

Course Outcomes Guide (COG)

Course Title: Principles of Biology Bio113

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Course Team: Rosemary Nickerson, Kristen Lennon

Expected Learning Outcomes:

1. Students will demonstrate scientific literacy by effectively locating, evaluating, and communicating scientific information in oral, written, and/or visual formats.
2. Students will demonstrate familiarity with fundamental experimental design, laboratory technique, and data analysis.
3. Students will apply critical thinking skills to solve scientific problems.
4. Students will demonstrate a fundamental understanding of biological concepts including: the scientific method of inquiry, biological chemistry, bioenergetics, cellular and molecular biology, and genetics.

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

- 3 multiple choice / short answer exams (100 pts each)
- 1 cumulative Common Final Exam (100 pts)
- 15 lecture homework assignments (P/F, 10 pts each)
- 10 online lecture quizzes (high ten, worth 10 points each)
- 10 lab quizzes/assignments (20 pts each) (2 selected assignments attached, Appendix A)

Validation (What methods have you used or will you use to validate your assessment?)

Online homework assignments and quizzes are assessed automatically by educational software designed by the publisher of the course textbook. Each assessment item is linked to a specific learning objective and ranked by difficulty level 1-5.

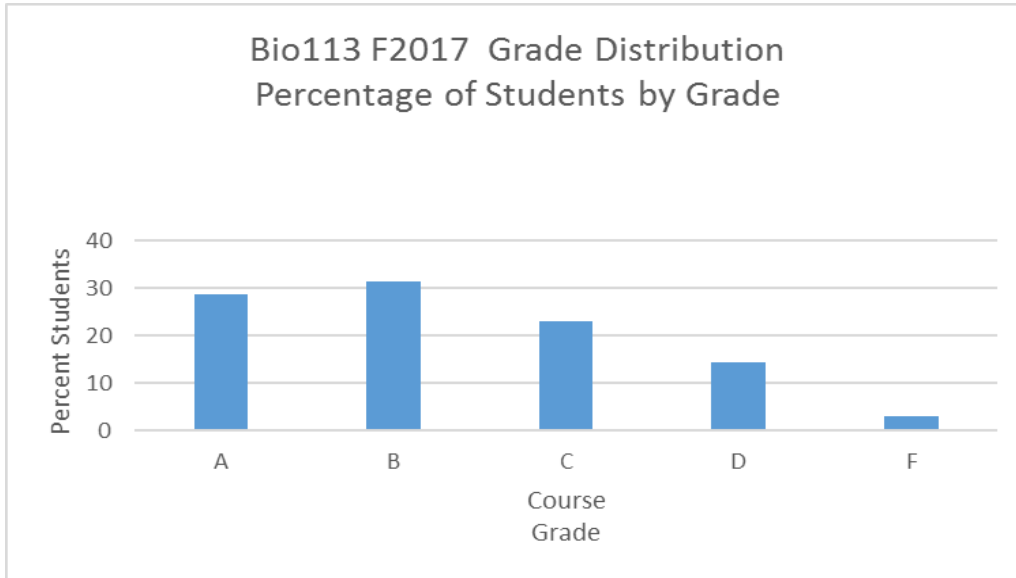
All assignments that include essay questions are not automatically graded are assessed using a common rubric.

The Common Final Exam has been developed in house by the course instructors and has been validated by pre and post instruction exams. The scores on the Common Final exam correlate well with course grades.

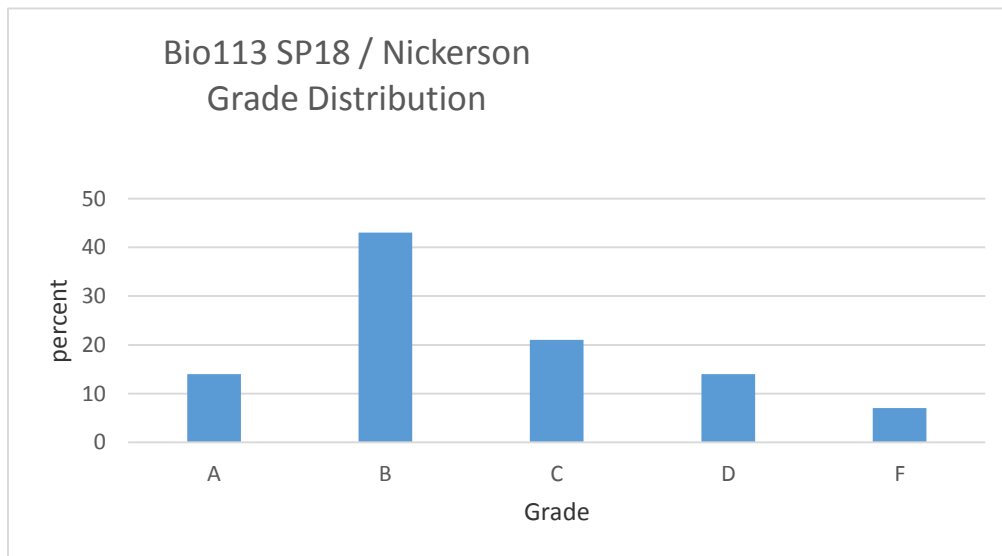
Results (What do your assessment data show? If you have not yet assessed student achievement of your learning outcomes, when is assessment planned?)

Grade Distributions

A. F2017 BIO113 Grade Distribution



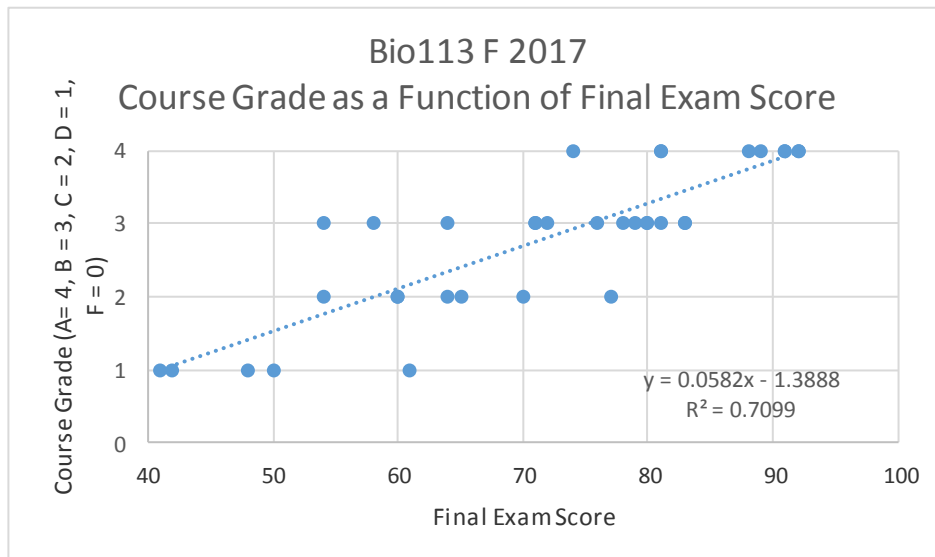
B. SP18 BIO113 Grade Distribution



The Grade distribution for both semesters shows that most students receive a final course grade of B or better. This is expected in a foundation course designed for and taken by STEM majors.

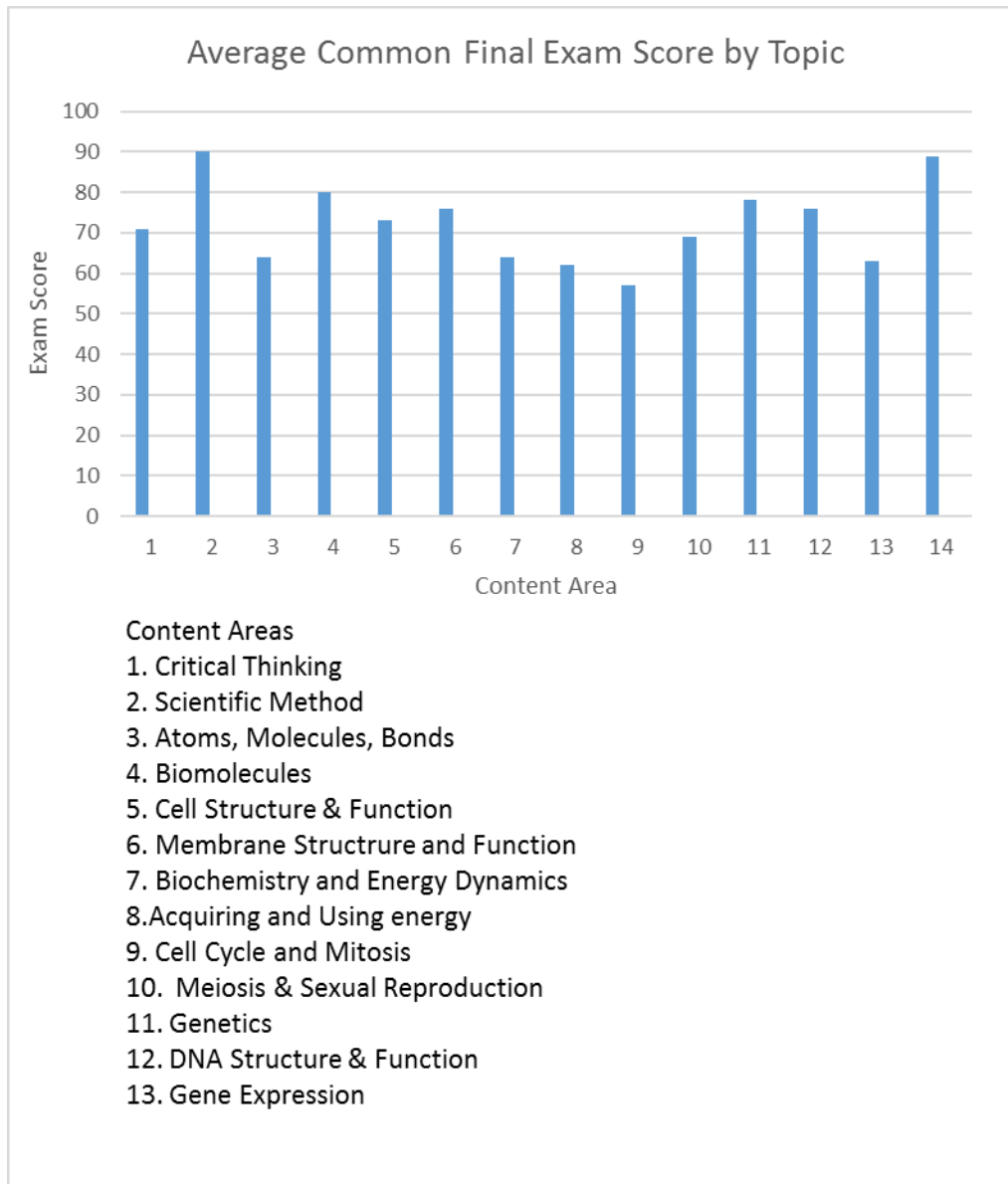
The grade distribution shows that more students earned a grade of A in a face-to-face class (Graph 1. F2017) compared to a hybrid class (Graph 2. SP2018). Class materials for these sections were identical with the exception of lecture attendance.

3. Validation of Common Final Exam



Student Scores on the Bio113 Common Final Exam correlate with Final Course Grades, $R^2 = 0.7099$

4. Analysis of Content Areas on Final Exam

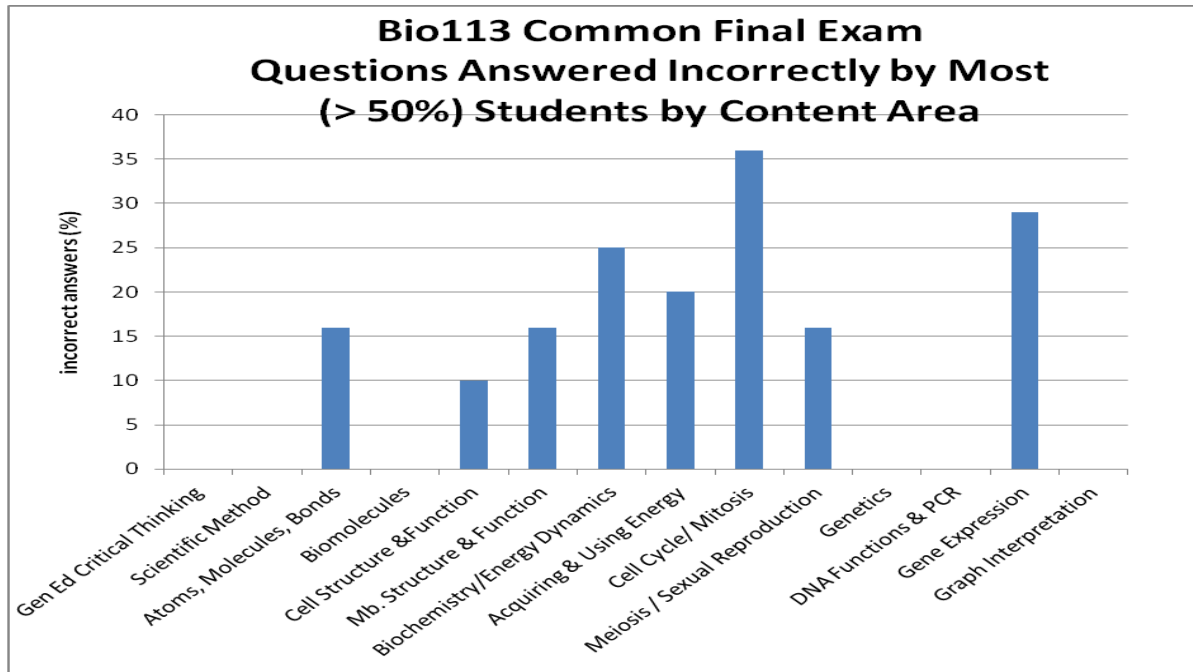


The average score in Gen Ed/Critical Thinking content area 1 was 71% .

The average score in Graph Interpretation content 14 area was 92%.

The average score for the entire exam was 72%.

5. Item Analysis of Questions on Bio113 Common Final Exam



Item Analysis of the Bio113 Common Final Exam identified individual questions of concern, which were answered incorrectly by more than 50% of students.

Follow-up (How have you used or how will you use the data to improve student learning?)

One content area of concern is Gene Expression. Student mastery of this content seems to suffer due to its necessary placement at the very end of a semester. Understanding of the topic of Gene Expression requires mastery of previous course topics which rely on mastery of previous course topics, etc. There is no sensible way to approach this topic without the prerequisite information, so its placement in the course schedule is not possible.

Students are performing very well in the content areas of Genetics, and DNA Structure and Function. Increasing the amount of class/assignment hours spent on Gene Expression, at the expense of these content areas might be a way to provide students with more 'time on task'.

The questions and answer keys on the topics of cellular respiration, mitosis, and gene expression for the Bio113 Common Final Exam will be reviewed by the team for clarity and accuracy.

Budget Justification (What resources are necessary to improve student learning?)

Successful delivery of the course content relies on the continued supply of lab reagents and lab equipment required to perform laboratory investigations. The purchase and preparation of these materials depends on the Science Laboratory Coordinator.

Students rely heavily on Student Learning Center and Testing Center services for:

- access to course materials, physical and online
- printing of course handouts and notes
- private tutoring
- group study
- learning assessment