disability is required by the Disability Services Office for you to receive reasonable academic accommodations.

# Inorganic Chemistry Laboratory – Spring 2009

## Syllabus: *Lab Organization, Tests and Grading System*

### CHE 320L

**1- BEFORE THE LAB:** Students are expected to come to lab with a thorough understanding of the principles involved in the experiment, the goal of the experiment and the safety precautions and experimental procedures to be followed. This level of preparation **requires that BEFORE COMING TO LAB:**

- You check Blackboard for any announcements or reading assignments prior to class
- You read the experiment and any assigned or recommended reading found on Blackboard.
- You prepare the experiment protocol in your lab notebook. An experiment protocol includes:
  - The title and the date of the experiment.
  - The objective(s) of the experiment.
  - The **list of materials (chemicals, glassware, lab supplies)** needed to conduct the experiment.
  - The procedure to be followed to conduct the experiment using clearly separated and numbered individual steps. **This procedure must be written on the left side of the lab notebook.**

All entries must be made in **blue or black pen and be neat and legible.**

Each new experiment is to start on a new page.

***You must have enough information present in your experiment protocol to be able to perform the experiment WITHOUT using or referring to the experiment handout. You will not be allowed to access the experiment handout while conducting the experiment.***

- **Experiment protocol will be checked and initialed by the instructor at the beginning of the lab period (8:00 am).**
- **Failing to present the experiment protocol will result in a zero for this portion of the lab.**
- **If the experiment protocol has not be prepared before the beginning of the lab period, you will NOT be able to conduct that lab experiment, you will NOT be eligible for a make-up lab and will receive a zero for that lab.**
- **Failing to write a complete protocol will be penalized 5 points for each missing portion.**
- **Penalty of 15% off that portion of the lab grade will be applied if a pencil is used to write the experiment protocol.**

**2- DURING THE LAB:** Students are expected to participate in all aspects of the experiments and to respect the safety rules. During the lab period, you will:

- Perform the experiment using the experiment protocol recorded in your lab notebook.
- Record in your lab notebook **on the right side of your protocol and next to each step:**
  - **Any changes**, no matter how slight they may be, to the procedure described in the protocol.
  - The **ACTUAL amounts of materials used.**
  - All **data collected and observations.** Students must record what they actually did and observed

- Calculations to be recorded in the lab notebook can be done across the whole page (not necessarily on the right side). It is important to record original data rather than mental calculations made from the data.
- All entries must be made in **blue or black pen and be neat and legible**. The detailed format of the lab notebook record is described in the textbook by Mohrig *et al.* (Chapter 3).

- **The “copy pages” of your lab notebook containing the records of the experiment performed will be collected by the instructor at the end of each lab period.**
- **Failing to turn the copy pages of your lab notebook at the end of the lab period will result in a 15% off the value of that portion of the lab grade.**
- **Penalty of 15% off the values of that portion of the lab grade will be applied if a pencil is used to write the data and observation.**

**3- AFTER THE LAB:** Students will be asked to report their data in more details than what is recorded in the lab notebook during the conduction of the experiment.

**1. Lab Reports** will be required for each lab experiment. A list of helpful tips for lab report writing are given in “Course Handouts” on Blackboard. It is strongly suggested you refer to this document before writing your lab reports.

***Basic Lab Reports:*** The format and content of each basic lab report are included at the end of each experiment handout.

***Formal Lab Reports:*** Formal Lab Reports are to be done for the following experiments:

- Synthesis and Magnetism of Tetra- $\mu$ -acetatobis(aquacopper(II))
- Synthesis of Bis(1,2-dimethylimidazole)copper(I) Hexafluorophosphate)

The template to be used for the formal lab reports is given in “Course Handouts” on Blackboard. When using this template, you simply have to change the title, table headings and text to fit the experiment.

- **Lab reports (basic and formal) must:**
  - **Follow the appropriate format.**
  - **Be typed (HANDWRITTEN, even partially, lab reports will NOT be ACCEPTED).**
  - **Include all the spectra and graphs attached at the end of the report.**
  - **Include the answers to assigned questions also attached to the end of the report.**
  - **Be turned in one week after the scheduled completion of the experiment unless indicated otherwise by the instructor.**
  - **Hand-delivered. Emailed lab reports will NOT be accepted unless indicated otherwise by the instructor.**
- **LATE and HANDWRITTEN (even partially) LAB REPORTS will NOT BE ACCEPTED resulting in a score of zero for that portion of the lab.**
- **Making up results or using a classmate’s results without prior instructor’s approval will not be tolerated and be considered as cheating.**

- **Penalty of 25% off the values of that portion of the lab grade will be applied if the appropriate format is not followed.**

**2. Samples** of all compounds synthesized are to be submitted along with the report. Samples are to be identified with the date, the student's name, the sample's name and the mass of the sample.

**4- SAFETY & HOUSEKEEPING:** All safety rules discussed during the first lab period must be obeyed. **NO FOOD OR DRINK is allowed in lab**, including open water bottles. Violation of these rules will result in dismissal from the lab and a grade of zero for that experiment. Habitual violation of the safety rules during the semester will result in dismissal from the course and a failing a grade. Proper clothing (**LONG PANTS AND CLOSED TOE SHOES**) and **SAFETY GOGGLES must be worn at all times**, or you will not be allowed to enter the lab, and will not receive any make-up opportunity.

The following waste disposal regulations and good housekeeping practices must be observed:

- Dispose of your waste in the *appropriate* containers labeled "inorganic wastes".
- Do not return unused chemical to the reagent bottle.
- Keep your work surfaces as well as common area clean at all times.
- Clean up any material spill, especially on or near the balances, immediately.
- Switch off the light of your hood and switch off the light before you leave.

**5- LOCKER & EQUIPMENT MAINTENANCE:** Students are required to keep all the equipment (locker equipment as well as common equipment) cleaned and in good order. Make sure all your locker equipment is returned to your locker at the end of the lab period. When manipulating, keep in mind that lab equipment is costly. You might be penalized for broken and / or missing pieces of equipment and glassware.

**7- ATTENDANCE & MAKE-UP POLICY:** Missed labs will generally be assigned a grade of zero. Only under **extreme circumstances** will a student be allowed to make up a lab experiment. **Any make-up experiment will have to be scheduled between May 3<sup>rd</sup> and May 8<sup>th</sup> (final week of class).**

**8- STUDENT RESPONSIBILITIES:**

- **Be on time**
- Be prepared, including pre-lab reading and materials
- Participate in the lab
- Complete assignments on time
- Attend every lab session as scheduled

**9- EXAM:**

There will be one cumulative final given on Thursday April 30<sup>th</sup>, 2009 from 8:00 am until 12:50 pm in SC 461.

### 10- GRADING SYSTEM:

Each experiment has a different total value of points, depending on the lab report format. A tentative grading system is as follows:

- Protocol (prepared before lab), in-lab procedure and lab participation will be assigned 30 points
- Each Basic Lab Report will be assigned 70 pts for a total of 100 points.
- Each Formal Lab Report will be assigned 120 points for a total of 150 points,
- Exam will be assigned 250 points

| Graded Work                                  | Points / Each | Possible Points          |
|--|---------------|--------------------------|
| Seven (7) Experiments with Basic Lab Reports | 100           | 700 (56%of final grade)  |
| Two (2) Experiments with Formal Lab Reports  | 150           | 300 (24%of final grade)  |
| One (1) comprehensive final exam             | 250           | 250 (20% of final grade) |
| <b>TOTAL</b>                                 |               | <b>1250</b>              |

#### Penalties:

- Protocol not prepared = Exclusion from that lab + zero for the entire lab
- Protocol not presented at the beginning of the lab period = zero for that portion
- Incomplete protocol = Deduction of 5 point per missing part
- Entries in the lab notebook made in pencil = 15% off for affected portion of the entry.
- Late lab reports = zero for that portion.
- Handwritten (even partially) lab reports = zero for that portion.
- Appropriate lab report format not followed= 25% off value of the lab report.

Tentative point grade distribution

| POINT RANGE | PERCENT     | LETTER GRADE |
|-------------|-------------|--------------|
| 1125 – 1250 | 90% to 100% | A            |
| 1000 – 1124 | 80% to 89%  | B            |
| 875 – 999   | 70% to 79%  | C            |
| 750 – 874   | 60% to 69%  | D            |
| < 749       | Below 60%   | F            |