



Independent Research Experience in Chemistry Master Syllabus

1. Title, Number, and Classification

073-0295 Chemistry 295 Independent Research Experience in Chemistry
College Credit
Elective

2. Course Term

16 week Semester or 8 week summer term

3. Credit and Contact Hours

Credit hours: (Variable) 2-3
Contact hours: (Variable) 1 lecture plus 2 or 4 laboratory

4. Prerequisites

Eligibility for English 101, OR grade of C or better in English 100, OR consent of the department chairperson

5. Catalog Description

Original laboratory research supervised by a faculty member, either on campus or off-campus. A well-defined academic goal must be outlined by the instructor and the student. This course will usually require library research, laboratory work, and the preparation of final and oral reports. Writing assignments, as appropriate to the discipline, are part of the course.

6. Students for whom the course is intended

This course targets students who express an interest in pursuing science as a career. It provides an opportunity for this scientifically curious student to become scientifically proficient through application of the scientific process in the interest of creating new knowledge, and under the close supervision of a faculty mentor.

7. Course Objectives

The broad objectives of this course are to:

1. Identify a scientifically interesting research question
2. Promote scientific inquiry using the scientific method
3. Develop lab notebook record-keeping skills
4. Develop written and verbal presentation skills
5. Develop proficiency in safe lab behavior and proper disposal of lab materials

8. Learning Outcomes

Upon completion of this course, the student will have demonstrated the ability to:

1. Pose a scientifically interesting question that is:
 - a. of interest to the scientific community
 - b. supported by literature research
2. Utilize the scientific method to:

- a. pose a testable hypothesis
 - b. test a hypothesis by experiment
 - c. gather, analyze, and confirm experimental results
 - d. refine a hypothesis in light of empirical data
 - e. propose future experiments
3. Keep a lab notebook that is:
 - a. well organized
 - b. a reflection of what occurs in the lab
 - c. is useful to future students
 4. Present lab results to peers in an appropriate manner, such as via:
 - a. written reports
 - b. research papers
 - c. oral presentations, both formal and informal
 5. Demonstrate proficiency in safe lab behavior and proper disposal of lab materials, such as:
 - a. reading a Safety Data Sheet (SDS)
 - b. explaining proper disposal techniques and procedures

9. Topical Course Outline (suggested)

WEEK	LECTURE TOPIC	LAB TOPIC
1	Keeping a Laboratory Notebook	Lab Orientation and Safety Tour
2	Reading MSDS Sheets	Project Lab Work
3	Discussion of potential projects	Project Lab Work
4	Searching the Scientific Literature	Project Lab Work
5	Writing a Scientific Lab Report	Project Lab Work
6	Student Presentation of Topic	Project Lab Work
7	Writing a Scientific Paper	Project Lab Work
8	Student Self Evaluation of Lab Notebook	Project Lab Work
9	Written Midterm Progress Report	Project Lab Work
10	Student Oral Presentations	Project Lab Work
11	Making a Scientific Presentation	Project Lab Work
12	Student Self Evaluation of Lab Notebook	Project Lab Work
13	Instructor Critique of Lab Notebook	Project Lab Work
14	Writing a Scientific Paper	Project Lab Work
15	Open Topics	Project Lab Work
FINAL	Lab Notebook and Final Paper Due	Final Student Presentations

10. Texts and Materials (suggested)

1. *The ACS Style Guide: A Manual for Authors and Editors*, 2nd Ed.; Todd, J.S., Ed.; American Chemical Society, Washington, D.C., 1997.
2. Relevant readings from the scientific literature.

11. Methods of Instruction (suggested)

Interactive lectures by the instructor, both student- and instructor-led discussions, formal and informal oral presentations, formal lab reports, and a formal research paper. All papers should be written in American Chemical Society format.

12. Methods of Evaluation:

Achievement of course objectives may be evaluated by: self-evaluation and critique of lab notebook (formative), formal and informal oral presentations (formative and summative), formal written lab updates (formative), and a final paper (summative).

Authorized Signature and File

Date: _____