

# Assessment: Assessment Plan

## Degree Program - AS - Cell and Molecular Biology (BS)

**CIP Code:** 26.0406.00

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**Program Purpose Statement:** Students majoring in cell molecular biology for the B.S. degree must complete a minimum of 39 hours from this department, including the following:

BIOL 1403, 1404 2102, 3302, 3320, 3120 (or 3310), 3416, 4320, MBIO 3401.

Three of the following courses, at least one of which must include a laboratory: BIOL 4300 (counts as a laboratory course), BOT 3401, 3409, MBIO 3403, 4310, 4402, 4404, 4406, ZOOL 3401, 4304, 4409

Additional junior or senior level courses in the department to bring the total course hours from biology sciences to a minimum of 39 (may include the courses above), or may use either PHIL 3322 or 3325.

Strongly recommends BIOL 3310 or 4300.

Requires a chemistry minor including both CHEM 3311 and 3312.

**Modality:** Face-to-Face

## Student Learning Outcome: Theories of Cell and Molecular Biology

To be able explain the underlying evidence for, identify the strengths and limitations of, and reason with, all of the major sub-disciplines of modern cell and molecular biology, including cell theory, molecular genetics, Central Dogma, gene regulation and the molecular evolution.

**Outcome Status:** Active

**Outcome Type:** Student Learning

**Start Date:** 09/01/2016

**End Date:** 09/01/2017

### Assessment Methods

Method 1 - have at least 25 embedded questions at the beginning of Biology I (BIOL 1403 pre-test) and at the end of Biology II (BIOL1404 post-test) to assess how much the students have learned to critically think over the year in Biology I and II.

(Active)

**Criterion:** Method 1 - to have an average of at least 70% of the embedded questions answered correctly on the second exam

Method 2 - evaluate students in BIOL 3320 (Cell Biology) and Biology 4320 (Molecular Biology). This will be done in Cell Biology by identifying how they cooperate in group situations, learning to construct and develop ideas in to platforms such as scientific posters in which each student takes part in both the construction and presentation of data. In Molecular Biology students are given the option to take either one or two oral examinations, which will evaluate their ability to think on their feet and synthesize information about molecular mechanisms during a finite time period. (Active)

**Criterion:** Method 2 - in Cell Biology to show competency and be able to recognize and measure each other's relative contributions to the group effort. This will be reported to the instructor, who will also have independently evaluated the poster, presentation and students' relative contributions. In Molecular Biology at least 70% of the students should show significant

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improvement in the second oral exam score over the first oral exam score

## Student Learning Outcome: Scientific Reasoning in Cell and Molecular Biology

Students will be able to reason scientifically and properly identify situations when such reasoning should be applied to the evaluation of data, hypotheses, and theories in Cell and Molecular Biology.

**Outcome Status:** Active

**Outcome Type:** Student Learning

**Start Date:** 09/01/2016

**End Date:** 09/01/2017

### Assessment Methods

Method 1 –have at least 25 embedded questions at the beginning of Biology I (BIOL 1403 pre-test) and at the end of Biology II (BIOL1404 post-test) to assess how much the students have learned to critically think over the year in Biology I and II.

(Active)

**Criterion:** Method 1 - Students are able to answer at least 70% of embedded questions correctly on the second exam.

Method 2- Conduct anonymous exit interviews/surveys that cannot be tracked during the sophomore and senior years and determine what students they think they have learned and how they have grown academically during their undergraduate experience. Sophomore surveys should help with the issue of retention. (Active)

**Criterion:** Method 2: Students report how much they have learned and grown academically in their undergraduate experience, using a rubric of: None, Some, Average, Above Average, Excellent. The department goal is that 70% of the student ratings are Above Average or Higher.

## Student Learning Outcome: Current techniques and experimental design

To have an appreciation and knowledge of current techniques commonly used in cell and molecular research and how to design experiments using these techniques and analyze the results

**Outcome Status:** Active

**Outcome Type:** Student Learning

**Start Date:** 09/01/2016

**End Date:** 09/01/2017

### Assessment Methods

Method 1- determine the ability of students in BIOL 3120 (Cell Biology Laboratory) to understand and follow protocols and write up results from a series of experiments

(Active)

**Criterion:** Method 1 - students will be expected to earn at least a 70% on each of the write-ups that are turned in and evaluated by the instructor

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Method 2 - Students in Cell Biology Lab will present an oral analysis of web site exploration projects that are relevant to the class (Active)

**Criterion:** Method 2 - as evaluated by the instructor the presentations should be both clear and thorough, documenting an understanding of the techniques involved

## Student Learning Outcome: Preparation for a postgraduate career

To have developed a cumulative and integrated knowledge of one or more cell and/or molecular biological disciplines at a level sufficient for employment in industry, or admission to graduate or professional schools.

**Outcome Status:** Active

**Outcome Type:** Student Learning

**Start Date:** 09/01/2016

**End Date:** 09/01/2017

### Assessment Methods

Method 1 - Students in BIOL 4101 (Biology Seminar) will summarize in written form the various departmental seminar speakers' topics to reflect on their understanding. This will be submitted to the instructor and returned. This will indicate development of communication skills as experience in writing is gained. Students in BIOL 4110 (So you want to be a biologist, now what?) will be asked to interview faculty members of other professionals to gain firsthand knowledge of what it takes to be an academician. These will be presented to the class.

(Active)

**Criterion:** Method 1 -at least 70% of the students should be making detectable progress in writing skills throughout the courses and should improve their ability to articulate various aspects of Cell and Molecular Biology.

Method 2 - In BIOL 4300 (Undergraduate Research) students are given individual or group projects in an active research lab; they are evaluated based on their work ethic and effort in the lab, presentations given at lab meetings or research conferences and their relative contributions to publishing the results of their work. (Active)

**Criterion:** Method 2 - In the research lab, students will be expected to independently work on either their own or a group project to the degree that a formal presentation will be given to the lab group that is clear and concise, and then provide criticism on their own presentations, as well as other students in the lab. Some mentors expect presentations at regional or national meetings where the student is first author and presenter. If the results of the research is published, authorship (and relative position on the author line) will be determined by contributions to the generation of data and to the writing of the manuscript.

Method 3 - at 3 and 6 years sampling of cell and molecular biology alumni (who have taken both BIOL 4110 and BIOL 4101 will be surveyed to identify what percentage of students have matriculated to the career they thought would be appropriate based on their experiences as majors in DBS. Alumni will reflect on how their preparation impacted their academic development and/or ability to acquire jobs. (Active)

**Criterion:** Method 3 - that at least 70% of former Cell and Molecular Biology students surveyed should indicate that their experiences in Biological Sciences contributed to their development and ability to matriculate to graduate or professional schools and/or acquire the job of their choice in biology,