

University of Louisiana at Lafayette

Detailed Assessment Report 2015-2016 Biology PhD

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(Includes those Action Plans with Budget Amounts marked *One-Time, Recurring, No Request.*)

Mission / Purpose

The Department of Biology aims to further scientific knowledge through extensive research and teaching. The graduate program endeavors to train future scientists and scholars in Environmental and Evolutionary Biology through extensive hands-on research opportunities coupled with intensive classroom instruction. Graduate opportunities include the Masters of Science and Doctor of Philosophy degrees.

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

SLO 1: Research Project Design

All doctoral students in the degree program will have the skills and knowledge necessary to design a research project that has the potential to contribute new knowledge related to the area of the student's specialization.

Related Measures

M 1: Dissertation Proposal

Each student's ability to design a research project is evaluated by a committee of faculty during the oral defense of the student's written dissertation proposal. Committee members are encouraged to assess all students who defend a dissertation proposal. The committee evaluates the proposal and asks the student questions to assess their understanding of theory, experimental design, and quantitative analyses related to the proposed research. The committee votes to determine if the student has passed or failed the proposal defense.

The committee members (at least five faculty members) report their assessment using an evaluation rubric that was developed by the Department of Biology. As members of the student's committee, the raters are experts in the student's area of study and hence can provide accurate and reliable assessments. The assessment forms are submitted to a departmental Administrative Assistant, who compiles the data and provides anonymous data (i.e., that does not reveal the student or evaluator names) to the Graduate Coordinator for analysis and reporting.

Rubric A (Evaluation of Dissertation Proposal) consists of 4 components, each with a maximum score of 3, resulting in a maximum evaluation score of 12.

Ph.D. Environmental & Evolutionary Biology

Rubric A: Evaluation of Dissertation Proposal.

Each faculty member on a student's committee is required to complete the following assessment as part of ongoing review of the Ph.D. program in Environmental and Evolutionary Biology.

Student name (please print) _____, Date _____, Semester _____

Evaluator's name (please print) _____, Evaluator's signature _____

Assessment of component:

Score each criterion below using the following scale:

1 – Does not meet expectations

2 – Meets expectations

3 – Exceeds expectations

NA – Not assessed

Criteria

Breadth of disciplinary knowledge

Is broad, general knowledge of the field of biology evident? Is the rationale for the proposed research clearly stated and placed within the framework of existing biological knowledge?

Score: _____

Depth of knowledge of specific research topic

Is there evidence that the student has expanded his/her expertise on the specific research topic beyond what is provided in coursework? Is there evidence of a firm grasp of relevant primary literature and current research needs/directions in this specific research area evident? Is there evidence that the proposed research will make a significant contribution

to the specific research area and to biology in general?

Score: _____

Ability to design and analyze research experiments

Has the student stated concise hypotheses or specific research questions to be addressed by the proposed research? Are the proposed experiments appropriate for addressing the research questions? Are the proposed analyses appropriate for the questions addressed?

Score: _____

Ability to express information both in writing and orally

Is the research proposal well organized and presented in a logical progression? Is the grammar and writing style correct, succinct, and easy to understand? If there was an oral presentation, was it well organized and clearly presented?

Score: _____

Source of Evidence: Academic direct measure of learning – other

Committee member evaluations from student defenses of Ph.D. dissertation proposals in the Department of Biology

Source of Evidence: Academic direct measure of learning - other

Target:

Currently the goal is for 80% or more of Ph.D. students to defend their dissertation proposals successfully with a rubric score of at least 8 or higher.

Finding (2015-2016) - Target: Met

To provide meaningful numbers, we report cumulative data for the past five years. From AY 2011-12 through AY 2014-16, we met the target of 80% or more of Ph.D. students earning a rubric score of at least 6 or higher in the proposal defense: 100% of student (19 out of 19) who were assessed surpassed the target, with an average score of 7.1. We are currently working to increase participation in the assessment process.

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

Curriculum expansion and enhancement

We are working toward our ongoing, long-term goals of offering more 500/600-level courses for our graduate students, who have requested more courses at the 500 and 600 levels. Such courses will help them prepare better for comprehensive exams, research projects, theses/dissertations, and final defenses/exams, all of which are accomplishments that we assess. In addition, such courses will help our students more readily meet the program requirements for 500/600-level course credits.

Established in Cycle: 2012-2013

Implementation Status: Finished

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Comprehensive Exam | **Outcome/Objective:**
Disciplinary Knowledge

Measure: Dissertation Defense | **Outcome/Objective:**
Research Presentation

Measure: Dissertation Proposal | **Outcome/Objective:**
Research Project Design

Implementation Description: In 2014-15, we offered new graduate course in Neurobiology (Biol 423G), Histology (434G, new as a senior and graduate-level course), Comparative Vertebrate Morphology (436G, new as a senior & graduate course), and Estuarine Ecology and Coastal Marine Biology (440G); at the 500 level, we offered a newly redesigned Statistical Ecology (575). In 2015-16, we offered new graduate courses in Neurobiology (424G, lab), and Fish Ecology & Management (446G).

Rubric Implementation

Implementation of revised rubrics; work to increase faculty compliance with assessment requirements

Established in Cycle: 2014-2015

Implementation Status: Finished

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Comprehensive Exam | **Outcome/Objective:**
Disciplinary Knowledge

Measure: Dissertation Defense | **Outcome/Objective:**
Research Presentation

Measure: Dissertation Proposal | **Outcome/Objective:**
Research Project Design

Curriculum enhancement

We are continuing to work on our long-term goals of offering more 500/600-level courses for our graduate students. Such courses will help them prepare better for comprehensive exams, research projects, theses/dissertations, and final defenses/exams, all of which are accomplishments that we assess.

Established in Cycle: 2015-2016

Implementation Status: In-Progress

Priority: Medium

Relationships (Measure | Outcome/Objective):

Measure: Comprehensive Exam | **Outcome/Objective:**
Disciplinary Knowledge

Measure: Dissertation Defense | **Outcome/Objective:**
Research Presentation

Measure: Dissertation Proposal | **Outcome/Objective:**
Research Project Design

SLO 2: Disciplinary Knowledge

All doctoral candidates in the degree program will be able to demonstrate a breadth of knowledge across the discipline and a depth of knowledge in their

area of specialization

Related Measures

M 2: Comprehensive Exam

Each candidate's knowledge is tested by a committee of faculty during written and oral comprehensive exams. Committee members are encouraged to assess all students who take the Comprehensive Exam. Candidates are asked questions to evaluate the breadth and depth of their knowledge. The committee votes to determine if the student has passed or failed the exam.

The committee members (at least five faculty members) report their assessment using an evaluation rubric that was developed by the Department of Biology. As members of the student's committee, the raters are experts in the student's area of study and hence can provide accurate and reliable assessments. The assessment forms are submitted to a departmental Administrative Assistant, who compiles the data and provides anonymous data (i.e., that does not reveal the student or evaluator names) to the Graduate Coordinator for analysis and reporting.

Rubric B (Evaluation of Comprehensive Exam) consists of 4 components, each with a maximum score of 3, resulting in a maximum evaluation score of 12.

Ph.D. Environmental & Evolutionary Biology

Rubric B: Evaluation of Comprehensive Examination.

Each faculty member on a student's committee is required to complete the following assessment as part of ongoing review of the Ph.D. program in Environmental and Evolutionary Biology.

Student name (please print) _____, Date _____, Semester _____

Evaluator's name (please print) _____, Evaluator's signature _____

Assessment of component:

Score each criterion below using the following scale:

1 – Does not meet expectations

2 – Meets expectations

3 – Exceeds expectations

NA – Not assessed

Criteria

Breadth of disciplinary knowledge

Is broad, general knowledge of the field of biology evident? Did the responses demonstrate understanding across hierarchical levels of biological organization as appropriate?

Score: _____

Depth of knowledge of specific research topic

Is there evidence that the student has expanded his/her expertise on the specific biological topics beyond what is provided in coursework? Is a firm grasp of relevant primary literature and current research needs/directions in this specific research area evident?

Score: _____

Ability to express information in writing

Are the written responses accurate and concise? Are responses well organized and presented logically? Are the grammar and writing style correct, succinct, and easy to understand? If figures or graphs were used, were they organized clearly and correctly formatted? Were figures and graphs, if used, correctly interpreted?

Score: _____

Ability to express information orally

Are responses to questions clear and understandable? Does the student handle questions well and in a professional manner?

Score: _____

Source of Evidence: Comprehensive/end-of-program subject matter exam

Committee member evaluations of Ph.D. student Comprehensive Exams in the Department of Biology

Source of Evidence: Comprehensive/end-of-program subject matter exam

Target:

Currently the goal is for 80% or more of Ph.D. students to pass their Comprehensive Exams successfully with a rubric score of at least 6 or higher.

Finding (2015-2016) - Target: Met

To provide meaningful numbers, we report cumulative data for the past five years. From AY 2011-12 through AY 2014-16, we met the target of 80% or more of Ph.D. students earning a rubric score of at least 6 or higher in the proposal defense: 100% of student (19 out of 19) who were assessed surpassed the target, with an average score of 7.1. We are currently working to increase participation in the assessment process.

Related Action Plans (by Established cycle, then alpha):**Curriculum expansion and enhancement**

We are working toward our ongoing, long-term goals of offering more 500/600-level courses for our graduate students, who have requested more courses at the 500 and 600 levels. Such courses will help them prepare better for comprehensive exams, research projects, theses/dissertations, and final defenses/exams, all of which are accomplishments that we assess. In addition, such courses will help our students more readily meet the program requirements for 500/600-level course credits.

Established in Cycle: 2012-2013

Implementation Status: Finished

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Comprehensive Exam | **Outcome/Objective:** Disciplinary Knowledge

Measure: Dissertation Defense | **Outcome/Objective:** Research Presentation

Measure: Dissertation Proposal | **Outcome/Objective:** Research Project Design

Implementation Description: In 2014-15, we offered new graduate course in Neurobiology (Biol 423G), Histology (434G, new as a senior and graduate-level course), Comparative Vertebrate Morphology (436G, new as a senior & graduate course), and Estuarine Ecology and Coastal Marine Biology (440G); at the 500 level, we offered a newly redesigned Statistical Ecology (575). In 2015-16, we offered new graduate courses in Neurobiology (424G, lab), and Fish Ecology & Management (446G).

Rubric Implementation

Implementation of revised rubrics; work to increase faculty compliance with assessment requirements

Established in Cycle: 2014-2015

Implementation Status: Finished

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Comprehensive Exam | **Outcome/Objective:** Disciplinary Knowledge

Measure: Dissertation Defense | **Outcome/Objective:** Research Presentation

Measure: Dissertation Proposal | **Outcome/Objective:**
Research Project Design

Curriculum enhancement

We are continuing to work on our long-term goals of offering more 500/600-level courses for our graduate students. Such courses will help them prepare better for comprehensive exams, research projects, theses/dissertations, and final defenses/exams, all of which are accomplishments that we assess.

Established in Cycle: 2015-2016

Implementation Status: In-Progress

Priority: Medium

Relationships (Measure | Outcome/Objective):

Measure: Comprehensive Exam | **Outcome/Objective:**
Disciplinary Knowledge

Measure: Dissertation Defense | **Outcome/Objective:**
Research Presentation

Measure: Dissertation Proposal | **Outcome/Objective:**
Research Project Design

SLO 3: Research Presentation

All doctoral candidates will have the skills necessary to analyze results and present them in oral and written formats associated with presentation and publication of original research in the area of the student's specialization.

Related Measures

M 3: Dissertation Defense

Each candidate's ability to analyze and synthesize data, and to present the results of research, is evaluated by a committee of faculty during the oral defense of the student's dissertation. The defense presentation is open to the public, and the audience may ask the student questions about the research. The committee evaluates the oral and written presentation of the dissertation research and asks candidates questions to evaluate their understanding of the nature of the research, as well as problems associated with the analysis and interpretation of data. The committee votes to determine if the student has passed or failed the defense. Committee members are encouraged to assess all students who defend their thesis.

The committee members (at least five faculty members) report their assessment using an evaluation rubric that was developed by the Department of Biology. As members of the student's committee, the raters are experts in the student's area of study and hence can provide accurate and reliable assessments. The assessment forms are submitted to a departmental Administrative Assistant, who compiles the data and provides anonymous data (i.e., that does not reveal the student or evaluator names) to the Graduate Coordinator for analysis and reporting.

Ph.D. Environmental & Evolutionary Biology

Rubric C: Evaluation of Thesis (written and oral defense).

Each faculty member on a student's committee is required to complete the following assessment as part of ongoing review of the Ph.D. program in Environmental and Evolutionary Biology.

Student name (please print) _____, Date _____, Semester _____

Evaluator's name (please print) _____, Evaluator's signature _____

Assessment of component:

Score each criterion below using the following scale:

1 – Does not meet expectations

2 – Meets expectations

3 – Exceeds expectations

NA – Not assessed

Criteria

Understanding of the research within the context of the discipline

Is the rationale for the research clearly stated within the framework of existing biological knowledge?

Score: _____

Depth of knowledge of specific research topic

Is a firm grasp of relevant primary literature in the specific research area evident? Does the research address a current data/knowledge gap in the specific field? Is the relevance of the research findings to the research field properly stated? Does the research make a significant contribution to the specific area of research and to biology in general?

Score: _____

Ability to design and analyze research experiments

Has the student stated concise hypotheses/research questions that are addressed by the proposed research? Are the experiments appropriate for addressing the research questions? Are the analyses appropriate? Are the conclusions justified/supported by the data?

Score: _____

Ability to express information in writing

Is the dissertation well written and logically organized? Are the grammar and writing style correct, succinct, and easy to understand? Are the questions, methods, and results clearly stated? Are the results properly discussed? Is the overall significance of the research findings evident?

Score: _____

Ability to express information orally

Is the presentation well organized and presented? Were the visual aids (figures, tables, etc.) well organized, labeled clearly and understandably, and easy to read? Did the student speak clearly and audibly, as well as engage the audience? Did the student respond well to questions?

Score: _____

Source of Evidence: Senior thesis or culminating major project

Committee member evaluations of student defense of Ph.D. dissertation in the Department of Biology

Source of Evidence: Senior thesis or culminating major project

Target:

Currently the goal is for 80% or more of Ph.D. students to defend their dissertations successfully with a rubric score of at least 10 or higher.

Finding (2015-2016) - Target: Met

To provide meaningful numbers, we report cumulative data for the past five years. From AY 2011-12 through AY 2014-16, we met the target of 80% or more of Ph.D. students earning a rubric score of at least 10 or higher in the proposal defense: 100% of students (21 out of 21) assessed surpassed the target, with an average score of 12.1. We are currently working to increase participation in the assessment process. Beyond our assessment data, we have been collecting data on the professional accomplishments and post-graduation employment outcomes of biology graduate students. We provide a summary of these findings below to supplement the regular assessment and to demonstrate the outstanding productivity and success of the biology graduate programs. In the calendar year 2015, biology graduate (MS & PhD combined) students at UL Lafayette published 14 papers in peer-reviewed journals, submitted 14 additional manuscripts for publication, and gave 61 presentations at off-campus conferences or seminars. We have

also assembled longer-term data on the employment outcomes of biology MS and PhD graduates. As of 2016 (the most recent year for which we have analyzed data), 99% of biology PhD graduates started post-graduate careers in biology. The large majority of our graduates stayed in academia, with a much smaller proportion (11%) obtaining a government position. Some graduates entered K-12 education, private industry, or non-governmental organizations. Of those graduates staying in academia, the majority started out as post-doctoral researchers. Another significant proportion was hired directly into Assistant Professor positions. Most of these were tenure-track positions, while some were appointments as non-tenure-track Research Assistant Professor. A slightly lower proportion of our graduates started as an Instructor or Lecturer at the college level. Among the graduates of our doctoral program who took their first position in government, positions included those at U.S. federal agencies (such as EPA, USDA, NOAA, NMFS, USGS, Smithsonian, Army Corps of Engineers, US Patent Office), state agencies (e.g., Washington State Department of Ecology), and agencies overseas (e.g., the National Aquarium of Taiwan). Finally, some of our graduates started their careers in private industry (e.g., CH2M Hill) or non-governmental organizations (e.g., The Nature Conservancy). Doctoral program graduates are working all over the world, including Australia, Brazil, China, Columbia, Ecuador, France, Germany, Kenya, New Zealand, Nigeria, Panama, South Korea, and Taiwan. Approximately 15% of our graduates work internationally. In the US, our graduates work in 30 states and Washington DC. We continue to collect data from additional years and will report new results as the data and analyses are updated in future years.

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

Curriculum expansion and enhancement

We are working toward our ongoing, long-term goals of offering more 500/600-level courses for our graduate students, who have requested more courses at the 500 and 600 levels. Such courses will help them prepare better for comprehensive exams, research projects, theses/dissertations, and final defenses/exams, all of which are accomplishments that we assess. In addition, such courses will help our students more readily meet the program requirements for 500/600-level course credits.

Established in Cycle: 2012-2013

Implementation Status: Finished

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Comprehensive Exam | **Outcome/Objective:** Disciplinary Knowledge

Measure: Dissertation Defense | **Outcome/Objective:** Research Presentation

Measure: Dissertation Proposal | **Outcome/Objective:** Research Project Design

Implementation Description: In 2014-15, we offered new graduate course in Neurobiology (Biol 423G), Histology (434G, new as a senior and graduate-level course), Comparative Vertebrate Morphology (436G, new as a senior & graduate course), and Estuarine Ecology and Coastal Marine Biology (440G); at the 500 level, we offered a newly redesigned Statistical Ecology (575). In 2015-16, we offered new graduate courses

in Neurobiology (424G, lab), and Fish Ecology & Management (446G).

Rubric Implementation

Implementation of revised rubrics; work to increase faculty compliance with assessment requirements

Established in Cycle: 2014-2015

Implementation Status: Finished

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Comprehensive Exam | **Outcome/Objective:** Disciplinary Knowledge

Measure: Dissertation Defense | **Outcome/Objective:** Research Presentation

Measure: Dissertation Proposal | **Outcome/Objective:** Research Project Design

Curriculum enhancement

We are continuing to work on our long-term goals of offering more 500/600-level courses for our graduate students. Such courses will help them prepare better for comprehensive exams, research projects, theses/dissertations, and final defenses/exams, all of which are accomplishments that we assess.

Established in Cycle: 2015-2016

Implementation Status: In-Progress

Priority: Medium

Relationships (Measure | Outcome/Objective):

Measure: Comprehensive Exam | **Outcome/Objective:** Disciplinary Knowledge

Measure: Dissertation Defense | **Outcome/Objective:** Research Presentation

Measure: Dissertation Proposal | **Outcome/Objective:** Research Project Design

Analysis Questions and Analysis Answers

How were assessment results shared and evaluated within the unit?

Our assessment results are summarized at departmental faculty meetings. Other accomplishments, such as publications, conference presentations, grants, and awards, are shared with the entire department by e-mail. An updated report on the job-placement success of our graduates is available on the departmental web site.

Identify which action plans [created in prior cycle(s)] were implemented in this current cycle. For each of these implemented plans, were there any measurable or perceivable effects? How, if at all, did the findings appear to be affected by the implemented action plan?

As we note for other questions in the Achievement Summary, the biology graduate programs are already very strong, with students making good progress, presenting results at conferences, publishing, and finding employment. Our action plans for most years have been to continue our regular assessments, with occasional revisions of the assessment rubrics to reflect changes in program options and requirements. We have also been responsive to our students' requests for more graduate courses, particularly at the 500/600 level, and we continue to expand our graduate course

offerings; the new courses will increase both the breadth and depth of our graduate training, both of which are critical parts of our assessments, and will increase our ability to tailor graduate training to the needs of students in particular fields within biology. Our slow accumulation of assessment data and the strong assessment results thus far have indicated no need to improve our training of graduate students every year. Therefore, as expected, we see little need for year-to-year changes in our action plans.

What has the unit learned from the current assessment cycle? What is working well, and what is working less well in achieving desired outcomes?

Working well: student progress and accomplishments (passing proposal defenses, comprehensive exams, and final defenses), times to degrees, professional development (publications, conference presentations, grants, awards), and success in job placement. Not working as well: faculty compliance with assessment requirements, time spent on assessments and reports, the unrealistic expectation of yearly changes and improvements in assessments. Because not all faculty members participate in the assessments and the numbers of students in our graduate programs are small to moderate, we only slowly acquire data that would indicate issues with our programs; a longer assessment cycle would help alleviate these limitations.

We continue to seek new approaches for increasing faculty compliance with assessments. Increased compliance should help us obtain useful sample sizes more quickly than has been possible in the past. One of the challenges in a broad-based graduate program is that there is no core knowledge that can be expected of all students. For example, we have been developing new graduate courses that should help provide additional training in several areas. However, because specialized training is provided to each graduate student, and most students take only a limited proportion of our courses, steps like adding new courses are unlikely to affect average assessment outcomes in measurable ways. In small and medium-sized graduate programs such as ours, few graduate students complete the assessed activities in any given year, which makes it necessary to accumulate data over several years in order to obtain meaningful results. If positive effects are to be observed, changes in average scores will be small and thus will require large sample sizes accumulated over an evaluation period of several years. For these reasons, it is impossible to expect to make meaningful changes to our assessments every year, and it is unrealistic to expect improved outcomes every year or a single year after a new practice is implemented. In spite of the small sample sizes of our assessments, the assessments as well as other metrics indicate that our graduate programs are in very good shape. We have received feedback from the administration indicating that the biology graduate programs are among the best on campus. Furthermore, average times to completion are lower than the national average for biology, and biology graduate students regularly publish research papers, present research at national and international conferences, and get hired into jobs in their fields of interest. These accomplishments have been steady for many years, indicating that our graduate programs function well. Similarly, our assessment data for the past several years indicate no major or ongoing weaknesses in graduate student training that need improvement. Nevertheless, we are constantly seeking ways to improve our programs. If the assessment outcomes should change as our sample size grows, then we will make any necessary improvements.