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| ***Chem 351: Independent Study Section 002 Spring 2014 Credit Hrs: 2*** |
| ***Course Meets:*** Friday 12:30-1:20, Sims 113C ***Course Coordinator:*** Dr. Takita Felder Sumter ***Contact Information:*** (sumtert at Winthrop dot edu), **Office:** Sims 302; 803-323-4991 ***Office Hours:*** TW 2:00-3:00pm and by appointment  |
| ***Course Objectives:*** CHEM 351 provides students with an introduction the [faculty](http://bohr.winthrop.edu/faculty) mentored research experience and will allow them to work on hypothesis-based investigations in chemistry. Upon completion of this, students should understand the art of experimental design, **think critically and solve problems (ULC#1),** and **communicate their findings to effectively informed audiences (ULC#4)**. |
| ***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* |

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| *Student Learning Outcomes:* Students will learn to: Use scientific databases such as  [SciFinder](https://0-scifinder.cas.org.library.winthrop.edu/) and [PubMed](http://www.ncbi.nlm.nih.gov/pubmed) to access primary literature Read and appreciate the significance of relevant journal articles Begin to design and perform experiments using scientific instrumentation and techniques Analyze and interpret scientific data with respect to the research goal Write a formal report of their research (in the form of a scholarly article) Present their work to faculty from a wide range of 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. *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% (8 of 11) 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; **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 outlined 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. Late papers will receive a **10% penalty for *each day*  that the paper is late, including weekends and holidays.***Arrange Faculty Research Committee Meetings:* Students must submit assignments to committee members and arrange meeting(s) as required. Failure to schedule meetings during the specified week will also result in late penalties. 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%) *CHEM 351 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 hard copy of the signed course contract must be submitted to Dr. Sumter by* ***January 24th****.* 2.  Project Summary to Safety Committee and Safety Training (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, and complete a safety quiz to be given by Dr. Snyder (time and location TBA). Failure to attend will immediately revoke eligibility to conduct research. 3.  Introduction/Literature Review (100 pts) Students will receive guidance with using SciFinder, PubMed, and other online resources at the Dacus Library 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: 2/14***
* This document will serve as the basis for the introduction section of the final paper.

4.   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.  5.   Oral Progress Report (100 pts) A presentation of your research project progress including a detailed discussion of your results and plans. This will be presented orally to the committee in the form of a 15- to 20-minute PowerPoint presentation.  6.    Written Progress Report (100 pts) You are to provide a description of your research project progress that describes your results and experimental plans. Your document should include:* This document serves as the final paper for CHEM 351 and should be a summary o fall work conducted this semester.
* A polished 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 experiment.
* A detailed description of what you were trying to accomplish, the methods used, and a description of the findings (with specific references to figures or tables) should also appear in this document.
* Although students will continue to revise until the mentor and committee approves the document. The final revised paper is due by **4/27**.

9.  Final Departmental Research Presentation (150 pts): *In lieu of a traditional final exam,* an oral (PowerPoint) presentation of the semester’s work given to students and faculty during the final exam period **(April 30, 2014 at 11:30pm).** 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.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 (125pts): 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: 1) initial description of overall research goal and 2) presentation of an experimental technique.  |

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| ***Total Points:*** ***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. |