Assessment Plan for the Biological and Chemical Sciences Major

2018 -2019

1. Program Mission Statement

The major in biological and chemical sciences provides students the opportunity and the guidance to build a foundation for further learning in the fundamental areas of biology, the study of life, and chemistry, the study of matter. Students engage in active learning as they apply the scientific method towards understanding the natural world. Students think critically when evaluating their learning, and are prepared to share their education with others. Students learn to write and to speak effectively about science and scientific issues. Students are prepared for a variety of careers, including education and general science careers.

2. 3. 4. Program Goals, Learning Objectives and Measurable Learning Outcomes

Goal 1: Students learn the fundamental basics of biology and chemistry, and appreciate the interconnections between them.

- **Objective a:** ***Learn important concepts and principles that underpin biology and chemistry***
  - **Learning Outcome i:** Gain knowledge in biology and chemistry
  - **Learning Outcome ii**: Apply concepts in different scenarios in lecture and lab
- **Objective b:** ***Demonstrate the interrelationships of chemistry and biology***
  - **Learning Outcome i:** Understand basic biochemical pathways such as photosynthesis and respiration
  - **Learning Outcome ii:** Describe the bonding mechanisms found in major classes of biological molecules

Goal 2: Students investigate scientific questions using the scientific method and proper research techniques, and learn to evaluate data and communicate their results both orally and in writing, using proper technology.

- **Objective a:** ***Learn the scientific method and how to properly conduct a scientific study***
  - **Learning Outcome i:** Design a lab or field study using the scientific method
  - **Learning Outcome ii:** Present results in a lab report and in oral presentation formats
- **Objective b:** ***Evaluate data using statistical methods such as graphs and basic summary measurements***
  - **Learning Outcome i:** Students can make and evaluate graphs
  - **Learning Outcome ii:** Students can use excel to conduct simple statistical analyses
- **Objective c:** ***Evaluate the value of sources of information found on the internet and in print***
  - **Learning Outcome i:** Learn how to find primary research sources
  - **Learning Outcome ii:** Use primary literature sources to support a thesis

Goal 3: Students critically evaluate issues relating to science in society.

Objective a: ***Investigate how science is important to society***

Learning Outcome i: Learn the importance of science to our everyday lives

Learning Outcome ii: Discuss current scientific discoveries

Goal 4: Students learn the value of science in the liberal arts and for lifelong learning.

Objective a: ***Understand the value of diverse perspectives in scientific study***

Learning Outcome i: Group work where students interact with their peers

Learning Outcome ii: Learn to be creative in scientific investigations

5. Means of Assessment of Outcomes

Goal	Objective	Outcome	How Outcome is Measured	Measurement Tool	Success Criteria	Data Location
1	Students learn the fundamental basics of biology and chemistry, and appreciate the interconnections between them.					
	a. Learn important concepts and principles that underpin biology and chemistry	i. Gain knowledge in biology and chemistry	Exams and homework questions	Locally Developed Rubrics	100% of students to score at or above C level; 70% at or above B level; 30% at or above A level	Faculty files

		ii. Apply concepts in different scenarios in lecture and lab	Discussion questions and lab reports/handouts	Locally Developed Rubrics	100% of students to score at or above C level; 70% at or above B level; 30% at or above A level	Faculty files
Goal	Objective	Outcome	How Outcome is Measured	Measurement Tool	Success Criteria	Data Location
	b. Demonstrate the interrelationships of chemistry and biology	i. Understand basic biochemical pathways such as photosynthesis and respiration	Class activities in Biol 130, specifically the diagrams of photosynthesis and respiration, Chem 213 - lab activity, and Chem 214, final exam question	Locally Developed Rubrics	100% of students to score at or above C level; 70% at or above B level; 30% at or above A level	Faculty files

		ii. Describe the bonding mechanisms found in major classes of biological molecules	Exams and lab activities	Locally Developed Rubrics	100% of students to score at or above C level; 70% at or above B level; 30% at or above A level	Fac ulty files
2	Students investigate scientific questions using the scientific method and proper research techniques, and learn to evaluate data and communicate their results both orally and in writing, using proper technology.					
	a. Learn the scientific method and how to properly conduct a scientific study	i. Design a lab or field study using the scientific method	Lab projects	Locally Developed Rubrics	100% of students to score at or above C level; 70% at or above B level; 30% at or above A level	Fac ulty files
		ii. results in lab report & presentation	Lab projects	"	"	"
	b. Evaluate data using statistical methods such as graphs and basic summary measurements	i. Students can make and evaluate graphs	Exams and lab activities	Locally Developed Rubrics	100% of students to score at or above C level; 70% at or above B level; 30% at or above A level	Fac ulty files

		ii. Students can use excel to conduct simple statistical analyses	Lab activities	Locally Developed Rubrics	100% of students to score at or above C level; 70% at or above B level; 30% at or above A level	Fac ulty files
	c. Evaluate the value of sources of information found on the internet and in print	i. Learn how to find primary research sources	Lab and lecture activities	Locally Developed Rubrics	100% of students to score at or above C level; 70% at or above B level; 30% at or above A level	Fac ulty files
		ii. Use primary literature sources to support a thesis	Lab and lecture activities	Locally Developed Rubrics	100% of students to score at or above C level; 70% at or above B level; 30% at or above A level	Fac ulty files
3	Students critically evaluate issues relating to science in society and learn proper research techniques.					

	a. Investigate how science is important to society	i. Learn the importance of science to our everyday lives	Class discussions and projects	Locally Developed Rubrics	100% of students to score at or above C level; 70% at or above B level; 30% at or above A level	Fac ulty files
		ii. Discuss current scientific discoveries	Class discussions and projects	Locally Developed Rubrics	100% of students to score at or above C level; 70% at or above B level; 30% at or above A level	Fac ulty files
4.	Students learn the value of science in the liberal arts and for lifelong learning.					
	a. Understand the value of diverse perspectives in scientific study.	i. Group work where students interact with their peers	Lab and lecture projects	Locally Developed Rubrics	100% of students to score at or above C level; 70% at or above B level; 30% at or above A level	Fac ulty files

		ii. Learn to be creative in scientific investigations	Lab and lecture projects	Locally Developed Rubrics	100% of students to score at or above C level; 70% at or above B level; 30% at or above A level	Fac ulty files

6. How assessment data will be utilized

We will focus on Program Goal 2, Objective a, and both of its learning outcomes. To do this we will analyze assignments from CHEM 214L, CHEM 323L, CHEM 322, BIOL 130L, BIOL 309L, BIOL 312L, BIOL 119L. We will assess the outcomes of each assignment/activity to determine they fit our success criteria and make changes if necessary.