

# University of Louisiana at Lafayette

## Detailed Assessment Report 2015-2016 Biology MS

As of: 11/02/2016 02:03 PM CENTRAL

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

### Mission / Purpose

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The Department of Biology aims to advance scientific knowledge through extensive teaching and research. The graduate program endeavors to train future scientists and scholars in biology through advanced course work and research. Graduate degrees include the Master of Science in biology and Doctor of Philosophy in Environmental and Evolutionary Biology.

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

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#### **SLO 1: Understanding of Research Methods, Analyses, and Results**

All candidates in the M.S. Program will have the skills and knowledge necessary to understand research methods and results related to the area of the student's specialization. Students in M.S. Program may choose the thesis track involving the design and completion of research project and written thesis, or the non-thesis track involving extensive advanced course work and both written and oral exams beyond those in regular courses.

#### Related Measures

##### **M 1: Thesis Proposal Defense (thesis track) or Comprehensive Exam (non-thesis track)**

Each student's ability to understand research methods and results is evaluated by a committee of at least three faculty members. Thesis-track M.S. students are evaluated during the oral defense of the student's written thesis proposal; non-thesis M.S. students are evaluated through a written comprehensive exam. Committee members are encouraged to assess all students at these stages of study. The committee evaluates the student's writing and asks questions to assess the student's understanding of theory, methods, and research results in his/her field. The committee votes to determine if the student has passed or failed the proposal defense or written comprehensive exam.

The committee members report their assessments 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. We attempt to obtain a complete sample of students taking the exam during each assessment period.

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

M.S. in Biology, Rubric A (thesis track): Evaluation of Thesis Proposal

Each faculty member on a student's committee is required to complete the following assessment as part of the Biology Department's on-going review of the M.S. Program.

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?

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: Committee member evaluations from student defenses of M.S. thesis proposals in the Department of Biology

**Non-thesis Rubric A** (Evaluation of Written Comprehensive Examination) consists of 3 components, each with a maximum score of 3, resulting in a maximum evaluation score of 9, which is scaled up to 12 for analysis to be equivalent to scores for the thesis track.

Non-thesis M.S. in Biology, Rubric A: Evaluation of Written Comprehensive Examination.

Each faculty member who evaluates the student is required to complete the following assessment as part of the Biology Department's on-going review of the non-thesis track of the M.S. Program.

Student name (please print) \_\_\_\_\_, Date \_\_\_\_\_, Semester \_\_\_\_\_

\_\_\_\_\_  
Evaluator's name (please print) \_\_\_\_\_, Evaluator's signature  
\_\_\_\_\_

Assessment of component:

Score each criterion 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 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: \_\_\_\_\_

Source of Evidence: Committee member evaluations of non-thesis M.S.

## student Comprehensive Exams in the Department of Biology

Source of Evidence: Senior thesis or culminating major project

**Target:**

Currently the goal is considered achieved if 80% or more students pass the exam. Beginning in Fall 2010, the goal will be considered achieved if at least 80% of the students assessed score 8 or better.

**Finding (2015-2016) - Target: Met**

To provide meaningful numbers, we report cumulative data for the past five years. From AY 2011-12 through 2015-16, we met the target of 80% or more of M.S. students earning a rubric score of at least 8 or higher in the proposal defense or comprehensive exam: 94.1% (16 out of 17) of students who were assessed surpassed the target, with an average score of 9.9. We are still considering additional revisions to make the results for thesis-track and non-thesis-track M.S. students more comparable to one another, and perhaps to allow pre- and post-event comparisons. In addition to these possible revisions and to accumulating sufficient data for analysis, we are currently working to increase participation in the assessment process. Independently of our assessment data, we have also 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), 93% of biology MS graduates started careers in science following graduation and most continued as doctoral students; a substantial proportion took jobs as field and laboratory technicians or took positions in federal or state agencies. 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. 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:** Thesis Defense (thesis track) or Final Oral Exam (non-thesis track) | **Outcome/Objective:** Evaluation of Research and Presentation Skills

**Measure:** Thesis Proposal Defense (thesis track) or

Comprehensive Exam (non-thesis track) |

**Outcome/Objective:** Understanding of Research Methods, Analyses, and Results

**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

**Established in Cycle:** 2014-2015

**Implementation Status:** Finished

**Priority:** High

**Relationships (Measure | Outcome/Objective):**

**Measure:** Thesis Defense (thesis track) or Final Oral Exam (non-thesis track) | **Outcome/Objective:** Evaluation of Research and Presentation Skills

**Measure:** Thesis Proposal Defense (thesis track) or Comprehensive Exam (non-thesis track) |

**Outcome/Objective:** Understanding of Research Methods, Analyses, and Results

### Rubric Revision

Further revise assessments for thesis and non-thesis MS programs to have comparable total scores, so that they don't need to be scaled to a common total score

**Established in Cycle:** 2014-2015

**Implementation Status:** In-Progress

**Priority:** Medium

**Relationships (Measure | Outcome/Objective):**

**Measure:** Thesis Defense (thesis track) or Final Oral Exam (non-thesis track) | **Outcome/Objective:** Evaluation of Research and Presentation Skills

**Measure:** Thesis Proposal Defense (thesis track) or Comprehensive Exam (non-thesis track) |

**Outcome/Objective:** Understanding of Research Methods, Analyses, and Results

### 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:** Thesis Defense (thesis track) or Final Oral Exam (non-thesis track) | **Outcome/Objective:** Evaluation of Research and Presentation Skills

**Measure:** Thesis Proposal Defense (thesis track) or Comprehensive Exam (non-thesis track) |

**Outcome/Objective:** Understanding of Research Methods, Analyses, and Results

**Implementation Description:** Whenever possible, and particularly after we hire new faculty members, we revise or develop new courses at the graduate level.

### **SLO 3: Evaluation of Research and Presentation Skills**

All candidates in the M.S. program will have the skills necessary to evaluate and orally discuss research results in the student's field.

#### Related Measures

##### **M 3: Thesis Defense (thesis track) or Final Oral Exam (non-thesis track)**

Each candidate's ability to critically evaluate and discuss the results of research is evaluated by a committee of at least three faculty members. Thesis-track M.S. students are evaluated during the oral defense of the student's written thesis; non-thesis M.S. students are evaluated through a final oral exam. The committee evaluates the student's work and asks questions to assess the breadth and depth of the student's knowledge, including his/her ability to critically evaluate and discuss the nature of the research, analyses, and interpretation of data. The committee votes to determine if the student has passed or failed. Committee members are encouraged to assess all students who defend a thesis or take the final oral comprehensive exam.

The committee members assess the students' performance and 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.

**Thesis-track Rubric B** (Evaluation of Thesis [written and oral defense]) consists of 5 components, each with a maximum score of 3, resulting in a maximum evaluation score of 15.

M.S. Biology Rubric C: Evaluation of Thesis (written and oral defense of master's thesis).

Each faculty member on a student's committee is required to complete the following assessment as part of the Biology Department's on-going review of the M.S. Program.

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 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?

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 thesis well written and organized in a logical fashion? 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: Committee member evaluations of student defense of M.S. thesis in the Department of Biology

**Non-thesis-track Rubric B** (Evaluation of Non-Thesis Master's Final Exam) consists of 3 components, each with a maximum score of 3, resulting in a maximum evaluation score of 9, which is scaled up to 15 for analysis to be equivalent to scores for the thesis track.

Non-thesis M.S. Biology Rubric B: Evaluation of Non-Thesis Master's Final Exam.

Each faculty member who evaluates the student is required to complete the following assessment as part of the Biology Department's on-going review of the non-thesis track of the M.S. Program.

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

Did the student demonstrate a broad, general knowledge of biology?

Score: \_\_\_\_\_

Depth of knowledge of field

Does the student have a thorough understanding—appropriate for a master’s level graduate—of key concepts, principles, and findings in the fields represented by his/her graduate course work?

Score: \_\_\_\_\_

Ability to express information orally

Were the student’s responses to questions clear and understandable?  
Did the student handle questions well and in a professional manner?

Score: \_\_\_\_\_

Source of Evidence: Senior thesis or culminating major project

**Target:**

Currently the goal is for 80% or more of M.S. students to defend their theses 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 2015-16, we met the target of 80% or more of M.S. students earning a rubric score of at least 10 or higher in the thesis defense (thesis track) or final oral exam (non-thesis track): 81.8% (18 out of 22) of students who were assessed surpassed the target, with an average score of 10.7. We are still considering additional revisions to make the results

for thesis-track and non-thesis-track M.S. students more comparable to one another, and perhaps to allow pre- and post-event comparisons. In addition to these possible revisions and to accumulating sufficient data for analysis, 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. 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:** Thesis Defense (thesis track) or Final Oral Exam (non-thesis track) | **Outcome/Objective:** Evaluation of Research and Presentation Skills

**Measure:** Thesis Proposal Defense (thesis track) or Comprehensive Exam (non-thesis track) |

**Outcome/Objective:** Understanding of Research Methods, Analyses, and Results

**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**

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**Established in Cycle:** 2014-2015

**Implementation Status:** Finished

**Priority:** High

#### **Relationships (Measure | Outcome/Objective):**

**Measure:** Thesis Defense (thesis track) or Final Oral Exam (non-thesis track) | **Outcome/Objective:** Evaluation of Research and Presentation Skills

**Measure:** Thesis Proposal Defense (thesis track) or Comprehensive Exam (non-thesis track) |

**Outcome/Objective:** Understanding of Research Methods, Analyses, and Results

#### **Rubric Revision**

Further revise assessments for thesis and non-thesis MS programs to have comparable total scores, so that they don't need to be scaled to a common total score

**Established in Cycle:** 2014-2015

**Implementation Status:** In-Progress

**Priority:** Medium

**Relationships (Measure | Outcome/Objective):**

**Measure:** Thesis Defense (thesis track) or Final Oral Exam (non-thesis track) | **Outcome/Objective:** Evaluation of Research and Presentation Skills

**Measure:** Thesis Proposal Defense (thesis track) or Comprehensive Exam (non-thesis track) |

**Outcome/Objective:** Understanding of Research Methods, Analyses, and Results

**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:** Thesis Defense (thesis track) or Final Oral Exam (non-thesis track) | **Outcome/Objective:** Evaluation of Research and Presentation Skills

**Measure:** Thesis Proposal Defense (thesis track) or Comprehensive Exam (non-thesis track) |

**Outcome/Objective:** Understanding of Research Methods, Analyses, and Results

**Implementation Description:** Whenever possible, and particularly after we hire new faculty members, we revise or develop new courses at the graduate level.

## **Analysis Questions and Analysis Answers**

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**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?**

We are still revising our assessments for the non-thesis track of our MS program, which is necessary for making our analysis of assessment data consistent across the two tracks of the MS program. The effects are unlikely to change our outcomes, but instead will simplify the analysis and reporting of our assessment data. 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.

**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, the unrealistic expectation of yearly changes to assessments and yearly improvements. 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.

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 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, 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 very 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.