

## Capstone I AY16 Program Review: Program Outcomes and Capstone Assignment Alignment CHEMISTRY/BIOCHEMISTRY

### Program Learning Outcomes (PLOs)

#### 1) Chemistry/Biochemistry

The Chemistry and Biochemistry Program provides two separate degree pathways which focus on Chemistry or Biochemistry, and supports the physical science liberal arts core. Graduates of these programs are highly sought after in the private and public sectors, and find employment as teachers, research chemists, or chemical technicians in industry, government labs and state or federal agencies. Many graduates continue to pursue advanced degrees in the physical and life sciences, the health professions, and in the Master of Arts in Teaching (MAT) program.

#### 2) Program Outcomes

-**Content Knowledge** – Students will understand the basic chemical/biochemical principles and content in the major specialty areas which include inorganic, organic, physical, analytical, and biochemistry.

-**Communication and Critical Thinking** – Students will understand the importance of the discipline to modern society and be able to communicate chemical/biochemical information both orally and in writing to their peers and the public.

-**Applied Learning Skills** – Students will acquire safe chemical/biochemical laboratory practices and techniques including the use of instrumentation and computers.

-**Inquiry and Integrated Learning** – Students will be able to design and conduct chemical/biochemical research with appropriate documentation including laboratory notebooks and literature searches.

#### 3) Program Capstone Analysis

-**CHEM 401:** Students will participate in an original research project selected with and supervised by a member of the chemistry-biochemistry faculty. This capstone course fulfills the Applied Learning Skills and Inquiry and Integrated Learning program outcomes.

-**CHEM 407:** During this three-term sequence students select and research topics in chemistry (fall term); prepare and peer-review a research paper (winter term); and deliver a 50 minute final, polished technical presentation on their topic (spring term). This capstone course fulfills the Content Knowledge, Communication and Critical Thinking, and Inquiry and Integrated Learning program outcomes.

## Capstone Assignment

EASTERN OREGON UNIVERSITY  
College of Arts and Sciences  
Course Syllabus

**Number of Course:** CHEM 401

**Name of Course:** Research

**Catalog Description:** Individual research project selected with and supervised by a member of the chemistry faculty. Prerequisite: Consent of instructor.

**Credit Hours:** 1-3. Each hour of credit corresponds to three hours of research commitment per week.

**Text or Suggested Materials:** Varies.

**Learning Outcomes:** Upon successful completion of this course, students will be able to:

1. Have a deeper understanding of the core chemical principles in the student's chosen research area;
2. Design and conduct experiments supporting the research project, using safe and accepted laboratory methods;
3. Be able to perform literature searches in support of the research project;
4. Prepare oral and written presentations regarding the results of the research project, both for technical and for non-technical audiences; and
5. Understand the role of the research project in the pursuit of a larger research agenda and its place in the larger chemical community.
6. This capstone course fulfills the Applied Learning Skills, and Inquiry and Integrated Learning program outcomes.

**Means of Assessment:** Each learning outcome for each student is individually assessed by his/her faculty research advisor. Assessment is proficiency-based.

**Brief Outline of Course Content:** Students develop a research project, design and conduct experiments in support of the project, and present their results to their peers and to the chemical community.

**Statement on Academic Misconduct:** Eastern Oregon University places a high value upon the integrity of its student scholars. Any student found guilty of an act of academic misconduct (including, but not limited to, cheating, plagiarism, or theft of an examination or supplies) may be subject to having his or her grade reduced in the course in question, being placed on probation or suspended from the University, or being expelled from the University—or a combination of these. Please see Student Handbook at: <http://www.eou.edu/saffairs/handbook/honest.html>

**Statement on Americans with Disabilities:** If you have a documented disability or suspect that you have a learning problem and need accommodations, please contact the Disability Services Program in Loso Hall 234. Telephone: 962-3081.

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#### **4) Program Capstone/Senior Project Closing the Loop...**

**-CHEM 401:** Due to active research faculty mentors, 100% of students in the 2014-2015 academic year achieved or exceeded minimum established proficiency benchmarks. The Chemistry and Biochemistry program will continue to encourage students to produce research that will be presented at regional or national meetings, or published in appropriate journals, including the Eastern Oregon Science Journal.

**-CHEM 407:** As a result of requiring students to select articles from the Journal of the American Chemical Society as their primary source for seminar topic selection, 100% of students in the 2014-2015 academic year achieved or exceeded minimum established proficiency benchmarks. The Chemistry and Biochemistry program will continue to use this strategy to direct students to appropriate primary literature sources for the selection of their topic and will continue to monitor student performance.

#### **Closing the Loop Statement**

Between CHEM 401 and 407 all PLOs are addressed. The 407 capstone assignment mostly assesses "Content knowledge" and "Communication and Critical Thinking." It also assesses, at least in part, "Inquiry and Integrated Learning" as students have to draw information and concepts from a variety of chemistry subdisciplines. However, the 407 capstone assignment does not address "Applied Learning Skill," which is the focus of the Chem 401 capstone. So between the two courses, all CHEM/BIOCHEM PLOs are addressed.

**Action Plan:** N/A