

Course Meets: Friday 12:30-1:20, Sims 113C

Course Coordinator: Dr. Takita Felder Sumter (sumtert at Winthrop dot edu),
Sims 302; 803- 323-4991

Office Hours: W 3:30-4:30pm, TR 1:30-2:30pm or appointment

Course Objectives: CHEM 551 is the first of a two-semester sequence that provides a [faculty](#) mentored research experience that exposes undergraduates to hypothesis-based investigations in chemistry. Upon completion of the two courses, students should be able to design experiments, analyze and skillfully interpret data, and communicate their findings to informed audiences.

Required Textbooks: 1) *The ACS Style Guide, 3rd ed., Coghill and Garson, 2006 (or earlier editions)* and 2) *A Short Guide to Writing about Chemistry, 2nd ed., Beall and Trimbur, 2001*

Student Learning Outcomes:

- Use scientific databases such as [SciFinder](#) and [PubMed](#) to access primary literature
- Read and appreciate the significance of relevant journal articles
- Design and carefully perform experiments using scientific instrumentation and techniques
- Analyze and interpret scientific data with respect to the research goal
- Write, review, and revise a formal report of their research (in the form of a scholarly article)
- Present their work to faculty who specialize in various chemistry disciplines

Student Responsibilities:

Pre-read assignments: Read assignments before class so that you will be able to contribute to the in-class discussions relating to the various assignments. These readings are from the required texts and are outlined in the course schedule.

Conduct Research: You are expected to **devote at least 9 hours per week to laboratory research.** You and your mentor will agree on these hours and outline them in your course contract. This is an absolute requirement to pass the class

Class Attendance Policy: In addition to this time, you will also spend time preparing course assignments. The nature of these assignments will be discussed when the course meets on Friday at 12:30-1:20. Each class meeting is designed to enhance the undergraduate research experience and students must attend at least 75% (no more than two absences) of the classes to pass the course. Students missing class are responsible for all course assignments. Students are required to attend and participate in all meetings; each unexcused absence will **lower your course grade by one level (A to A- to B+, etc.).**

Identify a Faculty Research Mentor: Students in this course should have already selected a faculty research mentor. Students are expected to meet with your mentor at least once each week. The mentor is responsible for outlining the project goals and guiding the research throughout the semester. In doing so, the faculty mentor will provide technical instruction and make students aware of any potential hazards and safety procedures. He or she will also review oral and written work prior to submitting to the faculty research committee. However, **STUDENTS**

should be first reader of their work and should not submit documents that have not been edited and proofread.

The faculty mentor will also guide students in assembling a research committee with an appointed committee chair. The research committees will track student progress and participate in evaluating student work.

Submit all Assignments as Scheduled: Several written and oral assignments are required for successful completion of this course. Students are to pay careful attention to due dates and submit the first draft to mentors as scheduled. The revised document should be submitted to the mentor and the committee. The mentor's copy should have a document revision form attached that specific outlines students' actions in response to comments. Your committee may impose a point penalty for late assignments.

Arrange Faculty Research Committee Meetings: Students must submit assignments to committee members and arrange meeting(s) as required. Your final research presentation will be given in an open forum to all Chemistry faculty (who will participate in the final grade).

Grading: Course grades will be determined based on the total points earned and assigned as follows:

A(93-100%); A-(90-92%); B+(87-89%); B(83-86%); B-(80-82%); C+(77-79%); C(70-76%); D(60-69%); F (<60%)

Assigning an incomplete grade indicates that, for a valid reason, the course has not been completed. Due to the nature of this course, justifications for incomplete grades must be documented by the University's Dean of Students.

Graduate Student Requirements: Graduate credit on the course will be awarded based on completion of all undergraduate course requirements in addition to completion of a research paper and oral presentation that is not directly related to your research. This assignment must be 5-7 pages containing at least 15 primary literature references formatted according to ACS guidelines. Additionally, the student will present this work orally to their research committee. This assignment is worth an additional 150 points. Graduate students should also note that the plus/minus grading system will not be used.

CHEM 551 Assignments:

Note: Additional requirements required by your mentor/committee should be outlined in the Course Contract. Also the dates outlined in the course schedule are tentative and subject to change at the coordinator's discretion.

1. Course Contract (10 pts): An individual, signed agreement between student, mentor, and committee members outlining expectations and goals for the semester. At a minimum, this must include:

- Names and signatures of all parties, with one committee member designated the Committee Chair
- The number of hours that the student will work each week (the student should keep a log of hours worked)
- The tentative research schedule outlining likely days and times the student will be in the lab
- A schedule for regular (weekly) student-mentor meetings
- Any additional course requirements not listed on this general syllabus

The signed course contract must be submitted to Dr. Sumter.

2. Project Summary to Safety Committee and Safety Quiz (40 pts): A description of materials and methods, hazards, and safety precautions to be encountered in the course of the semester, as outlined in the Chemical Hygiene Plan (Section C7) will be completed in consultation with the faculty mentor. Copies of the completed Project Summary

should be submitted to the mentor, committee members and Dr. Sumter. Students are also required to attend a **safety training session, to be given by Dr. Snyder on Friday August, 24th** during the course meeting time. Failure to attend will immediately make you ineligible to conduct research. A 25-pt quiz based on safety training is required.

3. Introduction Draft (100 pts) Students will receive guidance with using SciFinder and PubMed to find pertinent literature for their projects. This is the first step in the scientific process and will assist in getting background materials for the upcoming assignments.
 - Students should come to class with a list of specific questions and/or topics that will be addressed during the in-class Literature Review instruction session.
 - They are then to generate a review of the most substantial findings and current knowledge in their respective fields. This document should not simply list and explain research but should have a logical flow of ideas that fall under a common research theme. Drafts must include at least 7 current and relevant references, with in-text citations and endnotes according to the *ACS* style guide. **Due: 9/21**
 - This document will serve as the basis for the introduction section of the final paper.
4. Written Research Proposal (100 pts) An in-depth description of the goals, methods and impact of the two-semester research project. The written proposal should conform to the format provided in class, including Introduction, Specific Aims, Background and Significance, Methods, Project Timeline, and Literature Cited sections. **Due: 10/5**
5. Oral Research Proposal (100 pts) An oral powerpoint presentation to the committee (15-20 minutes) designed to brief committee members on your research plans for the academic year. **To be held the week ending October 5th.**
6. Methods and Results to Date (75 pts) You are to provide a description of your research project progress that describes your results and experimental plans. Your document should include:
 - a. *Methods* (30 pts) Should also include any updated safety information (hazards encountered, etc.). When appropriate the methods used must be referenced, with appropriate citations and endnotes in the required format.
 - b. *Results* (45 pts) –A detailed description of completed work related to each of the Specific Aims set out in the Proposal, including graphical or tabular representation of results obtained (with specific references to figures or tables and including in-text citations).
 - c. A near final draft of each table or figure that summarizes your data complete with clear legends or captions that convey as much information as possible about the experimental design. **Due 11/9**
8. Final Paper (150 pts total) A draft of the final (two-semester) paper , to include revised title and Introduction (incorporating committee feedback) and initial drafts of Methods and Results sections (see descriptions below). The draft must be fully referenced (minimum 10 sources), with in-text citations and endnotes in *ACS* format. **Due: 12/3**
9. Final Oral Progress Presentation (150 pts): *In lieu of a traditional final exam*, a 15-20 minute oral (PowerPoint) presentation of the semester's work will be given to the faculty research committee (date and time to be determined by students and faculty). The successful presenter will: (1) provide a complete introduction to the goals and significance of the project and the techniques employed, (2) describe experimental methods utilized and

results obtained thus far and (3) address specific plans for the following semester. **The date for these presentations is 12/5 at 2:30 pm and 12/10 at 2:30 pm.**

10. Laboratory Notebook (125 pts): Mentors will grade notebooks on format, neatness, organization, and detail.
11. Laboratory Technique (125 pts): Mentors will assign grades based on the quality of students' laboratory performance.
12. Laboratory Safety (75pts): Mentors will assess students' laboratory hygiene and safety practices and assign grades accordingly.
13. Participation in Weekly Meetings (100 pts): Each student is expected to actively participate in course meetings. In addition, students will be required to give two brief in-class presentations in class over the course of the semester
 - Initial description of overall research goal
 - Presentation of an experimental technique

Total Points: 1150

Student Code of Conduct: Responsibility for good conduct rests with students as adult individuals. The policy on academic misconduct is outlined at <http://www2.winthrop.edu/studentaffairs/handbook/StudentHandbook.pdf>

Students with Disabilities: Winthrop University is dedicated to providing access to education. If you have a disability and need accommodations, please contact Gena Smith, Coordinator, Services for Students with Disabilities, at 323-3290, as soon as possible. Once you have your Professor Notification Form, you should show it to me so that appropriate arrangements can be made.