Oakland University
College of Arts and Science
Chemistry Department

Independent Research CHM 491, 3 credit hours
XXXX Semester, 20XX

**Instructor:** A faculty at the Chemistry Department

**Contact information** (e-mail. Phone): http://www2.oakland.edu/chemistry/

**Catalog Description:** Undergraduate research with at least eight hours per week in the laboratory. Requires a written report. Satisfies the university general education requirement for the capstone experience for the BA and BS in Chemistry.

**Course Description:** CHM 491, Independent Research, is designed to enhance the chemistry degree by providing students the opportunity to pursue independent research. Students work under the direct supervision of a faculty member in the chemistry department as an apprentice scientist. The course provides research training for students in various chemistry and related fields in both experimental and theoretical aspects. An ethical component (ethics in science) is included. Part of the course includes literature research: finding information in the literature pertaining to methods, analytical techniques, and current status of knowledge.

**Course Prerequisites:** Junior standing

Student must be in good academic standing to participate in CHM 491. Enrollment is only by faculty approval via an Add/Drop form, which requires the signature of a faculty member.

**General Education Learning Outcomes:**

Integration Knowledge Areas

Capstone Experience

The student will demonstrate:

- appropriate uses of a variety of methods of inquiry and a recognition of ethical considerations that arise
- the ability to integrate the knowledge learned in general education and its relevance to the student’s life and career

**Course Objectives:**

1. Participate in an academically oriented research project.
2. Integration of the fundamentals already learned to scientific investigation.
3. Gain experience at formal communication in chemistry in both written and oral form.
4. Conduct literature research regarding the area of investigation; become familiar and proficient with the use of the chemical literature and information location/retrieval; and demonstrate proper attributions
5. Build on previous course work in the major

**Cross-Cutting Capacities and/or Knowledge Exploration Areas:**

1. Effective communication
2. Formal reasoning
3. Natural Science and Technology

**Required Text and Supporting Course Material:** Depends on the individual project, faculty advisors often provide readings specific to the research project.
Course Procedures: This class includes mainly laboratory work, but lectures (ethics), seminar presentations, and independent library work are included.

Expectations of Students:
1. Students are expected to work in the laboratory for at least 8 hours a week.
2. Students are expected to read relevant research literature during entire research period.
3. Students must report research progress periodically and submit a final research report.
   In the report:
   a. Address the relevance of the research to problems that affect everyday life.
   b. State the general goal of the project and the specific hypothesis that has been tested.
   c. Report methods used.
   d. Provide research results (e.g. original data and data analysis).
   e. Cite journal articles or book chapters Follow instructions for authors of ACS journals and ACS Style Guide.

Grade Determination:
A  excellent (4.0 grade points)
B  good (3.0 grade points)
C  average (2.0 grade points)
D  lowest passing grade (1.0 grade points)
F  not passing
I  incomplete

Safety and Ethics:
1. All students must pass the Oakland University Chemical Safety training prior to the lab work.
2. Students must adhere to the departmental policy for conducting CHM 491 research evenings and weekends.
3. All students should have health insurance.
4. Students cannot receive both monetary compensation in the form of a salary, hourly wage or work study support and CHM 491 research credits (for the same hours).
5. In addition to students completing the standard Oakland University Safety and ethic training, students must receive the appropriate safety training needed to work with equipment, chemicals, and application of procedures based on the research conducted in the lab (for example waste disposal, radiation safety). Instructor may expel a student who has not received the appropriate training for the laboratory.

Academic Conduct Policy: A student will be referred to the Academic Conduct Committee for review if suspected of fabrication, falsification, or plagiarism during the research project. For further details see current Undergraduate Catalog.

Add/Drops: The University add/drop policy will be explicitly followed. It is the student’s responsibility to be aware of the University deadline dates for dropping the course.

Special Considerations: Students with disabilities who may require special considerations should make an appointment with campus Disability Support Services. Students should also bring their needs to the attention of the instructor as soon as possible.