Course Outcomes Guide (COG)

Directions: Please complete this form to document your progress toward improving student learning. For each item, indicate your progress and your anticipated next steps. Thank you!

Course Title: Bio 201 Spring 2016 **Date: 5/25/16**

Course Team: Lennon

Expected Learning Outcomes
STUDENT LEARNING OUTCOMES:

1. Apply a basic core of scientific and quantitative knowledge to enhance understanding of cell structure and function at the molecular level.
2. Develop and maintain a notebook of laboratory records.
3. Utilize laboratory skills to enhance understanding of cell structure and function while participating in a group environment.

COURSE CONTENT OBJECTIVES:

1. Build on the fundamental concepts of cell structure and function from previous study to include:
    a. the relationship between molecular structure and function.
    b. the dynamic character of cellular organelles.
    c. the use of chemical energy in running cellular activities.
    d. ensuring accurate macromolecular biosynthesis.
    e. unity and diversity at the macromolecular and cellular levels and the relationship to adaptation through time.
    f. homeostatic mechanisms that regulate cellular activity.
2. Relate experimental processes and evidence to the knowledge of cell structure and function that is being learned.
3. Relate the molecular and sub-cellular components of a cell to a framework of heredity and evolution.
4. Integrate classical research findings to current hands-on experiences with the latest biotechnology and information technology.

Assessment (How do or will students demonstrate achievement of each outcome? Please attach a copy of your assessment electronically.)

- Assessment of lecture learning content:
    - 3 multiple choice, true/false, short answer, and essay exams (100 pts each)
    - 1 cumulative final exam (100 pts)
    - Worksheet/quiz for each chapter covered (points vary)

    - Presentation of an original research paper related to course content. (25 pts)
- Assessment of lab learning content:
    - 6 lab reports in lab notebook (varying points value)
    - 2 oral presentation of lab experiment (25)
    - 4 experimental design activities (15 pts each)
    - 1 final project involving design of experiment, carrying out of experiment, and poster presentation to class (45 pts)

Grades were determined as follows:

Lecture work was worth 65% of the final grade

Lab was worth 35% of the final grade

Validation (What methods have you used or will you use to validate your assessment?)
A variety of assessment strategies were employed to address student strengths, weaknesses, and assessment preferences. No one type of tool was used, allowing the student to demonstrate proficiency more fully.

Rubrics were created for each assignment/exercise, and students are given access to the rubrics used to assess their work prior to the work being due. Students were encouraged to use rubrics as a guide to the assignment. In addition, students were assigned an anonymous lab report from another student and asked to grade that lab report with the given rubric. This was to encourage students to use the rubric critically while writing their reports.

Results (What do your assessment data show? If you have not yet assessed student achievement of your learning outcomes, when is assessment planned?)

Avg Exam I (n=9)	Avg Exam I (n=9)	Avg Exam III (n=9)	Avg Final Exam (n=9)	Avg Lab Grade (n=9)
70.2%	**61%**	**59.5%**	**77%**	**87.7%**

%A	%B	%C	%D	%F	% Walkaway F
33	**11**	**33**	**22**	**0**	**0**

Follow-up (How have you used or how will you use the data to improve student learning?)
BIO-201 began the semester with 10 students. One withdrew part way through the semester. I reached out to him several times, but was not able to convince him to come in to talk with me about his progress in the class. At the time he withdrew, be was passing BIO 201, but I believe he was concerned that he would not pass. My belief stems from an email that I received from his mother regarding his concerns.
Student performance in BIO 201 was much lower than I would expect from upper level majors. As you can see from the statistics above, students tended to perform very well in lab, but not as well in lecture. Higher lab grades appear to have significantly impacted their overall grades in the course as surprisingly low exam scores still resulted in 100% of students passing the class. While I am happy that they are succeeding in lab, which concentrates on developing the critical thinking skills needed to do laboratory biology (experimental design, carrying out their own

experiments, collecting and analyzing data), I am concerned with the low level of performance in lecture. From talking with students, my best hypothesis as to what may be going on in lecture relates to a continuing problem with inconsistent preparation for the class material. As mentioned in previous COGs, the Biology faculty are working to solve this problem with the main goal to make sure all students are getting the same material in their introductory biology class (BIO 101 and BIO 113). In the meantime, I continued to provide extra resources for students in BIO 201, and tried to indicate what topics from their introductory classes they need to brush up on in order to succeed in BIO 201.

This is the third time I have taught this course. Following student feedback, a new textbook was selected for the Spring of 2015, and creation of a completely new lecture portion of the course began in Spring 2015 and continued in Spring 2016. The goal for this course, including lecture and lab, is to align it with the American Society for Cell Biology *Cell Biology Learning Framework* (http://www.coursesource.org/courses/cell-biology) and with the inquiry- and evidence-based reasoning spirit of the Next Generation Science Standards (http://www.nextgenscience.org/) and the AAAS Vision and Change in Undergraduate Biology Education (http://visionandchange.org/).

Budget Justification (What resources are necessary to improve student learning?)
Class will require supplies to support labs.
Labs focus on increasing students' understanding of the nature of science, including experimental design, carrying out of experiments, data analysis, and presentation of results.
Supplies need to be flexible to support student-designed experiments.
Request funds to allow students to print research posters.