

Degree: Master of Science in Biology
2023-2024 Assessment Plan

	Student Learning Outcome #1	Graded Exam Question/Problem: Graduate students will demonstrate an in-depth knowledge of the fundamental principles of Biology learned in graduate courses.
PLAN	Assessment Method(s)	<p>Graduate students will take a comprehensive written exam in the graduate level course. The examination question will be written by the instructor of record for the course. The embedded question will be evaluated using a rubric.</p> <p>Levels of proficiency:</p> <p>Level # 4 - Excellent: Student can write and develop the information in a clear logical fashion. Student answers the question asked. Answer is thorough and incorporates relevant information. Student includes all relevant information from lecture and text and applies learned information correctly.</p> <p>Level # 3 - Good: Student can write and develop the information in a clear logical fashion. Student answers question asked. Answer incorporates relevant information; however, one or more pertinent facts/observations/ideas are omitted.</p> <p>Level # 2 - Marginal: Student does not write in a clear logical form. Ideas are present but not organized into a meaningful development of topic. Facts are incorporated in a disorganized fashion. Information is missing from the discussion, and irrelevant information is included. Does not appear that the student really understands but knows information from lecture and is hoping it is relevant.</p> <p>Level # 1 -Poor: Illogical assemblage of facts and misinformation. Student does not truly answer the questions, and only includes information that has limited applicability.</p>

	Proficiency	The desired level of performance will be a mean of 3.0 and above on a four-point scale. This level of performance was chosen because it represents adequate level of training, based on the rubrics, for a person obtaining a master's degree in science.
DO	Benchmark	This level of performance was chosen because it represents adequate level of training, based on the rubrics, for a person obtaining a master's degree in science.
	Results of Assessment	<p>The overall mean on the rubric for this outcome was 3.9 ± 0.308 (mean \pm sd, n = 5).</p> <p>Questions:</p> <p>Did student answer the question asked? 4.0 ± 0.0</p> <p>Is the information written in a logical and organized manner? 3.8 ± 0.447</p> <p>Is the information complete, correct, and terminology of the discipline used in the appropriate manner? 3.8 ± 0.447</p> <p>Does the student exhibit full comprehension of the biological principles asked by the question? 4.0 ± 0.00</p>
S T U D Y	Analysis of Results	<p>Assessment was performed in three courses: Medical Microbiology, Immunology, and Molecular Biology.</p> <p>The desired level of performance was exceeded.</p> <p>A fundamental ability of an educated person is to take information learned and apply that information to new or novel situations. Understanding the fundamental principles of biology will enable our graduates to develop a biological intuition that will enable them to apply their knowledge and insight to understand problems that they will encounter in the future.</p>

ACT	Improvement Plan for 2024-2025	<p>To improve graduate students' written communications skills, we plan to:</p> <ul style="list-style-type: none"> • Encourage more graduate faculty to incorporate embedded questions into their comprehensive written exams. With only a sample size of 5, we are not getting a full comprehensive survey of our graduate student's knowledge and understanding of biological principles.
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	Student Learning Outcome #2	Writing Biological research papers: Graduate students will demonstrate the ability to apply the scientific method and scientific reasoning when writing biological research papers or proposals in graduate classes that require research papers and for those students writing a master's thesis
PLAN	Assessment Method(s)	<p>A numeric value (1 to 4) corresponding to the level of performance will be assigned to each question on the scientific research report rubric. Scientific research reports and proposals assigned in graduate courses will be used in the assessment. Mean and standard deviations for each rubric metric will be calculated, as will the mean and standard deviation of each report section and overall report scores.</p> <p>Levels of proficiency:</p> <p>Level # 4 - Excellent: Student followed all instructions. Student demonstrated the ability to develop the information in a clear logical fashion. Student was able to draw conclusions from the data and tie those conclusions to ideas presented in the literature.</p> <p>Level # 3 - Good: Student followed most instructions. Student demonstrated and inconsistent ability to develop the information in a clear logical fashion. Student was able to draw conclusions from the data and tie those conclusions to ideas presented in the literature.</p> <p>Level # 2 - Marginal: Student was inconsistent in their ability to follow instructions. Student demonstrated major deficiencies in their ability to develop the information in a clear logical fashion. Student was unable to draw conclusions from the data and tie those conclusions to ideas presented in the literature.</p> <p>Level #1 - Poor: Failure to comply with instructions. Student demonstrated an inability to develop the information in a clear logical fashion. Student did not draw conclusions from the data and tie those conclusions to ideas presented in the literature.</p>

	Proficiency	The desired level of performance will be a mean of 3 and above on a four-point scale.
DO	Benchmark	This level of performance was chosen because it represents adequate level of training, based on the rubrics, for a person obtaining a master's degree in science.
	Results of Assessment	<p>The overall mean for the 10 dimensions on the rubric was at 3.48 ± 0.80 (mean \pm sd, n = 11) which is above the desired level of performance.</p> <p>Questions:</p> <p>Are there the required number of pages, double-spaced pages of text not including figures and tables and literature cited? Mean = 3.18 ± 0.87</p> <p>Is the writing style consistent with scientific writing and is terminology used appropriately? Mean = 3.45 ± 0.93</p> <p>Are numbers and scientific names written in the proper format? Mean = 3.54 ± 0.69</p> <p>Is there a clear thesis statement/statement of purpose or hypothesis and objectives? Mean = 3.55 ± 0.69</p> <p>Is the paper logically organized and are there logical transitions between topics? Mean = 3.55 ± 0.94</p> <p>Is there a comparison and synthesis of different ideas? Mean = 3.45 ± 0.82</p> <p>Does the review of the literature support the body of the paper? If a proposal are the methods appropriate? Mean = 3.72 ± 0.90</p> <p>Are the citations in the proper format in the text and literature cited? Mean = 3.40 ± 0.70</p> <p>Are there at least ten citations from the primary literature? Mean = 3.93 ± 0.81</p>

		<p>If tables and figures are used, are tables and figures formatted correctly, appropriately labeled, and referred to in the text? Mean = 3.00 ± 0.82</p>
S T U D Y	Analysis of Results	<p>Assessment was performed in seven courses: Vertebrate Natural History, Conservation Biology, Cell Biology, Parasitology, Embryology, Molecular Biology, and Immunology.</p> <p>The desired level of performance was exceeded.</p> <p>The scientific methods and scientific reasoning form the foundation of the pursuit knowledge in the modern world. A biologist needs to be able to utilize the scientific methods to develop experiments designed to answer specific hypotheses. Data resulting from the experiments then needs to be statistically, logically, and objectively evaluated. No research is then complete until it has been presented to the scientific community in written form.</p> <p>While the overall performance score was above the desired level of performance, the students struggled in specific areas, such as the incorporating tables and figures into the report and formatting issues.</p>

ACT	Improvement Plan for 2024-2025	<p>To improve graduate students' written communications skills, we plan to:</p> <ul style="list-style-type: none">• Encourage graduate faculty to teach graduate students how to develop scientific papers, including going over the structure of scientific papers and how to interpret and integrate tables and graphs. This will first be integrated into the Fall 2024 Ecology course
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	Student Learning Outcome #3	Oral communication of primary literature: Students will prepare an oral presentation as part of BIOL 5110 Graduate Seminar and other courses.
PLAN	Assessment Method(s)	<p>Oral presentations based on primary literature review will be assigned in the Graduate Seminar (BIOL 5110) course, which is offered during both fall and spring semesters (as well as other courses). The rubric below will be used to evaluate presentations and assess the outcome. Mean proficiency levels (\pm standard deviation) will be calculated for of each rubric metric of all presentations during the year; a mean of means will also be calculated.</p> <p>Level of proficiency:</p> <p>Level # 4 - Excellent: No deficiencies (excellent skills demonstrated).</p> <p>Level # 3 - Good: Minor deficiencies in literature organization and presentation skills (student was acceptably prepared for the oral presentation; has a near complete understanding of background issues, experimental design, and methods; only minor difficulty in understanding the results presented and their significance to the building of new scientific knowledge).</p> <p>Level # 2 - Marginal: Major deficiencies in literature organization and presentation skills (student is marginally prepared for the oral presentation; has only a basic understanding of background issues, experimental design, and methods; had difficulty understanding the poignant results presented and their significance to the building of new scientific knowledge).</p> <p>Level # 1 - Poor: Unacceptable literature organization and presentation skills (student is unprepared for the oral presentation; has little understanding of background issues, experimental design, and methods; does not understand the poignant results presented and their significance to the building of new scientific knowledge).</p>

	Proficiency	The desired level of performance will be a mean of 3 and above on a four-point scale.
DO	Benchmark	This level of performance was chosen because it represents adequate level of training, based on the rubrics, for a person obtaining a master's degree in science.
	Results of Assessment	<p>The overall mean for this outcome was 3.30 ± 0.89 (\pm sd, n = 8)</p> <p>Questions:</p> <p>Were the broad topic and pertinent sub-topics introduced? Mean = 3.50 ± 0.76</p> <p>Specific research objectives or hypothesis clearly stated? Mean = 3.63 ± 0.52</p> <p>Were the experimental design and methods presented and understood? Mean = 3.38 ± 0.91</p> <p>Were the significance of results understood and clearly communicated? Mean = 3.38 ± 0.74</p> <p>Were the conclusions of the paper summarized on the last slide? Mean = 3.13 ± 0.84</p> <p>Was the PowerPoint presentation visually attractive, easy to read, clear, and simple? Mean = 3.25 ± 1.17</p> <p>What was the quality of the presentation style? Mean = 2.88 ± 1.36</p> <p>Was the student able to answer questions? Mean = 3.25 ± 0.71</p>
S T U D Y	Analysis of Results	<p>Assessment was performed in 2 courses: both Graduate Seminars (Fall and Spring).</p> <p>The overall desired level of performance was exceeded.</p> <p>The ability to clear communicate is one of the primary tool skills of an educated person. Graduate students will be able to define a focused body of primary literature on a biological subject and synthesize the primary literature into an oral presentation that uses appropriate visual aids to communicate the “big picture” background on the focused research topic, the</p>

		<p>experimental design and methods used in a specific research investigation, the poignant results, and their relevance to understanding the conclusions and significance of the research.</p> <p>While the overall performance score was above the desired level of performance, the students struggled in specific areas, such as the quality of the presentation and conveying specific conclusions.</p>
ACT	Improvement Plan for 2024-2025	<p>To improve graduate students' oral communications skills, we plan to:</p> <ul style="list-style-type: none"> • Encourage graduate faculty to have graduate students give presentations in at least 2 more classes other than graduate seminar. This will provide additional opportunities for graduate students to speak in front of others. • In graduate seminar, have the faculty member teach the graduate students principles of a good presentation, specifically how to utilize good slides and how to present one's self in giving the presentation.