WSU Ph.D. Biological Sciences
2020-2021 Assessment Plan

Mission Statement

The PhD in Biological Sciences program's mission is to prepare students to develop into independent, creative biological scientists. Our program is uncommon in providing students exposure to a remarkable breadth of research disciplines including ecology, evolutionary biology, cell biology, neurobiology, developmental biology, microbiology, and gene regulation. This program provides students the opportunity to specialize while continually being exposed to research in the broader fields of biological sciences. Students are trained in formal coursework and are transitioned into active, innovative, and original research. Students are also trained in verbal and written scientific presentations skills that are necessary for reporting and presenting research results.

Ph.D. in Biological Sciences Program Outcomes

Students successfully completing the WSU Ph.D. in Biological Sciences should be able to:

1. Demonstrate a strong understanding of current state of knowledge in their chosen fields;
2. Show proficiency in general experimental design for experiments in their fields;
3. Demonstrate independence in the execution and trouble-shooting of experimental programs;
4. Keep current with published literature to identify significant gaps in the current arena of knowledge in their specific disciplines;
5. Propose testable hypotheses and develop novel experimental designs to test those hypotheses;
6. Present research work in written and oral forms as is common and appropriate for their fields of research; and
7. Become independent researchers in Biological Sciences.

2020-2021 Assessment Learning Outcomes

For the 2020-21 assessment, the following learning outcomes will be utilized:

1. Students will demonstrate mastery of their biological field evidenced by broad understanding and connectivity of the broader field and by bringing new knowledge and insights;
2. Students will demonstrate mastery of research design and methods;
3. Students will demonstrate mastery of communication evidenced by giving professional and compelling presentations and manuscripts;
4. Students will demonstrate mastery of their own research evidenced by an ability to answer questions skillfully, showing deep insight of their work, and projection of future directions in the field.

Assessment 1 – Mastery of Field

Learning Outcome
Students will demonstrate mastery of their biological field evidenced by broad understanding and connectivity of the broader field and by bringing new knowledge and insights.

Data Sources
Following defense of the dissertation, each member of the dissertation committee will score the student's mastery of the field using an established rubric (see next page).

Data Gathering and Timeline
Committee surveys will be distributed and completed within 10 days of the dissertation defense. Each student completing a dissertation defense will be evaluated individually using the scores of their committee members and the percent of students meeting the minimum criteria reported.

Data Evaluation
Two questions on the survey will cover this learning outcome; "Mastery of Field" and "Mastery of Current Literature in Field." Survey responses will be scored as follows: Outstanding = 4, Very Good = 3, Acceptable = 2, Unsatisfactory = 1. Scores will be added across the respondents and reported as a mean value for each student. The percent of students meeting the minimum criteria will be reported.

Criteria for Acceptable Performance
90% of students completing their dissertation will score a minimum of 3.0 for the Mastery of Field and Mastery of Current Literature in Field questions on the dissertation committee survey.

Assessment 2 – Mastery of Research Design and Methods

Learning Outcome
Students will demonstrate mastery of research design and methods.

Data Sources
Following defense of the dissertation, each member of the dissertation committee will score the student's mastery of the field using an established rubric.

Data Gathering and Timeline
Committee surveys will be distributed and completed within 10 days of the dissertation defense. Each student completing a dissertation defense will be evaluated individually using the scores of their committee members and the percent of students meeting the minimum criteria reported.

Data Evaluation
Two questions on the survey will cover this objective; "Mastery of Research Design" and "Mastery of Research Design and Execution." Survey responses will be scored as follows: Outstanding = 4, Very Good = 3, Acceptable = 2, Unsatisfactory = 1. Scores will be added across the respondents and reported as a mean value for each student. The percent of students meeting the minimum criteria will be reported.

Criteria for Acceptable Performance
90% of students completing their dissertation will score a minimum of 3.0 for the Mastery of Research Design and Mastery of Research Design and Execution questions on the dissertation committee survey.

Department of Biological Sciences PhD Dissertation Committee Survey

Learning Outcome	Outstanding	Very Good	Acceptable	Unsatisfactory
Mastery of Field	Demonstrates mastery of relevant literature and critical insights	Shows broad knowledge of relevant literature	Shows limited but adequate knowledge of field	Shows lack of knowledge or misunderstanding
Mastery of Research Design and Methods	Demonstrates mastery of design and methods	Demonstrates technical competency and troubleshooting	Demonstrates adequate technical competency	Demonstrates inadequate design, inappropriate or incorrect methods
Mastery of Communication	Presents a professional and compelling presentation	Presents a professional and polished presentation	Presents a good presentation	Poor presentation, organization and/or communication
Mastery of Work	Answers questions skillfully, shows deep insight, projects future direction of the field	Answers questions well and appreciates next steps	Answers questions adequately. Shows professionalism.	Inability to answer questions with authority or answers incorrectly.
Mastery of Research Design and Execution	Independently designs and troubleshoots problem. Independently identifies appropriate experimental approaches.	Develops designs and works out problems with some initial consultations	Understands and follows designs well. Adequately works out trivial problems and understands and contributes to work-arounds.	Does not demonstrate a solid understanding of design. Execution is impeded by inadequate attention to detail or understanding.
Mastery of Current Literature in Field	Demonstrates broad understanding and connectivity of broader field. Brings new knowledge and insight.	Demonstrates good understanding of field and can identify seminal advances when they occur.	Shows solid understanding of articles in the field when in discussions.	Is unsure of the current background, and does not see the broader connectivity.
Mastery of Written Communication	Clearly states the goal of the research and establishes its contribution to and important, identifiable gap in the field. Presents and explains research design and results in a compelling and clear manner. Discusses results in relation to the current knowledge and highlights its contributions.	Establishes the goals of the work and reviews the relevant literature. Fully presents research design and results so that they can be understood and replicated. Discussion puts the work in the full context of the field.	Adequate introduction with relevant literature review and clear statement of research questions. Adequate account of methods. Clear presentation of results. Adequate explanation of results in context.	Poor statement of purpose of work. Unclear statement of relevance to field. Inadequate presentation of methods and poor presentation of results. Discussion repeats results without relationship to current knowledge in field.

Assessment 3 – Mastery of Communication

Learning Outcome
Students will demonstrate mastery of communication evidenced by giving professional and compelling presentations and manuscripts.

Data Sources
Following defense of the dissertation, each member of the dissertation committee will score the student's mastery of the field using an established rubric. In addition, an exit survey will be given to each student (see next page) following the defense that summarizes the number of national or regional conferences attended, the number of posters or oral presentations given, and the number of publications submitted or accepted in peer-reviewed journals.

Data Gathering and Timeline
Both committee and student surveys will be distributed and completed within 10 days of the dissertation defense. Each student completing a dissertation defense will be evaluated individually using the scores of their committee members and the values they report in their exit surveys. The percent of students meeting the minimum criteria will be reported.

Data Evaluation
Two questions on the survey will cover this objective; "Mastery of Communication" and "Mastery of Written Communication." Survey responses will be scored as follows: Outstanding = 4, Very Good = 3, Acceptable = 2, Unsatisfactory = 1. Scores will be added across the respondents and reported as a mean value for each student. The percent of students meeting the minimum criteria will be reported.

The number of publications submitted or accepted in peer-reviewed journals will be gathered for each student using the student exit surveys, and the percent of students meeting the minimum criteria will be reported.

Criteria for Acceptable Performance
90% of students completing their dissertation will score a minimum of 3.0 for the Mastery of Communication and Mastery of Written Communication questions on the dissertation committee survey.

90% of PhD students completing their dissertation will have done each of the following:

a. Attended a minimum of two regional or national meetings;
b. Presented a minimum of three poster or oral presentations; and
c. Published or submitted a minimum of two peer-reviewed journal articles as the first author.

Department of Biological Sciences PhD Student Exit Survey

1 How many semesters did it take to complete your degree? (include spring/summer semesters.)

2 At the time of your dissertation defense, how many peer-reviewed publications have been:

Accepted

Submitted

3 How many national or regional conferences have you attended?

Number of posters presented

Number of oral presentations given

4 Have you had experience mentoring/teaching undergraduates in a:

Classroom/class laboratory setting

Research lab setting

5 Are you continuing onto another education program after graduation?

Higher science degree

Professional degree in science or health

Higher degree not related to current degree

6 Do you intend to work after graduation?

Are you still looking/interviewing

Do you already have a job lined up?

7 Does the job or target job rely on skills that you have acquired in your PhD program?

Assessment 4 – Mastery of Work

Learning Outcome
Students will demonstrate mastery of their own research evidenced by an ability to answer questions skillfully, showing deep insight of their work, and projection of future directions in the field.

Data Sources
Following defense of the dissertation, each member of the dissertation committee will score the student's mastery of the field using an established rubric.

Data Gathering and Timeline
Committee surveys will be distributed and completed within 10 days of the dissertation defense. Each student completing a dissertation defense will be evaluated individually using the scores of their committee members and the percent of students meeting the minimum criteria reported.

Data Evaluation
One question on the survey will cover this objective; "Mastery of Work". Survey responses will be scored as follows: Outstanding = 4, Very Good = 3, Acceptable = 2, Unsatisfactory = 1. Scores will be added across the respondents and reported as a mean value for each student. The percent of students meeting the minimum criteria will be reported.

Criteria for Acceptable Performance
90% of students completing their dissertation will score a minimum of 3.0 for the Mastery of Work question on the dissertation committee survey.