Analysis Questions and Analysis Answers

For Academic Programs

Informed by your assessment activities related to student learning, what changes have you made in your degree program in the last three to five years? Describe the changes (e.g., curriculum revision, new courses, faculty development), the general results that prompted the changes (e.g., student performance on an assessment measure), and any impact on student learning that you might attribute to these changes.

The implementation of the assessment activities during the past three years in the Department of Biological Sciences has resulted in the improvement of several areas in the Biology Ph.D. curriculum:

1. Quality of graduate course curriculum: In response to feedback from our departmental review and our graduate students, the faculty are in the process of creating and implementing a core graduate course curriculum for all Biology Ph.D. graduate students with accompanying graduate course offerings that complement the student's research area.

2. Participation of Biology Ph.D. graduate students in professional meetings: The department continues to promote active participation of graduate students in professional meetings. We have implemented a yearly departmental research colloquium during which each graduate student presents a poster on their work. In the previous year 45% of graduate students presented their work in the research colloquium (participation is limited to one student per lab because of space limitations).

3. Faculty Service: 100% of our faculty are involved in outreach activities, including research publications (2.5 per faculty per year) and submission of research grants (2.7 submissions per faculty per year).

The impact of these assessment outcomes are as follows:

We have overhauled our Biology Ph.D. graduate curriculum to update and streamline our graduate course offerings and have a faculty retreat planned for this August where we will finalize these changes for addition to the graduate catalog. We are also planning to offer a targeted sequence of courses in our two major sections (Ecology, Evolution and Systematics and Molecular and Cell Biology) in response to feedback from our graduate students. The yearly research colloquium allows students to experience the breadth of research in the department and serves as a springboard for synergistic discussions amongst the students in different sections. These past three years of assessment have resulted in changes that complement the original tripartite goals (teaching, research & service) of the Department of Biological Sciences.

Mission / Purpose

The Mission of the Department of Biological Sciences is to provide high quality instruction to students at the undergraduate and graduate levels with an emphasis on active learning and problem solving. The department is committed to the advancement of knowledge through research and scholarly activities. Our faculty participates in outreach to the state, nation and world through service to the university community, to public, governmental and industrial sectors, and to professional societies. Within its areas of expertise, the department supports the tripartite mission of the University in teaching, research, and service.

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

SLO 1: Discipline Knowledge

Students who complete our Ph.D. program will explain the literature that supports current scientific concepts and how to select research problems, design experiments, and critically analyze data.

Connected Document
PhD Biology Curriculum Maps

Relevant Associations:
Student Learning Outcome #1 Improvement Action(s) to be advanced:

We will continue with the process of gathering data following current procedures. The department has developed a more standardized rubric for reporting of data regarding assessment of student's at the PhD level in light of the data from our recent program review.

Standard Associations
SACS 3.3.1
3.3.1.1 Educational programs, to include student learning outcomes
3.3.1.4 Research within its educational mission

Strategic Plan Associations
University of Alabama
4.3 Produce scholars who will become academic and civic leaders in their disciplines.
4.4 Produce graduates who will serve as effective leaders in Alabama's government, businesses, educational systems, health care, the arts, and other professions, and who will be leaders in their communities.
Related Measures

M 1: Research Proposal
Each student will submit a research proposal which is judged by a graduate committee composed of a chair and at least four members, one of whom holds an appointment outside the department or university.

Source of Evidence: Academic direct measure of learning - other
Target:
- Analyze annual summary graduate student reports to calculate the number of students submitting a research proposal

M 2: Written Exam
Students in the PhD program in Biology must be able to pass at least 12 out of 15 questions on the written exams or receive a score on a research proposal conforming to NIH guidelines of 3.0 or better on a scale of 5 or a research proposal conforming to NSF guidelines of very good or excellent as graded by each student's graduate committee. Calculate the percent of students who meet these criteria on their first attempt.

Source of Evidence: Academic direct measure of learning - other
Target:
- Analyze annual graduate student evaluations to calculate the percentage of students meeting these criteria on their first attempt

M 3: Dissertation Defense
Each student must present the results of their research in the form of a dissertation deemed acceptable by the graduate committee and pass a final oral defense of their dissertation as judged by their graduate committee.

Source of Evidence: Academic direct measure of learning - other
Target:
- Analyze the graduate student committee evaluation reports to calculate the number of graduate students passing a final oral defense

SLO 2: Technique, Technology and Skills
Students who complete our Ph.D. program will demonstrate techniques, technology and skills necessary to conduct meaningful research.

Connected Document
PhD Biology Curriculum Maps

Relevant Associations:
Student Learning Outcome #2 Improvement Action(s) to be advanced:

We will continue with the process of gathering data following current procedures. The department has developed a more standardized rubric for reporting of data regarding assessment of student's at the PhD level in light of the data from our recent program review.

Standard Associations
SACS 3.3.1
- 3.3.1.1 Educational programs, to include student learning outcomes
- 3.3.1.4 Research within its educational mission

Strategic Plan Associations
University of Alabama
- 4.3 Produce scholars who will become academic and civic leaders in their disciplines.
- 4.4 Produce graduates who will serve as effective leaders in Alabama's government, businesses, educational systems, health care, the arts, and other professions, and who will be leaders in their communities.

Related Measures

M 4: Assessment in Research Courses
Students will be assessed in courses that emphasize research techniques and development of skills at the graduate level and the available technology is assessed to ensure access to training in current methodology.

Source of Evidence: Academic direct measure of learning - other
Target:
- Analyze the annual graduate student summary report to calculate the percentage of students taken courses emphasizing modern research techniques

M 5: Instrumentation Proficiency
Each student will be evaluated for the proficiency in use of instrumentation and ability to synthesize results and solve problems by observing of the student in the laboratory and by discussing with the student areas of improvement.

Source of Evidence: Academic direct measure of learning - other
Target:
- Analysis of annual graduate student reports to assess the graduate student proficiency in these areas

M 6: Review Student Performance
Each student's Graduate committee will review the performance of the student in courses and assesses the methods employed by the student in their research during the annual review of the student's progress.
Source of Evidence: Academic direct measure of learning - other

Target:
Analyse annual graduate student committee reports to assess these areas

SLO 3: Independent Thinking and Effective Communication
Students who complete our Ph.D. program will demonstrate independent thinking and effective communication.

Connected Document
PhD Biology Curriculum Maps

Relevant Associations:
Student Learning Outcome #n Improvement Action(s) to be advanced:

We will continue with the process of gathering data following current procedures. The department has developed a more standardized rubric for reporting of data regarding assessment of student's at the PhD level in light of the data from our recent program review.

Standard Associations
SACS 3.3.1
3.3.1.1 Educational programs, to include student learning outcomes
3.3.1.5 Community/public service within its educational mission

Strategic Plan Associations
University of Alabama
4.3 Produce scholars who will become academic and civic leaders in their disciplines.
4.4 Produce graduates who will serve as effective leaders in Alabama's government, businesses, educational systems, health care, the arts, and other professions, and who will be leaders in their communities.

Related Measures

M 7: Departmental Seminars
Faculty and students will provide to each Ph.D. student with suggestions for improving communication skills based on presentation of a research talk in the weekly departmental graduate seminar where students will explain, in broadly understandable language, the reasons for their research topic and the tools they will use to address questions.

Source of Evidence: Academic direct measure of learning - other

Target:
Analysis of the annual graduate student report to assess their participation on weekly department graduate seminars

M 8: Professional Meeting Attendance
Advanced graduate students will be encouraged to attend at least one professional meeting and to present their research.

Source of Evidence: Academic indirect indicator of learning - other

Target:
For the 2013-2014 academic year we will increase the number of Ph.D. students participating in professional meetings and presenting their research to 75%.

Finding (2013-2014) - Target: Partially Met
For the 2013-2014 academic year a total of 25 Ph.D. students participated in professional meetings and presented their research. This represents 47% of our Ph.D. students in Biological Sciences. Lower participation is partly related to the current funding climate in the sciences. However, our percentage may be artificially low due the inclusion of first year Ph.D. students in our total that lack research results to present.

Related Action Plans (by Established cycle, then alpha):
For full information, see the Details of Action Plans section of this report.

Promote meeting participation for senior Ph.D. students
Established in Cycle: 2013-2014
We will encourage faculty to have their more senior Ph.D. students participate in meetings and make presentations. We will ask f...

M 9: Four Semesters of TAP
All graduate students holding graduate teaching assistantships will be required to successfully complete four semesters of TAP (Teaching Advancement Program) to improve their skills as communicators and teachers.

Source of Evidence: Academic indirect indicator of learning - other

Target:
Analysis of the annual graduate student committee reports to assess their participation in this area

SLO 4: Demonstrate Broad Understanding
Students who complete our Ph.D. program will demonstrate a broad understanding of the interdisciplinary nature of scientific inquiry, and will be researchers capable of guiding others in research.
Connected Document
PhD Biology Curriculum Maps

Relevant Associations:
Student Learning Outcome #n Improvement Action(s) to be advanced:

We will continue with the process of gathering data following current procedures. The department has developed a more standardized rubric for reporting of data regarding assessment of student's at the PhD level in light of the data from our recent program review.

Standard Associations
SACS 3.3.1
- 3.3.1.1 Educational programs, to include student learning outcomes
- 3.3.1.4 Research within its educational mission

Strategic Plan Associations
University of Alabama
4.3 Produce scholars who will become academic and civic leaders in their disciplines.

Related Measures

M 8: Professional Meeting Attendance
Advanced graduate students will be encouraged to attend at least one professional meeting and to present their research.

Source of Evidence: Academic indirect indicator of learning - other

Target:
Analysis of the annual graduate student committee reports to assess their participation at professional meetings presenting their research

M 9: Four Semesters of TAP
All graduate students holding graduate teaching assistantships will be required to successfully complete four semesters of TAP (Teaching Advancement Program) to improve their skills as communicators and teachers.

Source of Evidence: Academic indirect indicator of learning - other

Target:
Analysis of the annual graduate student committee reports to assess their participation in this area

M 10: Employment Goals
Each Ph.D. student placement after graduation will be documented as an assessment of marketable training. The goal is 100% employment within the first year of completing the degree.

Source of Evidence: Academic indirect indicator of learning - other

Target:
We will implement a plan within the department to track the employment of our Ph.D. students after graduation.

Other Outcomes, with Any Associations and Related Measures, Targets, Findings, and Action Plans

Other: 5: Faculty Research Programs
Biological Sciences faculty will build research programs that contribute to the discipline, will provide training opportunities for undergraduate and graduate students, will obtain grant funding and will publish.

Relevant Associations:
Department Outcome #3 Improvement Action(s) to be advanced:

The chair will continue to implement current processes to further improve the grant and publication rate of the faculty.

Standard Associations
SACS 3.3.1
- 3.3.1.1 Educational programs, to include student learning outcomes
- 3.3.1.4 Research within its educational mission

Strategic Plan Associations
University of Alabama
1.1 Promote and enhance areas of academic, scholarship, and research excellence.

Related Measures

M 11: Analysis of Faculty Activity Reports
This outcome will be measured through analysis of annual faculty activity reports and annual faculty conferences with the department chair. The threshold level will be the mentoring of at least two undergraduate and two graduate students per faculty per year.

Source of Evidence: Administrative measure - other
Target:
Based on the annual faculty activity report calculate the average number of undergraduate and graduate students mentored per faculty per year

M 12: Faculty Grants
This outcome will be measured through analysis of annual faculty activity reports and annual faculty conferences with the department chair. The threshold level will be an average of 1 grant per faculty member per year.

Source of Evidence: Administrative measure - other

Target:
Analysis of the annual faculty activity report to calculate the average number of grants submitted per faculty per year

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

**Promote meeting participation for senior Ph.D. students**
We will encourage faculty to have their more senior Ph.D. students participate in meetings and make presentations. We will ask faculty to make students aware of funding opportunities provided by the department and the graduate school that will supplement funds provided by their Ph.D. advisors.

**Established in Cycle:** 2013-2014
**Implementation Status:** Planned
**Priority:** High

**Relationships (Measure | Outcome/Objective):**
- **Measure:** Professional Meeting Attendance | **Outcome/Objective:** Independent Thinking and Effective Communication
Detailed Assessment Report
2012-2013 Biology Ph.D.
As of 7/17/2014 07:45 AM CENTRAL

Mission / Purpose
The Mission of the Department of Biological Sciences is to provide high quality instruction to students at the undergraduate and graduate levels with an emphasis on active learning and problem solving. The department is committed to the advancement of knowledge through research and scholarly activities. Our faculty participates in outreach to the state, nation and world through service to the university community, to public, governmental and industrial sectors, and to professional societies. Within its areas of expertise, the department supports the tripartite mission of the University in teaching, research, and service.

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

SLO 1: Discipline Knowledge
Students who complete our Ph.D. program will explain the literature that supports current scientific concepts and how to select research problems, design experiments, and critically analyze data.

Connected Document
PhD Biology Curriculum Maps

Relevant Associations:
Student Learning Outcome #1 Improvement Action(s) to be advanced:
We will continue with the process of gathering data following current procedures. The department has developed a more standardized rubric for reporting of data regarding assessment of student's at the PhD level in light of the data from our recent program review.

Standard Associations
SACS 3.3.1
3.3.1.1 Educational programs, to include student learning outcomes
3.3.1.4 Research within its educational mission

Strategic Plan Associations
University of Alabama
4.3 Produce scholars who will become academic and civic leaders in their disciplines.
4.4 Produce graduates who will serve as effective leaders in Alabama's government, businesses, educational systems, health care, the arts, and other professions, and who will be leaders in their communities.

Related Measures

M 1: Research Proposal
Each student will submit a research proposal which is judged by a graduate committee composed of a chair and at least four members, one of whom holds an appointment outside the department or university.

Source of Evidence: Academic direct measure of learning - other
Target:
Analyze annual summary graduate student reports to calculate the number of students submitting a research proposal
Finding (2012-2013) - Target: Met
The percentage of PhD students submitting a research proposal was 100%. This is required for all PhD students as part of their qualifying exam.

M 2: Written Exam
Students in the PhD program in Biology must be able to pass at least 12 out of 15 questions on the written exams or receive a score on a research proposal conforming to NIH guidelines of 3.0 or better on a scale of 5 or a research proposal conforming to NSF guidelines of very good or excellent as graded by each student's graduate committee. Calculate the percent of students who meet these criteria on their first attempt.

Source of Evidence: Academic direct measure of learning - other
Target:
Analyze annual graduate student evaluations to calculate the percentage of students meeting these criteria on their first attempt
Finding (2012-2013) - Target: Met
100% of PhD students met the criteria on their first attempt.

M 3: Dissertation Defense
Each student must present the results of their research in the form of a dissertation deemed acceptable by the graduate committee and pass a final oral defense of their dissertation as judged by their graduate committee.
Source of Evidence: Academic direct measure of learning - other

Target:
Analyze the graduate student committee evaluation reports to calculate the number of graduate students passing a final oral defense

Finding (2012-2013) - Target: Met
The percentage of PhD students passing a final oral defense was 100%.

SLO 2: Technique, Technology and Skills
Students who complete our Ph.D. program will demonstrate techniques, technology and skills necessary to conduct meaningful research.

Connected Document
PhD Biology Curriculum Maps

Relevant Associations:
Student Learning Outcome #2 Improvement Action(s) to be advanced:

We will continue with the process of gathering data following current procedures. The department has developed a more standardized rubric for reporting of data regarding assessment of student's at the PhD level in light of the data from our recent program review.

Standard Associations

SACS 3.3.1
3.3.1.1 Educational programs, to include student learning outcomes
3.3.1.4 Research within its educational mission

Strategic Plan Associations

University of Alabama
4.3 Produce scholars who will become academic and civic leaders in their disciplines.
4.4 Produce graduates who will serve as effective leaders in Alabama's government, businesses, educational systems, health care, the arts, and other professions, and who will be leaders in their communities.

Related Measures

M 4: Assessment in Research Courses
Students will be assessed in courses that emphasize research techniques and development of skills at the graduate level and the available technology is assessed to ensure access to training in current methodology.

Source of Evidence: Academic direct measure of learning - other

Target:
Analyse the annual graduate student summary report to calculate the percentage of students taken courses emphasizing modern research techniques

Finding (2012-2013) - Target: Met
The percentage of PhD students taken courses emphasizing modern research techniques is 100% (BSC 607 and BSC 699).

M 5: Instrumentation Proficiency
Each student will be evaluated for the proficiency in use of instrumentation and ability to synthesize results and solve problems by observing of the student in the laboratory and by discussing with the student areas of improvement.

Source of Evidence: Academic direct measure of learning - other

Target:
Analysis of annual graduate student reports to assess the graduate student proficiency in these areas.

Finding (2012-2013) - Target: Met
Based on the analysis from annual student reports, 100% of graduate students demonstrate a proficiency in their ability to use instrumentation and ability to synthesize results and solve problems.

M 6: Review Student Performance
Each student's Graduate committee will review the performance of the student in courses and assesses the methods employed by the student in their research during the annual review of the student's progress.

Source of Evidence: Academic direct measure of learning - other

Target:
Analyse annual graduate student committee reports to assess these areas

Finding (2012-2013) - Target: Met
All faculty mentors (100%) provided an annual summary evaluation of their graduate students and reported satisfactory progress of students in their course work.

SLO 3: Independent Thinking and Effective Communication
Students who complete our Ph.D. program will demonstrate independent thinking and effective communication.

Connected Document
PhD Biology Curriculum Maps

Relevant Associations:
Student Learning Outcome #n Improvement Action(s) to be advanced:

We will continue with the process of gathering data following current procedures. The department has developed a
more standardized rubric for reporting of data regarding assessment of student's at the PhD level in light of the data from our recent program review.

**Standard Associations**

SACS 3.3.1
3.3.1.1 Educational programs, to include student learning outcomes
3.3.1.5 Community/public service within its educational mission

**Strategic Plan Associations**

University of Alabama
4.3 Produce scholars who will become academic and civic leaders in their disciplines.
4.4 Produce graduates who will serve as effective leaders in Alabama's government, businesses, educational systems, health care, the arts, and other professions, and who will be leaders in their communities.

**Related Measures**

**M 7: Departmental Seminars**

Faculty and students will provide to each PHD. student with suggestions for improving communication skills based on presentation of a research talk in the weekly departmental graduate seminar where students will explain, in broadly understandable language, the reasons for their research topic and the tools they will use to address questions.

Source of Evidence: Academic direct measure of learning - other

**Target:**
Analysis of the annual graduate student report to assess their participation on weekly department graduate seminars

**Finding (2012-2013) - Target: Met**
Participation of PhD students on weekly department seminars was 100% (BSC 602 and BSC 605).

**M 8: Professional Meeting Attendance**

Advanced graduate students will be encouraged to attend at least one professional meeting and to present their research.

Source of Evidence: Academic indirect indicator of learning - other

**Target:**
Analysis of the annual graduate student committee reports to assess their participation at professional meetings presenting their research

**Finding (2012-2013) - Target: Met**
50% of graduate students participated in professional meetings by presenting their research.

**M 9: Four Semesters of TAP**

All graduate students holding graduate teaching assistantships will be required to successfully complete four semesters of TAP (Teaching Advancement Program) to improve their skills as communicators and teachers.

Source of Evidence: Academic indirect indicator of learning - other

**Target:**
Analysis of the annual graduate student committee reports to assess their participation in this area

**Finding (2012-2013) - Target: Met**
100% of graduate teaching assistant students are participating in TAP for the required number of semesters.

**SLO 4: Demonstrate Broad Understanding**

Students who complete our Ph.D. program will demonstrate a broad understanding of the interdisciplinary nature of scientific inquiry, and will be researchers capable of guiding others in research.

**Connected Document**

*PhD Biology Curriculum Maps*

**Relevant Associations:**

Student Learning Outcome #n Improvement Action(s) to be advanced:

We will continue with the process of gathering data following current procedures. The department has developed a more standardized rubric for reporting of data regarding assessment of student's at the PhD level in light of the data from our recent program review.

**Standard Associations**

SACS 3.3.1
3.3.1.1 Educational programs, to include student learning outcomes
3.3.1.4 Research within its educational mission

**Strategic Plan Associations**

University of Alabama
4.3 Produce scholars who will become academic and civic leaders in their disciplines.

**Related Measures**
M 8: Professional Meeting Attendance
Advanced graduate students will be encouraged to attend at least one professional meeting and to present their research.

Source of Evidence: Academic indirect indicator of learning - other

**Target:**
Analysis of the annual graduate student committee reports to assess their participation at professional meetings presenting their research

**Finding (2012-2013) - Target: Met**
50% of graduate students participated in professional meetings by presenting their research.

M 9: Four Semesters of TAP
All graduate students holding graduate teaching assistantships will be required to successfully complete four semesters of TAP (Teaching Advancement Program) to improve their skills as communicators and teachers.

Source of Evidence: Academic indirect indicator of learning - other

**Target:**
Analysis of the annual graduate student committee reports to assess their participation in this area

**Finding (2012-2013) - Target: Met**
100% of graduate teaching assistant students are participating in TAP for the required number of semesters.

M 10: Employment Goals
Each Ph.D. student placement after graduation will be documented as an assessment of marketable training. The goal is 100% employment within the first year of completing the degree.

Source of Evidence: Academic indirect indicator of learning - other

**Target:**
Contact faculty mentors to calculate the percentage of Ph.D. employment

**Finding (2012-2013) - Target: Not Reported This Cycle**
Data not available this year.

Other Outcomes, with Any Associations and Related Measures, Targets, Findings, and Action Plans

OthOtcm 5: Faculty Research Programs
Biological Sciences faculty will build research programs that contribute to the discipline, will provide training opportunities for undergraduate and graduate students, will obtain grant funding and will publish.

**Relevant Associations:**
Department Outcome #3 Improvement Action(s) to be advanced:

The chair will continue to implement current processes to further improve the grant and publication rate of the faculty

**Standard Associations**

*SACS 3.3.1*
3.3.1.1 Educational programs, to include student learning outcomes
3.3.1.4 Research within its educational mission

**Strategic Plan Associations**
University of Alabama
1.1 Promote and enhance areas of academic, scholarship, and research excellence.

**Related Measures**

M 11: Analysis of Faculty Activity Reports
This outcome will be measured through analysis of annual faculty activity reports and annual faculty conferences with the department chair. The threshold level will be the mentoring of at least two undergraduate and two graduate students per faculty per year.

Source of Evidence: Administrative measure - other

**Target:**
Based on the annual faculty activity report calculate the average number of undergraduate and graduate students mentored per faculty per year

**Finding (2012-2013) - Target: Met**
Over 95% of the faculty per year are mentoring two undergraduate and two graduate students.

M 12: Faculty Grants
This outcome will be measured through analysis of annual faculty activity reports and annual faculty conferences with the department chair. The threshold level will be an average of 1 grant per faculty member per year.

Source of Evidence: Administrative measure - other

**Target:**
Analysis of the annual faculty activity report to calculate the average number of grants submitted per faculty per year

**Finding (2012-2013) - Target: Met**
An average of 2.6 grants are submitted per faculty per year.
Mission / Purpose
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Student Learning Outcomes, with Any Associations and Related Measures, Targets, Findings, and Action Plans

SLO 1: Discipline Knowledge
Students who complete our Ph.D. program will explain the literature that supports current scientific concepts and how to select research problems, design experiments, and critically analyze data.

Connected Document
PhD Biology Curriculum Maps

Relevant Associations:
Student Learning Outcome #1 Improvement Action(s) to be advanced:

We will continue with the process of gathering data following current procedures. The department has developed a more standardization rubric for reporting of data regarding assessment of student's at the PhD level in light of the data from our recent program review.

Standard Associations
SACS 3.3.1
3.3.1.1 Educational programs, to include student learning outcomes
3.3.1.4 Research within its educational mission

Strategic Plan Associations
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4.3 Produce scholars who will become academic and civic leaders in their disciplines.
4.4 Produce graduates who will serve as effective leaders in Alabama's government, businesses, educational systems, health care, the arts, and other professions, and who will be leaders in their communities.

Related Measures

M 1: Research Proposal
Each student will submit a research proposal which is judged by a graduate committee composed of a chair and at least four members, one of whom holds an appointment outside the department or university.

Source of Evidence: Academic direct measure of learning - other
Target:
Analyze annual summary graduate student reports to calculate the number of students submitting a research proposal
Finding (2011-2012) - Target: Met
The percentage of PhD students submitting a research proposal was 100%

M 2: Written Exam
Students in the PhD program in Biology must be able to pass at least 12 out of 15 questions on the written exams or receive a score on a research proposal conforming to NIH guidelines of 3.0 or better on a scale of 5 or a research proposal conforming to NSF guidelines of very good or excellent as graded by each student's graduate committee. Calculate the percent of students who meet these criteria on their first attempt.

Source of Evidence: Academic direct measure of learning - other
Target:
Analyze annual graduate student evaluations to calculate the percentage of students meeting these criteria on their first attempt
Finding (2011-2012) - Target: Met
100% of PhD students met the criteria on their first attempt

M 3: Dissertation Defense
Each student must present the results of their research in the form of a dissertation deemed acceptable by the graduate committee and pass a final oral defense of their dissertation as judged by their graduate committee.

Source of Evidence: Academic direct measure of learning - other
Target:
Analyze the graduate student committee evaluation reports to calculate the number of graduate students passing a final oral defense

Finding (2011-2012) - Target: Met
The percentage of PhD students passing a final oral defense was 100%

SLO 2: Technique, Technology and Skills
Students who complete our Ph.D. program will demonstrate techniques, technology and skills necessary to conduct meaningful research.

Connected Document
PhD Biology Curriculum Maps

Relevant Associations:
Student Learning Outcome #2 Improvement Action(s) to be advanced:

We will continue with the process of gathering data following current procedures. The department has developed a more standardized rubric for reporting of data regarding assessment of student's at the PhD level in light of the data from our recent program review.

Standard Associations

SACS 3.3.1
3.3.1.1 Educational programs, to include student learning outcomes
3.3.1.4 Research within its educational mission

Strategic Plan Associations
University of Alabama
4.3 Produce scholars who will become academic and civic leaders in their disciplines.
4.4 Produce graduates who will serve as effective leaders in Alabama's government, businesses, educational systems, health care, the arts, and other professions, and who will be leaders in their communities.

Related Measures

M 4: Assessment in Research Courses
Students will be assessed in courses that emphasize research techniques and development of skills at the graduate level and the available technology is assessed to ensure access to training in current methodology.

Source of Evidence: Academic direct measure of learning - other

Target:
Analyze the annual graduate student summary report to calculate the percentage of students taken courses emphasizing modern research techniques

Finding (2011-2012) - Target: Met
The percentage of PhD students taken courses emphasizing modern research techniques is 100%

M 5: Instrumentation Proficiency
Each student will be evaluated for the proficiency in use of instrumentation and ability to synthesize results and solve problems by observing of the student in the laboratory and by discussing with the student areas of improvement.

Source of Evidence: Academic direct measure of learning - other

Target:
Analysis of annual graduate student reports to assess the graduate student proficiency in these areas.

Finding (2011-2012) - Target: Not Reported This Cycle
Data not available this year

M 6: Review Student Performance
Each student's Graduate committee will review the performance of the student in courses and assesses the methods employed by the student in their research during the annual review of the student's progress.

Source of Evidence: Academic direct measure of learning - other

Target:
Analyse annual graduate student committee reports to assess these areas

Finding (2011-2012) - Target: Not Reported This Cycle
Data not available this year

SLO 3: Independent Thinking and Effective Communication
Students who complete our Ph.D. program will demonstrate independent thinking and effective communication.

Connected Document
PhD Biology Curriculum Maps

Relevant Associations:
Student Learning Outcome #n Improvement Action(s) to be advanced:

We will continue with the process of gathering data following current procedures. The department has developed a more standardized rubric for reporting of data regarding assessment of student's at the PhD level in light of the data from our recent program review.

Standard Associations
SACS 3.3.1
3.3.1.1 Educational programs, to include student learning outcomes
3.3.1.5 Community/public service within its educational mission

Strategic Plan Associations
University of Alabama
4.3 Produce scholars who will become academic and civic leaders in their disciplines.
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Related Measures

M 7: Departmental Seminars
Faculty and students will provide to each Ph.D. student with suggestions for improving communication skills based on presentation of a research talk in the weekly departmental graduate seminar where students will explain, in broadly understandable language, the reasons for their research topic and the tools they will use to address questions.

Source of Evidence: Academic direct measure of learning - other
Target:
Analysis of the annual graduate student report to assess their participation on weekly department graduate seminars
Finding (2011-2012) - Target: Met
Participation of PhD students on weekly department seminars was 100%

M 8: Professional Meeting Attendance
Advanced graduate students will be encouraged to attend at least one professional meeting and to present their research.

Source of Evidence: Academic indirect indicator of learning - other
Target:
Analysis of the annual graduate student committee reports to assess their participation at professional meetings presenting their research
Finding (2011-2012) - Target: Not Reported This Cycle
Data not available this year

M 9: Four Semesters of TAP
All graduate students holding graduate teaching assistantships will be required to successfully complete four semesters of TAP (Teaching Advancement Program) to improve their skills as communicators and teachers.

Source of Evidence: Academic indirect indicator of learning - other
Target:
Analysis of the annual graduate student committee reports to assess their participation in this area
Finding (2011-2012) - Target: Met
100% of graduate teaching assistant students are participating in TAP

SLO 4: Demonstrate Broad Understanding
Students who complete our Ph.D. program will demonstrate a broad understanding of the interdisciplinary nature of scientific inquiry, and will be researchers capable of guiding others in research.

Connected Document
PhD Biology Curriculum Maps

Relevant Associations:
Student Learning Outcome #n Improvement Action(s) to be advanced:

We will continue with the process of gathering data following current procedures. The department has developed a more standardized rubric for reporting of data regarding assessment of student's at the PhD level in light of the data from our recent program review.

Standard Associations
SACS 3.3.1
3.3.1.1 Educational programs, to include student learning outcomes
3.3.1.4 Research within its educational mission

Strategic Plan Associations
University of Alabama
4.3 Produce scholars who will become academic and civic leaders in their disciplines.

Related Measures

M 8: Professional Meeting Attendance
Advanced graduate students will be encouraged to attend at least one professional meeting and to present their research.
Source of Evidence: Academic indirect indicator of learning - other
**Target:**
Analysis of the annual graduate student committee reports to assess their participation at professional meetings presenting their research

**Finding (2011-2012) - Target: Not Reported This Cycle**
Data not available this year

**M 9: Four Semesters of TAP**
All graduate students holding graduate teaching assistantships will be required to successfully complete four semesters of TAP (Teaching Advancement Program) to improve their skills as communicators and teachers.

Source of Evidence: Academic indirect indicator of learning - other
**Target:**
Analysis of the annual graduate student committee reports to assess their participation in this area

**Finding (2011-2012) - Target: Met**
100% of graduate teaching assistant students are participating in TAP

**M 10: Employment Goals**
Each Ph.D. student placement after graduation will be documented as an assessment of marketable training. The goal is 100% employment within the first year of completing the degree.

Source of Evidence: Academic indirect indicator of learning - other
**Target:**
Contact faculty mentors to calculate the percentage of Ph.D. employment

**Finding (2011-2012) - Target: Not Reported This Cycle**
Data not available this year

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**Other Outcomes, with Any Associations and Related Measures, Targets, Findings, and Action Plans**

**OthOtcm 5: Sustained Level of Recognized Quality**
The program will improve and sustain a high level of recognized quality.

**Relevant Associations:**

**Standard Associations**

**SACS 3.3.1**
3.3.1.1 Educational programs, to include student learning outcomes

**Strategic Plan Associations**
University of Alabama
1.1 Promote and enhance areas of academic, scholarship, and research excellence.
1.2 Increase the recognition of the University's service priorities that enhance the quality of life for all Alabamians.

**Related Measures**

**M 11: Analyze Strengths**
We will use the 8-year program review to analyze our strengths.

Source of Evidence: Evaluations
**Target:**
Analysis of the 8-year program review to assess our strengths.

**Finding (2011-2012) - Target: Not Reported This Cycle**
Data not available this year

**M 12: Search for Opportunities for Improvement**
We will use the 8-year program review to search for opportunities for improvement.

Source of Evidence: Evaluations
**Target:**
Analysis of the 8-year program review to search for opportunities for improvement.

**Finding (2011-2012) - Target: Not Reported This Cycle**
Data not available this year

**M 13: Changes Made as Result of Review**
Faculty retreats, weekly seminars, annual graduate picnic, annual welcome gatherings and monthly faculty meetings have improved the collaboration and communication among graduate students, staff and faculty. A new building was recently completed (Science and Engineering Complex) to house most of the faculty in order to improve teaching and research infrastructure in the department.

Source of Evidence: Evaluations
**Target:**
Calculate the collaboration and communication among graduate students, staff and faculty by assessing the number of faculty retreats, weekly seminars and other social/professional meetings per year.

**Finding (2011-2012) - Target: Not Reported This Cycle**
100% of graduate students participated during weekly seminars and other social/professional meetings per year.

OthOtcm 6: Sustain Optimal Level of Enrollment
The program will build and sustain an optimal level of annual program enrollments and degree completion.

Relevant Associations:

Standard Associations
SACS 3.3.1
3.3.1.1 Educational programs, to include student learning outcomes

Strategic Plan Associations
University of Alabama
1.1 Promote and enhance areas of academic, scholarship, and research excellence.
3.12 Increase the level of academic scholarship support.

Related Measures

M 14: Credit Hour Production
We will calculate the graduate semester credit hour production for the last three fall semesters.

Source of Evidence: Existing data

Target:
Calculate the graduate semester credit hour production for the last three fall semesters.

Finding (2011-2012) - Target: Not Reported This Cycle
Data not available this year

M 15: Number of Courses Offered
We will calculate the number of graduate courses and sections offered for the last three fall semesters.

Source of Evidence: Existing data

Target:
Calculate the number of graduate courses and sections offered for the last three fall semesters.

Finding (2011-2012) - Target: Not Reported This Cycle
Data not available this year

M 16: Number of Students in Doctoral Program
We will calculate the number of students in the Doctoral program in Biology for the last three fall semesters.

Source of Evidence: Existing data

Target:
Calculate the number of students in the Doctoral program in Biology for the last three fall semesters.

Finding (2011-2012) - Target: Met
The number of PhD students in 2011-2012 is 42

M 17: Degrees Awarded
We will calculate the number of degrees awarded in the Doctoral program in Biology for last three years (August, December, and May).

Source of Evidence: Existing data

Target:
Calculate the number of degrees awarded in the Doctoral program in Biology for last three years (August, December, and May).

Finding (2011-2012) - Target: Met
The number of PhD degrees awarded during 2011-2012 was 10

OthOtcm 7: Highly Valued by Program Graduates and Key Constituencies
The program will be highly valued by its program graduates and other key constituencies it serves.

Relevant Associations:

Standard Associations
SACS 3.3.1
3.3.1.1 Educational programs, to include student learning outcomes

Strategic Plan Associations
University of Alabama
1.1 Promote and enhance areas of academic, scholarship, and research excellence.
4.3 Produce scholars who will become academic and civic leaders in their disciplines.

Related Measures

M 18: Rubric to Gauge Student Satisfaction
New rubrics will be implemented in order to gauge student satisfaction with the Doctoral degree program in Biology.

Source of Evidence: Student satisfaction survey at end of the program

Target:
Develop new rubrics to assess student satisfaction with the Doctoral degree program in Biology.

Finding (2011-2012) - Target: Not Reported This Cycle
Data not available this year
M 19: Faculty Polling
We will gather information from faculty regarding informal polling of Doctoral students regarding their satisfaction with the program and recommendations for improvement.

Source of Evidence: Client satisfaction survey (student, faculty)

Target:
Contact faculty mentor to request informal information from Ph.D. students regarding their satisfaction with the program and recommendations for improvement.

Finding (2011-2012) - Target: Not Reported This Cycle
Data not available this year

M 20: Analyze Application Letters
We will analyze letters of application to our Doctoral program in Biology/Marine Science to obtain information on aspects of our PhD program that are most valued.

Source of Evidence: Document Analysis

Target:
Analyze letters of application to our Doctoral program in Biology/Marine Science to obtain information on aspects of our PhD program that are most valued.

Finding (2011-2012) - Target: Not Reported This Cycle
Data not available this year

M 21: Informal Discussions between Faculty and Students
The chair or the head of the graduate committee will meet at least twice a semester with graduate students for a pizza dinner to get feedback from the graduate students on their satisfaction with the program.

Source of Evidence: Discussions / Coffee Talk

Target:
Request a report from the chair or the head of the graduate committee to assess feedback results from these gatherings

Finding (2011-2012) - Target: Not Reported This Cycle
Data not available this year

OthOtcm 8: Fostering Fundamental Understanding
The Department will offer courses that foster an understanding of fundamental biological principles, their experimental foundations, and their interface with chemistry, physics and mathematics.

Relevant Associations:
Department Outcome #1 Improvement Action(s) to be advanced:

We will continue with the current processes and implementations. The department is critically evaluating its graduate curriculum in light of our recent program review.

Standard Associations
SACS 3.3.1
3.3.1.1 Educational programs, to include student learning outcomes

Strategic Plan Associations
University of Alabama
3.12 Increase the level of academic scholarship support.

Related Measures

M 22: Assess for Breadth and Depth
We will assess our course offerings and content for breadth and depth of coverage each year.

Source of Evidence: Administrative measure - other

Target:
Assess the number of course offerings and content for breadth and depth of coverage each year.

Finding (2011-2012) - Target: Not Reported This Cycle
Data not available this year

M 23: Course Demand
During the pre-semester registration for Spring and Fall 2011 and 2012 courses, we will track courses to identify those that are filled to capacity. This assessment will provide us a semblance of student demand and need for courses.

Source of Evidence: Administrative measure - other

Target:
Assess the number of courses filled to capacity during the pre-semester registration

Finding (2011-2012) - Target: Not Reported This Cycle
Data not available this year

M 24: Course Demand
During the pre-semester registration for Spring and Fall 2011 and 2012 courses, we will track courses to identify those that are filled to capacity. This assessment will provide us a semblance of student demand and need for courses.
Source of Evidence: Client satisfaction survey (student, faculty)

**Target:**
Calculate the percentage of students answering very good or excellent

**Finding (2011-2012) - Target: Not Reported This Cycle**
Data not available this year

**M 25: Assess Level of Conceptual Understanding**
Pre-test/post-tests will be used in 100-level courses to assess the level of conceptual knowledge that students attain during the courses. We will consider a level of 70% of students passing at post-test acceptable.

Source of Evidence: Faculty pre-test / post-test of knowledge mastery

**Target:**
Calculate the percentage of students passing at post-test

**Finding (2011-2012) - Target: Not Reported This Cycle**
Data not available this year

**OthOtcm 9: Course Offerings**
The Department will offer courses that emphasize a conceptual knowledge of molecular and cellular biology, organismal biology, physiological principles, and population to ecosystem understandings.

**Relevant Associations:**
Department Outcome #2 Improvement Action(s) to be advanced (copied from 2010-11 report):

We will continue with the current processes and implementations. We will revisit the content and usefulness of our rubric in light of our upcoming program review.

**Standard Associations**

**SACS 3.3.1**
3.3.1.1 Educational programs, to include student learning outcomes

**Strategic Plan Associations**

University of Alabama

1.1 Promote and enhance areas of academic, scholarship, and research excellence.
4.3 Produce scholars who will become academic and civic leaders in their disciplines.

**Related Measures**

**M 22: Assess for Breadth and Depth**
We will assess our course offerings and content for breadth and depth of coverage each year.

Source of Evidence: Administrative measure - other

**Target:**
Assess the number of course offerings and content for breadth and depth of coverage each year.

**Finding (2011-2012) - Target: Not Reported This Cycle**
Data not available this year

**M 23: Course Demand**
During the pre-semester registration for Spring and Fall 2011 and 2012 courses, we will track courses to identify those that are filled to capacity. This assessment will provide us a semblance of student demand and need for courses.

Source of Evidence: Administrative measure - other

**Target:**
Assess the number of courses filled to capacity during the pre-semester registration

**Finding (2011-2012) - Target: Not Reported This Cycle**
Data not available this year

**M 24: Course Demand**
During the pre-semester registration for Spring and Fall 2011 and 2012 courses, we will track courses to identify those that are filled to capacity. This assessment will provide us a semblance of student demand and need for courses.

Source of Evidence: Client satisfaction survey (student, faculty)

**Target:**
Calculate the percentage of students answering very good or excellent

**Finding (2011-2012) - Target: Not Reported This Cycle**
Data not available this year

**OthOtcm 10: Faculty Research Programs**
Biological Sciences faculty will build research programs that contribute to the discipline, will provide training opportunities for undergraduate and graduate students, will obtain grant funding and will publish.

**Relevant Associations:**
Department Outcome #3 Improvement Action(s) to be advanced:

The chair will continue to implement current processes to further improve the grant and publication rate of the faculty
Standard Associations

SACS 3.3.1
3.3.1.1 Educational programs, to include student learning outcomes
3.3.1.4 Research within its educational mission

Strategic Plan Associations

University of Alabama
1.1 Promote and enhance areas of academic, scholarship, and research excellence.

Related Measures

M 26: Analysis of Faculty Activity Reports
This outcome will be measured through analysis of annual faculty activity reports and annual faculty conferences with the department chair. The threshold level will be the mentoring of at least two undergraduate and two graduate students per faculty per year.

Source of Evidence: Administrative measure - other
Target:
Based on the annual faculty activity report calculate the average number of undergraduate and graduate students mentored per faculty per year
Finding (2011-2012) - Target: Met
Over 95% of the faculty per year are mentoring two undergraduate and two graduate students

M 27: Faculty Grants
This outcome will be measured through analysis of annual faculty activity reports and annual faculty conferences with the department chair. The threshold level will be an average of 1 grant per faculty member per year.

Source of Evidence: Administrative measure - other
Target:
Analysis of the annual faculty activity report to calculate the average number of grants submitted per faculty per year
Finding (2011-2012) - Target: Met
An average of 2.6 grants are submitted per faculty per year

M 28: Faculty Publications
This outcome will be measured through analysis of annual faculty activity reports and annual faculty conferences with the department chair. The threshold level will be an average of one publication per faculty per year.

Source of Evidence: Activity volume
Target:
Analysis of the annual faculty activity report to calculate the average number of publications per faculty per year
Finding (2011-2012) - Target: Met
The average number of publications published by faculty per year is 2.1

OthOtm 11: Faculty Services
Biological Sciences faculty will provide services to the university, discipline and profession.

Relevant Associations:
Department Outcome #n Improvement Action(s) to be advanced:

The chair will continue to implement current processes to further improve and expand the level of service of the faculty to the department, university, local community and profession.

Standard Associations

SACS 3.3.1
3.3.1.3 Educational support services
3.3.1.5 Community/public service within its educational mission

Strategic Plan Associations

University of Alabama
1.2 Increase the recognition of the University's service priorities that enhance the quality of life for all Alabamians.
2.6 Enhance relationships among community and University of Alabama leaders to promote excellent quality of life for faculty, staff, and students.
4.1 Provide leadership in addressing economic, social, and cultural issues in Alabama through research and outreach activities.

Related Measures

M 29: Faculty Committees
100 % of the faculty will be expected to serve as members of university, community, or professional committees. Service will be assessed through analysis of annual faculty activity reports and annual faculty conferences with the department chair. All faculty will be expected to provide service at the department, university and/or professional level.

Source of Evidence: Activity volume
Target:
Analysis of the annual faculty activity report will be assessed to calculate the percentage of faculty saving as
members of university, community, or professional committees.

**Finding (2011-2012) - Target: Met**
100% of the faculty are serving as members at university, community and/or professional committees

**M 30: Grant Review**
100% of faculty will be expected to serve as reviewers of manuscripts and/or grants. Service will be assessed through analysis of annual faculty activity reports and annual faculty conferences with the department chair. All faculty will be expected to provide service at the department, university and/or professional level.

Source of Evidence: Administrative measure - other

**Target:**
Analysis of the annual faculty activity report will be assessed to calculate the number of faculty members serving as reviewers of manuscripts and/or grants

**Finding (2011-2012) - Target: Met**
100% of the faculty are serving as reviewers of manuscript and/or grants

**M 31: Faculty Leadership Positions**
100% of faculty will be expected to hold leadership positions at the university, community, or professional levels. Service will be assessed through analysis of annual faculty activity reports and annual faculty conferences with the department chair. All faculty will be expected to provide service at the department, university and/or professional level.

Source of Evidence: Administrative measure - other

**Target:**
Analysis of the annual faculty activity report will be used to assess the percentage of faculty members holding leadership positions at the university, community, or professional levels

**Finding (2011-2012) - Target: Met**
100% of the faculty are holding leadership positions at the university, community, and/or professional levels
Curriculum Maps #1  (In which courses or in what activities or assignments are Student Learning Outcomes Addressed)

Use “Introduce” when outcome is first address; “Reinforce” when outcome is reinforced; and “Master” when outcome is expected to be mastered. Note that you do not need to obtain a measure from every course in which an outcome is addressed (see Map #2)

<table>
<thead>
<tr>
<th>Course 1</th>
<th>Course 2</th>
<th>Course 3</th>
<th>Required Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduce, Reinforce and Master</td>
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</tr>
</tbody>
</table>

Curriculum Map II  (What assessment measures will be employed in which courses/activities/assignments for each Student learning Outcome)

Indicate which measure is being obtained in which course by typing “Measure n.n” in the appropriate cell. If you’d rather use a description of the measure, that is fine. Also, indicate the year/semester in which the measure will be obtained (e.g., Fall 2011). Student learning outcomes must be assessed at least once within a 2 ½ year period. Note that a measure does not need to be obtained from every course in which an outcome is covered (see Map #1).

<table>
<thead>
<tr>
<th>Course 1</th>
<th>Course 2</th>
<th>Course 3</th>
<th>Required Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Each student must present the results of their research in the form of a dissertation deemed acceptable by the graduate committee.</td>
<td>Students will be assessed in courses that emphasize research techniques and development of skills at the graduate level and the available technology is assessed to ensure access to training in current methodology.</td>
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<td>Students will be assessed in courses that emphasize research techniques and development of skills at the graduate level and the available technology is assessed to ensure access to training in current methodology.</td>
</tr>
<tr>
<td>2. Students must pass a final oral defense of their dissertation as judged by their graduate committee.</td>
<td>Faculty and students will provide to each PH.D. student with suggestions for improving communication skills based on presentation of a research talk in the weekly departmental graduate seminar where students will explain, in broadly understandable language, the reasons for their research topic and the tools they will use to address questions.</td>
<td>Faculty and students will provide to each PH.D. student with suggestions for improving communication skills based on presentation of a research talk in the weekly departmental graduate seminar where students will explain, in broadly understandable language, the reasons for their research topic and the tools they will use to address questions.</td>
<td>Faculty and students will provide with suggestions for improving a broad understanding of the interdisciplinary nature of scientific inquiry based on presentation of a research talk in the weekly departmental graduate seminar where the students explain the reasons for their research topic and the tools they will use to address questions.</td>
</tr>
</tbody>
</table>
| Course 4  
BSC 606 Adv Ecol Syst Seminar | Each student’s performance will be assessed by a Graduate committee in courses and progress in research at annual reviews. | Students will be assessed in courses that emphasize research techniques and development of skills at the graduate level and the available technology is assessed to ensure access to training in current methodology. | Faculty and students will provide with suggestions for improving a broad understanding of the interdisciplinary nature of scientific inquiry based on presentation of a research talk in the weekly departmental graduate seminar where the students explain the reasons for their research topic and the tools they will use to address questions. | Faculty and students will provide to each Ph.D. student with suggestions for improving communication skills based on presentation of a research talk in the weekly departmental graduate seminar where students will explain, in broadly understandable language, the reasons for their research topic and the tools they will use to address questions. |
| Required Task  
Annual Review | Each student’s Graduate committee will review the performance of the student in courses and assess the methods employed by the student in their research during the annual review of the student’s progress. | Each student’s curriculum will be reviewed for inclusion of courses that will require written assignments and oral presentations based on analysis and communication of research results. | The student’s curriculum will be reviewed for inclusion of courses that will require written assignments and oral presentations based on broad experience with primary literature. | The student’s curriculum will be reviewed for inclusion of courses that will require written assignments and oral presentations based on broad experience with primary literature. |
| Activity 1  
Laboratory Experience | Each student will be evaluated for the proficiency in use of instrumentation and ability to synthesize results and solve problems by observing of the student in the laboratory and by discussing with the student areas of improvement. | The student’s advisor will evaluate written papers and manuscripts prepared by the student. | The student’s advisor will critique written papers and manuscripts prepared by the student. | The student’s advisor will critique written papers and manuscripts prepared by the student. |
| Activity 2  
Professional Conferences | | Advanced graduate students will be encouraged to attend at least one professional meeting and to present their research. | Advanced graduate students will be encouraged to attend at least one professional meeting and to present their research. | Advanced graduate students will be encouraged to attend at least one professional meeting and to present their research. |
| Activity 3  
Comprehensive Exam | The student’s graduate committee will evaluate whether each Ph.D. student has depth of knowledge in their area of specialty from answers to discussion questions submitted by members of the committee or from a research proposal conforming to the guidelines of a federal agency on a topic approved by the committee, and from performance on a comprehensive oral exam. Students who do not succeed are given a second written exam, the opportunity to revise the proposal and/or a second oral exam. | | | |
| Activity 4  
Research proposal | Each student will submit a research proposal which is judged by a graduate committee composed of a chair and at least four members, one of whom holds an appointment outside the department or university. | | | |