

Course Syllabus: Research Techniques

CHEM 160H and CHEM 260, Spring 2020

Instructor: Hubert Muchalski, Ph.D.

General information

- **Course name and number:** Advanced Research Techniques (graduate, 3 Units); Research Techniques; CHEM 160H (undergraduate, 3 Units).
- **Time and location:** Friday, 08:00–08:50 AM in S1-242 (lecture)
- **Contact:** Science 1 room 352, phone (559) 278-2711, hmuchalski@mail.fresnostate.edu
- **Canvas:** The central repository for all course materials and information is our Canvas site, accessible through <https://fresnostate.instructure.com/courses/19960>. The Canvas site will house your grades, links to handouts, videos, and other materials.
- **Textbook:** The ACS Style Guide: Effective Communication of Scientific Information. Editor(s): Anne M. Coghill and Lorrin R. Garson. DOI: [10.1021/bk-2006-STYG](https://doi.org/10.1021/bk-2006-STYG)
- **Software and Services:** Scifinder Scholar account, EndNote, and ChemDraw. Available for free for Fresno State students. Refer to instructions on how to obtain the software (Canvas).
- **Office Hours:** I will be available for consultations after each class meeting (09:00–10:00 AM) and by appointment.

Introduction

Catalog description

Advanced concepts in experimental design. Development of practical research expertise and communication skills through the planning, completion, and presentation (both written and oral) of a short laboratory project.

Success as a scientific researcher requires a number of skills that are not fully developed at the undergraduate level. In addition to proficiency with the appropriate experimental techniques and instrumentation, researchers must be able to plan their time and experiments independently, and think creatively to overcome the problems that are inevitably encountered. Outside of the laboratory, researchers must have good written and oral communication skills both to present their work to others in the scientific community, and to effectively discuss their studies with fellow researchers.

In this class you will have the opportunity to improve your research skills. You will work on an independent research project that may be (but does not have to be) your MS thesis project. You will learn key elements for effective scientific writing and presentations. You will gain experience in

scientific writing and oral presentations through various assignments during the semester, culminating in the writing of a term paper on your research project. The ultimate goal of this course is to help you to develop the research skills necessary to successfully complete the MS degree.

Student Learning Outcomes

Students who successfully complete this course should be able to:

- gain proficiency in the advanced experimental techniques in their area required to carry out graduate-level research;
- design, plan, and execute experiments to test scientific hypotheses;
- use the research tools and databases to find and extract relevant information from research papers;
- cite references appropriately and avoid plagiarism;
- communicate scientific information in both formal presentations and informal discussions; and
- write competently in the style of the appropriate scientific journals.

Topics

1. Tools for research: databases, journals, software, and services
2. Components of scientific communication (manuscript and supporting information)
3. Hypothesis and research proposal development, experimental design
4. Publishing and peer-review
5. Scientific misconduct and plagiarism

Types of graded work

1. Research proposal
2. Presentation
3. Research report
4. Participation in in-class and online discussions

To support your learning and development I will provide assignments during the semester. Major assignments (listed above) will be graded. Other, smaller assignments will be ungraded. However, they must be submitted on time and meet all listed criteria to be deemed satisfactory.

Lab section

At the beginning of the semester you must identify a faculty member in the department who is willing to act as your research advisor (if you do not already have one). Together, you will identify your research project. For graduate students it can be the same as the MS thesis project. Undergraduate students will work on their Honors thesis project. You will be expected to work on the research project for a minimum of six hours per week during the semester. You should discuss lab hour requirements and expectations with your advisor. The grade for this section of the course will be assigned in consultation with your research advisor.

Final letter grade scheme

The letter grade scale followed a pattern close to the following: A = 90–100, B 80–89, C 70–79; D 60–69; and F <60.

Category	Subtotal
Laboratory (graded w/ advisor)	40%
Drafts	15%
In-class presentations	10%
Final presentation	10%
Final paper	25%

Course policies

Late work policy

Late assignments will not be accepted and will receive score of 0.

Technology issues when submitting work

For assignments submitted electronically, it is your responsibility to make sure they are submitted on time, through any means necessary, even if technology issues arise. If a tech issue arises, it is your responsibility to find another way to get it to me (for example, via an email attachment). Technology issues that are avoidable or resolved with a simple work-around will not be considered valid grounds for a deadline extension.

Academic dishonesty

For most assignments you are allowed and encouraged to work with others. However, the final product that you submit for feedback must be the result of your own efforts. Therefore you may share ideas and strategies with others, but collaboration on the actual finished product you submit is not allowed. Your work is expected to be the product of your own thinking, written and explained in your own words with no parts of the work copied from external sources such as books or websites, and done clearly enough in your own mind that you could explain the work from start to finish if asked. Specifically, this excludes:

- copying work from another student;
- copying work from a website;
- paraphrasing work done by another student or from print or internet resources—i.e. putting it in your own words—without coming up with the main ideas and strategies yourself; and
- *allowing or enabling* another student to copy or paraphrase work that you did, even if you did the original work yourself.

Violation of this policy is considered “academic dishonesty” and carries with it strong punitive measures mandated by Fresno State, including possible automatic failure of the course or suspension from the university. For details, please see APM 235 by going to <http://www.fresnostate.edu/>

[aps/documents/apm/235.pdf](#).

You may feel tempted to academic dishonesty at some point in the semester. The work can be difficult, and many of you are under a lot of stress. If you are considering academic dishonesty, please STOP, take a breath, and remember that your classmates and I want you to succeed in the course. You are not alone, and you have a strong network in the class for getting help.

Plagiarism Detection

The campus subscribes to Turnitin and the SafeAssign plagiarism prevention service through Canvas, and you will need to submit written assignments to Turnitin/SafeAssign. Student work will be used for plagiarism detection and for no other purpose. The student may indicate in writing to the instructor that he/she refuses to participate in the plagiarism detection process, in which case the instructor can use other electronic means to verify the originality of their work. Turnitin/SafeAssign Originality Reports will be available for your viewing.

Dropping the course after the census date

A *serious and compelling reason* is defined as an unexpected condition that is not present prior to enrollment in the course that unexpectedly arises and interferes with a student's ability to attend class meetings and/or complete course requirements. The reason must be acceptable to and verified by the instructor of record and the department chair. The condition must be stated in writing on the appropriate form. The student must provide documentation that substantiates the condition.

Failing or performing poorly in a class is not an acceptable "serious and compelling reason" within the University policy, nor is dissatisfaction with the subject matter, class or instructor.

University policies and disclaimers

In addition to course policies, you are expected to be familiar with Academic Regulations described in the [University Catalog](#) as well as policies listed below.

Students with Disabilities: Upon identifying themselves to the instructor and the university, students with disabilities will receive reasonable accommodation for learning and evaluation. For more information, contact Services to Students with Disabilities in the Henry Madden Library, Room 1202 (278-2811).

- Class Schedule Policies: <http://fresnostate.edu/studentaffairs/classschedule/policy/>
- Copyright Policy: <http://libguides.csufresno.edu/copyright>
- Students with Disabilities: <http://fresnostate.edu/studentaffairs/careers/students/interests/disabilities.html>
- Academic Integrity and Honor Code: <http://www.fresnostate.edu/academics/facultyaffairs/documents/apm/236.pdf>
- Policy on Cheating and Plagiarism: <http://fresnostate.edu/studentaffairs/studentconduct/policies/cheating-plagiarism.html>
- Add/Drop Course: <http://www.fresnostate.edu/studentaffairs/registrar/registration/>

- Computer requirements: <https://www.fresnostate.edu/catalog/academic-regulations/index.html#computerreq>
- Disruptive classroom behavior: <http://www.fresnostate.edu/academics/facultyaffairs/documents/apm/419.pdf>