Instructor: Dr. Charles H. Mahler, Phone (570) 321-4351 or (570) 322-8840 (h), mahler@lycoming.edu
Office Hours: Heim 202, Monday, Wednesday, Friday 10 AM – 12 noon, by appointment, or drop by.

CLASS: Mondays from 3:15 to 4:20 PM in Heim 215, plus an average of 12 hours per week in the lab, as arranged with your research advisor.

Prerequisites: CHEM 221 and consent of instructor. Corequisite: CHEM 330.


Evaluation and Grading:
Effort in Lab and Library Research 20%
Laboratory Technique and Notebook 5%
Resume, Cover Letter, Research Summary 5%
Paper drafts, practice talks, and participation (class discussion, peer review) 15%
Annotated Bibliography 10%
Poster* 10%
Colloquium* 15%
Final Paper 20%
100%
*All grades assigned in consultation with research advisor, poster and colloquium grades assigned in consultation with all chemistry faculty.

Grading Standard (from the Lycoming College Catalog):

Final Grade Interpretation
A Excellent: Signifies superior achievement through mastery of content or skills and demonstration of creative and independent thinking.
B Good: Signifies better-than-average achievement wherein the student reveals insight and understanding.
C Satisfactory: Signifies satisfactory achievement wherein the student’s work has been of average quality and quantity. The student has demonstrated basic competence in the subject area and may enroll in additional coursework.
D Passing: Signifies unsatisfactory achievement wherein the student met only the minimum requirements for passing the course and should not continue in the subject area without departmental advice.
F Failing: Signifies that the student has not met the minimum requirements for passing the course. A failing grade in the course may also result from academic dishonesty or from excessive unexcused absences.
Learning Objectives:
Students who successfully complete this course will:
1. Be able to search Chemical Abstracts and access the primary literature,
2. Gain experience in conducting original chemical research, and
3. Be able to communicate the results of their research, in both oral and written form.

Departmental Objectives:
This course helps to fulfill the following Department of Chemistry learning objectives:
1. Exhibit integrative, problem-solving skills, such as experimental design, data manipulation, and data interpretation,
2. Search the chemical literature, evaluate the results of the search, and access desired research materials,
3. Understand and use modern chemical instrumentation,
4. Demonstrate responsible conduct in the laboratory, including laboratory safety and ethical research practices,
5. Communicate the results of chemical investigations effectively in written and oral form.

College Mission:
The course supports the mission of Lycoming College to provide a distinguished baccalaureate education in the liberal arts and sciences.

Writing-Intensive Course:
CHEM 449 is a W-course, meaning that students who pass it will partially fulfill their writing-intensive graduation requirement. Writing intensive courses include instruction on writing, and students in these courses complete at least ten pages of formal writing and fifteen pages of informal writing. Formal writing assignments in this course include the annotated bibliography, the research summary and the final paper. Informal writing assignments include free-writing exercises, peer reviews of drafts and presentations, and drafts of the paper.

If you have questions or comments about anything in the course, please see me (and your research advisor). We are ready and willing to meet with you and discuss your concerns, answer questions, explain concepts, solve problems, etc. We would rather help you to understand something before an assignment is due, than to find out you don't understand it while grading your work.

Attendance:
Attendance at the weekly seminar is mandatory and each unexcused absence will result in a 5% reduction of the final grade. A maximum of one excused absence (must be documented by a note from physician, Dean, etc.) will be granted. You are expected to spend an average of 10-12 hours per week on laboratory work. While laboratory experiments don’t always lend themselves to fixed work schedules, you and your advisor should agree on a regular lab schedule. Treat this time as you would a regular class or lab meeting; if you will not be able to be in lab at the designated time, notify your advisor ahead of time. While some of this time may be spent reading the literature and planning experiments, cutting back on designated lab time to finish a draft or study for an exam is frowned upon.

Academic Integrity:
Be aware that in accordance with the College’s policy on academic honesty, any work you submit must be your own. Any instances of plagiarism will be severely penalized.
Effort in laboratory and library research: (20% of grade)
This takes the form of commitment to the project with regard to both the time and thought dedicated to the research. This includes an evaluation of your comprehension of the project and your intellectual input to the project (assessed via discussions about the project with the research advisor or 449 instructor, research presentations, and paper drafts).

Laboratory Technique and Notebook: (5% of grade)
Your mastery of techniques relevant your project will be evaluated. Included in this category are the skills necessary for the maintenance of laboratory equipment, laboratory hygiene, and safety. Keeping an accurate and detailed laboratory notebook and an organized file of spectral data is of paramount importance. Each lab has a slightly different protocol for keeping a lab notebook; please follow the protocol described by your research advisor. The laboratory notebook and spectral data will be submitted to the research advisor at the end of the semester and will be kept as part of the permanent records of the research laboratory (notebooks should remain in the laboratory as much as possible during the semester).

Resume, Cover Letter and Research Summary: (5% of grade)
A resume and cover letter will be prepared along with a research summary (this is useful to have on job interviews). Although only one draft of the resume and cover letter are required, you are encouraged to submit additional drafts if significant changes are suggested.

Paper Drafts, Practice Talks and Participation: (15% of grade)
Drafts will be returned with comments and, in some cases, a rough estimate of the letter grade that the draft would receive had it been submitted as the final product. The only purpose of this estimated grade is to give you an idea of how your final product will be evaluated. Drafts that are submitted on time and show clear evidence of significant effort will receive full credit (they don't need to be perfect – they are, after all, drafts!). However, submitting hastily written drafts that are short on content or are littered with errors will result in a significant reduction in the course grade. Similarly, failing to address critiques/suggestions from earlier drafts will result in a reduced grade.

Several research presentations (“practice talks”) are scheduled throughout the semester. Although these presentations are somewhat informal, a reasonable degree of professionalism is expected: be prepared, be knowledgeable about your project, be able to describe the work in a concise and informed manner, and be able to answer student and faculty questions regarding the project. Presentations will be reviewed by the chemistry faculty and fellow 499 students.

Participation includes reading assignments, which should be completed well before class meets; you will need time to think about what you have read and to prepare for class discussion of the reading. Please arrive at class ready to participate, and plan on having your comments and questions drive the discussion. Participation also includes peer review, feedback given on work presented by your fellow Chemistry 449W students.

Annotated Bibliography (and Literature Review): (10% of grade)
Two classes will be reserved for literature searches. You will use SciFinder to search Chemical Abstracts and locate journal articles that are pertinent to your research topic. These articles will form the basis for an annotated bibliography (worth 10% of your grade) and the literature review, which will ultimately be included in the final research paper.
Poster and Colloquium: (10% (poster) and 15% (colloquium) of grade)
You will present the results of your research to the Department of Chemistry in the form of a poster and a
colloquium presentation. A formal practice talk will be given in class several days before the colloquium.

Final Paper: (20% of grade)
The final paper is a report on your research project written in standard ACS style (refer to papers published in
the Journal of the American Chemical Society). It will consist of an abstract, introduction, literature review,
results and discussion, conclusions, an experimental section, and references. We will address the particulars of
each section in class. Drafts of various sections will be due throughout the semester (submit copies to the
course instructor and to your research advisor). We have found that at least three drafts of the entire paper are
needed to ensure a final product that everyone can be proud of. Please note that work will not be accepted
after the Thursday of finals week.

Miscellaneous:
Administrative procedures (withdrawals, etc.) will follow the published guidelines and rules of the college and
department. This syllabus is also available online at http://www.lycoming.edu/chem/fall2015/449syl.htm.

Academic Honesty:
On all work submitted for a grade, copying someone else's work or allowing another to copy your work and submit it
as their own is academic dishonesty and can lead to penalties such as failing the assignment or even dismissal from the
college. Always include citations for all sources consulted to avoid plagiarism. For further information on the college
policy on academic dishonesty, see the Pathfinder or Student Handbook.

Learning Disabilities:
Lycoming College provides academic support for students who officially disclose diagnosed learning, physical, and
psychological disabilities. If you have a diagnosed disability and would like to seek accommodations, please contact
Jilliane Bolt-Michewicz, Assistant Dean of Academic Services/Director of the Academic Resource Center. Dean Bolt-
Michewicz will help you arrange for appropriate academic accommodations. She can be reached by calling (570) 321-
4050, emailing michewicz@lycoming.edu, or visiting her office (Academic Resource Center, 3rd Floor of Snowden
Library).

Thoughts on Research:
Research is difficult and there will be experiments that don’t work and failures along the way. While that is to
be expected, it is also important to realize we usually learn as much or more from failures as we do from
successes. Here are two quotations from Winston Churchill that are applicable to research:

“Success is not final, failure is not fatal: it is the courage to continue that counts.”

“Success is stumbling from failure to failure with no loss of enthusiasm.”