Mission / Purpose

The Department of Biological Sciences will help undergraduate students attain broad mastery of advanced concepts across the breadth of topics and levels of organization in the biological sciences. Students will develop expertise in all aspects of the scientific method, including acquiring, analyzing, presenting, and interpreting information. Students who successfully complete the B.S degree will possess the general knowledge, mastery of appropriate research techniques and analytical reasoning skills necessary for entry-level careers in the Life Sciences, or for entry into advanced degree programs in Life Sciences.

Student Learning Outcomes/Objectives, with Any Associations and Related Measures, Targets, Findings, and Action Plans

SLO 1: Fundamental concepts
Acquire fundamental concepts in the fields of organismal biology, evolutionary biology, genetics, and ecology.

Related Measures

M 1: SALG survey instrument
Students will complete the SALG survey instrument (www.salgsite.org) after completing BIOS 1071.

Source of Evidence: Academic indirect indicator of learning - other

Connected Document

Bios 1071

Target:
80% of students will self-report learning gains of “good” or better in key concept/content areas (e.g., evolution).

Finding (2013-14) - Target: Not Met
Fall 2013: The mean answer for all these questions was 69%, but there was variance with the lowest response to understanding how this subject relates to real issues scoring lowest. Spring 2014: The instructor forgot to send out the link to the survey: No data.

Connected Documents

2114 survey Spring 2014
Summary document for Bios 1071 SALG survey

Related Action Plans (by Established cycle, then alpha):

Modify laboratory activities to reinforce major concepts and their significance
Learning gains for fundamental concepts may be influenced by the current design of laboratories as discrete standalone exercises. We currently do not explicitly link fundamental concepts from genetics to biological diversity across laboratory exercises, which may inadvertently encourage students to study them as isolated topics instead of developing a cumulative knowledge base over the course of the semester. This may also contribute to a lack of understanding of how topics relate to one another. We will look for ways to reference previous knowledge in each laboratory and promote cumulative learning over the semester. A particular concern is the low score on the scientific method, and it may be beneficial to rephrase laboratory introductions to place greater emphasis on developing and testing hypotheses regarding each week's material. This may also provide additional opportunities for active learning in small groups at the beginning and end of each laboratory exercise. We will also investigate the possibility of revising laboratory quizzes to include more cumulative knowledge. Weekly quizzes currently focus only on the current and previous week's laboratories, and adding questions aimed at cumulative review may help to promote a more comprehensive view of the material during the semester. Finally, we will look for opportunities to link laboratory activities to their practical applications in society. Laboratory instructors will review each week's activity during planning sessions and brainstorm ways to improve retention of concepts, their relationships, and applications. Instructors will discuss the activities while they are still fresh, hopefully improving the quality and practicality of suggestions.

Established in Cycle: 2013-14
Implementation Status: Planned
Priority: High

Relationships (Measure | Outcome/Objective):
Measure: SALG survey instrument | Outcome/Objective: Fundamental concepts

Implementation Description: During weekly planning sessions, laboratory instructors will analyze the previous week's activity with reference to the Fall, 2013 assessment and discuss strategies for enhancing retention, connection and application of concepts covered in laboratories. Lecture and laboratory instructors will meet at the end of the semester to review suggestions and revise laboratories for the Fall, 2014 semester.

Projected Completion Date: 05/2014
Responsible Person/Group: BIOS 1071 lecture instructors, laboratory supervisor (Larry Dew) and laboratory instructors

Teaching Workshops
Teaching workshops to improve pedagogy, incorporate newer teaching techniques that emphasize scientific connections vs facts

Established in Cycle: 2013-14
Implementation Status: Planned
Priority: High

Relationships (Measure | Outcome/Objective):
Measure: SALG survey instrument | Outcome/Objective: Fundamental concepts

Implementation Description: Held first teaching workshop with a guest speaker for the day to discuss Flipping the classroom to allow more data analysis and thought questions to be posed. Dr. K. Sata Sathasivan from the University of Texas at Austin was our speaker
Projected Completion Date: 01/2014
Responsible Person/Group: Wendy Schluchter

SLO 2: Adjustment to the university learning environment
Achieve satisfactory adjustment to the university learning environment.

Related Measures

M 1: SALG survey instrument
Students will complete the SALG survey instrument (www.salgsite.org) after completing BIOS 1071.
Source of Evidence: Academic indirect indicator of learning - other

Connected Document
Bios 1071

Target: 80% of students will report gains of "good" or better in attitudinal areas (confidence, enthusiasm)

Connected Document
Bios 1071

Finding (2013-14) - Target: Not Met
Fall 2013: The mean for this section of answers was 55%. Goal was not met Spring 2014: no data

Connected Document
Summary document for Bios 1071 SALG survey

Related Action Plans (by Established cycle, then alpha):
Evaluate the utility of self-reported gains in attitude
Self-reported gains in attitude may be subject to inflated self-assessments; that is, some students may perceive themselves as already being well-adjusted to the university learning environment and feel that they did not make gains in attitude during the semester. This course may be particularly subject to this perceptual bias since many of the students do not take the course until their second or third semester, by which time they may feel adequately adjusted. Whether or not they are actually well-adjusted, we need to determine if the low scores on this assessment are in part due to students prior feelings of being well-adjusted. We will develop a pre-course attitude survey to administer during Fall, 2014. If many students report low gain in positive attitude and a high pre-course self assessment, then this assessment may not be of significant value and may be dropped.

Established in Cycle: 2013-14
Implementation Status: Planned
Priority: High

Relationships (Measure | Outcome/Objective):
Measure: SALG survey instrument | Outcome/Objective: Adjustment to the university learning environment

Implementation Description: The laboratory supervisor and undergraduate program coordinator will develop a pre-course attitude assessment to be administered beginning in Fall, 2014.
Projected Completion Date: 05/2014
Responsible Person/Group: Laboratory supervisor (Larry Dew), undergraduate program coordinator (Mary Clancy)

Maintain current course content for another semester
We achieved our goal but want to see if this can be maintained with a different instructor for the course.

Established in Cycle: 2013-14
Implementation Status: Planned
Priority: High

Relationships (Measure | Outcome/Objective):
Measure: Pre/post test | Outcome/Objective: Cellular and molecular biology
Measure: SALG survey instrument | Outcome/Objective: Adjustment to the university learning environment

Connected Document
Dr. Mary Clancy

Maintain current course content for another semester

SLO 3: Cellular and molecular biology
Learn core concepts of cellular and molecular biology

Related Measures

M 2: Pre/post test
Pre- and post-course testing in BIOS 2114 using the IMAC Cell and Molecular Biology instrument (Shi, J et al 2010. CBE-Life Sciences Education 9: 453-461.)
Source of Evidence: Faculty pre-test / post-test of knowledge mastery

Connected Document
We surveyed Bios 2114 students

Target: Each class tested will achieve a normalized learning gain of 50% or higher for the semester.
Finding (2013-14) - Target: Met
Spring 2013: There were five questions directed at content for key learning goals, and responses for all five were 50% or higher (63%, 57%, 59%, 55%, 57%). Spring 2014: Similar responses in Spring.

Related Action Plans (by Established cycle, then alpha):
- Maintain current course content for another semester
  We achieved our goal but want to see if this can be maintained with a different instructor for the course.
  Established in Cycle: 2013-14
  Implementation Status: Planned
  Priority: High
  Relationships (Measure | Outcome/Objective):
    Measure: Pre/post test | Outcome/Objective: Cellular and molecular biology
    Measure: SALG survey instrument | Outcome/Objective: Adjustment to the university learning environment
  Responsible Person/Group: Dr. Mary Clancy

SLO 4: Mastery of advanced concepts
Attain broad mastery of advanced concepts across the breadth of topics and levels of organization in the biological sciences

Relevant Associations:

Related Measures
- M 3: ETS Major Field Test
  All students will take the ETS Major Field Test in Biology during their senior year.
  Source of Evidence: Standardized test of subject matter knowledge

Connected Documents
- ETS item analysis for 2012-2013 cohort
- Major Field Test Scores and Analysis

Target:
Mean overall score each semester will rank above the aggregated mean score of current test cohorts from UNO peer institutions.

Finding (2013-14) - Target: Partially Met
Fall 2013: Goal was partially met. Assessment indicators reveal weaknesses in evolutionary, population, and plant biology. Analytical skills are weak, especially compared to the national sample of institutions. The program appears to be succeeding in content areas of Biochemistry, Cell and Molec Biology and Genetics, but less so in analytical aspects. Spring 2014: Scores on this current year suggest that many students are not taking the exam seriously.

Connected Documents
- ETS comparisons from SREB school data Spring 2014
- spring 2014 ETS results

Related Action Plans (by Established cycle, then alpha):
- Field Test Plans
  Faculty met on April 28, 2014. We discussed the poor performance of students, many of whom left early from the exam. We decided to change the set of instructions we give students for this exam. They must score at least 50th percentile on one of the major areas of the exam in order to pass and graduate. Currently there is no such instruction given (e.g. they know they don’t have to do anything but show up and take the exam). Students will be informed of this change and encouraged to do well and take it seriously so they will graduate.
  Established in Cycle: 2013-14
  Implementation Status: Planned
  Priority: High
  Relationships (Measure | Outcome/Objective):
    Measure: ETS Major Field Test | Outcome/Objective: Mastery of advanced concepts

Details of Action Plans for This Cycle (by Established cycle, then alpha)

1071 Acquiring Fundamentals
Instructors and TAs for course will meet to discuss how to implement more emphasis on how this relates to real issues. All results will be reviewed and lab content, lecture will be modified to attempt to have students connect content with their life.

Established in Cycle: 2013-14
Implementation Status: Planned
Priority: High
Responsible Person/Group: Dr. J. L. Dew, Dr. J. Howard

Achieve satisfactory adjustment to the university learning environment.
Instructors and TAs for course will meet with to discuss how to improve attitudes and assimilation to learning environment.

Established in Cycle: 2013-14
Implementation Status: Planned
Priority: High
Responsible Person/Group: Dr. J. Larry Dew, Dr. Howard

Evaluate the utility of self-reported gains in attitude
Self-reported gains in attitude may be subject to inflated self-assessments; that is, some students may perceive themselves as already being well-adjusted to the university learning environment and feel that they did not make gains
in attitude during the semester. This course may be particularly subject to this perceptual bias since many of the students do not take the course until their second or third semester, by which time they may feel adequately adjusted. Whether or not they are actually well-adjusted, we need to determine if the low scores on this assessment are in part due to students' prior feelings of being well-adjusted. We will develop a pre-course attitude survey to administer during Fall, 2014. If many students report low gain in positive attitude and a high pre-course self-assessment, then this assessment may not be of significant value and may be dropped.

Established in Cycle: 2013-14
Implementation Status: Planned
Priority: High

Relationships (Measure | Outcome/Objective):
Measure: SALG survey instrument | Outcome/Objective: Adjustment to the university learning environment

Implementation Description: The laboratory supervisor and undergraduate program coordinator will develop a pre-course attitude assessment to be administered beginning in Fall, 2014.

Projected Completion Date: 05/2014
Responsible Person/Group: Laboratory supervisor (Larry Dew), undergraduate program coordinator (Mary Clancy)

Field Test Plans
Faculty met on April 28, 2014. We discussed the poor performance of students, many of whom left early from the exam. We decided to change the set of instructions we give students for this exam. They must score at least 50th percentile on one of the major areas of the exam in order to pass and graduate. Currently there is no such instruction given (e.g., they know they don't have to do anything but show up and take the exam). Students will be informed of this change and encouraged to do well and take it seriously so they will graduate.

Established in Cycle: 2013-14
Implementation Status: Planned
Priority: High

Relationships (Measure | Outcome/Objective):
Measure: ETS Major Field Test | Outcome/Objective: Mastery of advanced concepts

improvements in analytical skills
Plan: meeting to promote faculty awareness of need for improvements in analytical skills Increase emphasis on critical thinking, data interpretation throughout the curriculum

Established in Cycle: 2013-14
Implementation Status: Planned
Priority: High
Implementation Description: Hold Faculty meetings to share data
Responsible Person/Group: Mary Clancy/Wendy Schluchter

Maintain current course content for another semester
We achieved our goal but want to see if this can be maintained with a different instructor for the course.

Established in Cycle: 2013-14
Implementation Status: Planned
Priority: High

Relationships (Measure | Outcome/Objective):
Measure: Pre/post test | Outcome/Objective: Cellular and molecular biology
Measure: SALG survey instrument | Outcome/Objective: Adjustment to the university learning environment

Responsible Person/Group: Dr. Mary Clancy

Modify laboratory activities to reinforce major concepts and their significance
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Projected Completion Date: 05/2014
Responsible Person/Group: BIOS 1071 lecture instructors, laboratory supervisor (Larry Dew) and laboratory instructors

Teaching Workshops
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connections vs facts

**Established in Cycle:** 2013-14
**Implementation Status:** Planned
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**Relationships (Measure | Outcome/Objective):**
- **Measure:** SALG survey instrument
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**Projected Completion Date:** 01/2014
**Responsible Person/Group:** Wendy Schluchter

**Upper level courses in Evolutionary Bio and Ecology**
Encourage students to take upper-level courses in Ecology and Evolutionary Biology. We need to offer courses at more popular times, have faculty encourage all students to take these. And perhaps introduce some examples that our pre-med students will appreciate more (disease ecology, etc) in these particular courses.

**Established in Cycle:** 2013-14
**Implementation Status:** Planned
**Priority:** High

**Implementation Description:** Faculty meetings to discuss results and brainstorm about solutions
**Projected Completion Date:** 01/2014
**Responsible Person/Group:** Jerome Howard