

M.S. Program in Biology

A. Masters Graduate Learning Objectives (GLOs)

Upon completion of a Masters in Biology, students are expected to:

1. Demonstrate proficiency in the subject matter (GLO1)
2. Demonstrate an ability to perform a research project (GLO2)
 - a) By applying existing methodologies and techniques
 - b) By critically analyzing and evaluating research data
3. Make an original contribution to the discipline (GLO3)
4. Demonstrate professional skills (GLO4)
 - a) Through effective written communication
 - b) Through effective oral communication
5. Practice responsible conduct of research (GLO5)

B. Assessment Points for Measuring Masters Graduate Learning Outcomes (GLOs)

The Department of Biology has three primary assessment areas for Masters Graduate Student Outcomes (Table 2).

Table 2: Assessing Masters Graduate Student Learning Outcomes

Assessment area for Graduate Student Learning Outcomes (GSLO)	M.S. Graduate Learning Objectives (GLO) addressed	Mechanisms
MA1) Graduate course grades, including successful completion of BI598 Graduate prospectus, BI599 Graduate grant writing, and BI520 Research ethics	GLO1, GLO4, GLO5	Via Banner reports. Standards: “more than one C” as deficient, “only one C” as marginal, “no grade <B” as satisfactory, “all A’s” as excellent
MA2) Research Prospectus	GLO1, GLO2, GLO3, GLO4, GLO5	Masters Research Prospectus Defense Form
MA3) Thesis and Defense	GLO1, GLO2, GLO3, GLO4, GLO5	Masters Thesis and Defense Form

B. Rubrics for Masters Evaluation

Graduate Learning Objective	Deficient	Marginal / Needs Improvement	Satisfactory	Excellent
(What is being assessed)				

<p>GLO1 - Demonstrates proficiency of the subject matter</p> <p>(Is proficient in existing knowledge.)</p>	<p>Does not understand basic concepts or conventions. Misinterprets or misuses sources.</p>	<p>Displays a basic understanding of the field.</p>	<p>Displays an understanding of the field. Adequate exploration of interesting issues and connections.</p>	<p>Demonstrates proficiency as well as creativity in drawing on multiple sources. Synthetic and interdisciplinary.</p>
<p>GLO2 - Demonstrates research skills</p> <p>(Applies existing methodologies and techniques.)</p> <p>(Critically analyzes and evaluate their own findings and those of others.)</p>	<p>Misapplies or uses non- standard techniques without adequate rationalization.</p>	<p>Applies standard techniques. Does not recognize limitations of data / techniques where applicable.</p>	<p>Uses appropriate, techniques. Appropriately explains limitations of data / techniques where applicable.</p>	<p>Suggests and utilizes improvements to standard techniques. Limitations are competently discussed.</p>
	<p>Does not recognize improbable results.</p>	<p>Relies on others to suggest data that are relevant to solving a problem. Literature review is adequate but not critically assessed.</p>	<p>Identifies weaknesses in own work but discussion is not comprehensive.</p>	<p>Provides critical evaluation of previous works. Identifies and corrects weaknesses or flaws in referenced work. Identifies and discusses shortcomings in own work.</p>
<p>GLO3 - Makes a contribution to the discipline</p> <p>(Thinks to develop concepts & methodologies.)</p>	<p>Question or problem is trivial, weak, or previously solved.</p>	<p>Demonstrates competence but work is a minor contribution. Displays little insight.</p>	<p>Argument is present with reasonable structure. Is connected to observations.</p>	<p>Argument is strong, comprehensive, and coherent. Has some original ideas, insights, and observations.</p>
<p>GLO4 - Demonstrates professional skills</p>	<p>Writing is disorganized, has frequent spelling and grammatical errors. Illustrations poorly selected or illegible.</p>	<p>Writing is adequate. Structure and organization are weak, but sufficient. Illustrations legible, technically correct, and appropriate.</p>	<p>Well written and organized.</p>	<p>Concise, elegant, engaging. Technical content and graphic design of illustrations well planned / executed.</p>

<p>(a. Displays effective written communication skills.)</p> <p>(b. Display effective oral communication skills.)</p>	<p>Disorganized or unable to articulate an argument. Does not grasp intent of questions.</p>	<p>Clear and coherent, partially understands or addresses questions, responses may have some gaps in logic or inconsistencies. Partial but inadequate.</p>	<p>Clear and coherent. Engages appropriate audiences. Grasps intent.</p>	<p>Compelling, persuasive, and accessible to multiple audiences. Articulately addresses questions.</p>
<p>GLO5 - Practice responsible conduct of research</p> <p>(Understand and abide by the principles of Responsible Conduct of Research (RCR))</p>	<p>Little knowledge and understanding of RCR and/or displays willingness to violate principles of RCR.</p>	<p>Knowledge and understanding of principles of RCR and/or displays tendency to violate principles of RCR unintentionally or through negligence.</p>	<p>Adequate knowledge and understanding of principles of RCR and abides by principles of RCR.</p>	<p>Thorough knowledge and understanding of principles of RCR and strives to promote RCR in his/her own research and the research of others.</p>

Ph.D. Program in Biology

A. Ph.D. Graduate Learning Objectives (GLOs)

Upon completion of a Ph.D. in Biology, students are expected to:

1. Demonstrate mastery of the subject matter (GLO1)
2. Demonstrate ability to design and execute a research project (GLO2)
 - a) By applying appropriate methodologies and techniques
 - b) By critically analyzing and evaluating research data
3. Make an original and substantial contribution to the discipline (GLO3)
4. Demonstrate professional skills (GLO4)
 - a) Through effective written communication
 - b) Through effective oral communication
5. Practice responsible conduct of research (GLO5)

B. Assessment Points for Measuring Ph.D. Graduate Learning Outcomes (GLOs)

The Department of Biology has four primary assessment areas for Ph.D. Graduate Student Outcomes (Table 1).

Table 1: Assessing Ph.D. Graduate Student Learning Outcomes

Assessment area for Graduate Student Learning Outcomes (GSLO)	Ph.D. Graduate Learning Objectives (GLO) addressed	Mechanisms
PA1) Graduate course grades, including successful completion of BI598 Graduate prospectus, BI599 Graduate grant writing, and BI520 Research ethics	GLO1, GLO4, GLO5	Via Banner reports. Standards: “more than one C” as deficient, “only one C” as marginal, “no grade <B” as satisfactory, “all A’s” as excellent
PA2) Qualifying Exam	GLO1, GLO4	Ph.D. Qualifying Exam Form
PA3) Research Prospectus	GLO1, GLO2, GLO3, GLO4, GLO5	Ph.D. Research Prospectus and Defense Form
PA4) Dissertation and Defense	GLO1, GLO2, GLO3, GLO4, GLO5	Ph.D. Dissertation and Defense Form

A. Rubrics for Ph.D. Evaluation

Graduate Learning Objective (GLO) (What is being assessed)	Unacceptable	Marginal / Needs Improvement	Satisfactory	Excellent
GLO1 - Demonstrates mastery of the subject matter (Synthesizes existing knowledge.)	Does not understand basic concepts or conventions. Misinterprets or misuses sources.	Displays a basic understanding of the field.	Displays a solid understanding of the field. Adequate exploration of interesting issues and connections.	Demonstrates thorough mastery as well as creativity in drawing on multiple sources. Synthetic and interdisciplinary. Demonstrates a deep understanding of relevant literatures

<p>GLO2 - Demonstrates advanced research skills</p> <p>(a. Mastered application of existing methodologies and techniques.)</p>	<p>Misapplies or uses non-standard techniques without adequate rationalization.</p>	<p>Applies standard techniques. Does not recognize limitations of data / techniques were applicable.</p>	<p>Uses appropriate, theory, methods and techniques. Appropriately explains limitations of data / techniques were applicable.</p>	<p>Suggests and utilizes improvements to standard methods and techniques. Limitations are thoroughly and competently discussed.</p>
	<p>Does not recognize improbable results.</p>	<p>Relies on others to suggest data that are relevant to solving a problem. Literature review is adequate but not critically assessed.</p>	<p>Identifies weaknesses in own work but discussion is not comprehensive.</p>	<p>Provides critical evaluation of previous works. Identifies and corrects weaknesses or flaws in referenced work. Identifies and discusses shortcomings in own work.</p>
<p>GLO3 - Make an original and substantial contribution to the discipline</p> <p>(Think originally and independently to develop concepts and methodologies)</p>	<p>No independent research. Question or problem is trivial, weak, unoriginal, or previously solved.</p>	<p>Demonstrates competence but is not very original or significant. Displays little creativity, imagination, or insight.</p>	<p>Argument is strong, comprehensive, and coherent. Has some original ideas, insights and observations.</p>	<p>Has a compelling question or problem. Project is original, ambitious, creative, and thoughtful. Asks or addresses new / important questions.</p>
<p>GLO4 - Demonstrates professional skills</p> <p>(a. Displays effective written communication skills.)</p>	<p>Writing is disorganized, has frequent spelling and grammatical errors. Illustrations poorly selected or illegible.</p>	<p>Writing is adequate. Structure and organization are weak, but sufficient. Illustrations legible, technically correct, and appropriate.</p>	<p>Well written and organized.</p>	<p>Concise, elegant, engaging. Technical content and graphic design of illustrations well planned / executed.</p>
	<p>Disorganized or unable to articulate an argument. Does not grasp intent of questions.</p>	<p>Clear and coherent, partially understands or addresses questions, responses may have some gaps in logic or inconsistencies.</p>	<p>Clear and coherent. Engages appropriate audiences. Grasps intent.</p>	<p>Compelling, persuasive, and accessible to multiple audiences. Articulately addresses questions.</p>

(b. Oral communication skills.)				
<p>GLO5 - Practice responsible conduct of research</p> <p>(Understand and abide by the principles of Responsible Conduct of Research (RCR))</p>	<p>Little knowledge and understanding of RCR and/or displays willingness to violate principles of RCR.</p>	<p>Partial but inadequate knowledge and understanding of principles of RCR and/or displays tendency to violate principles of RCR unintentionally or through negligence</p>	<p>Adequate knowledge and understanding of principles of RCR and abides by principles of RCR.</p>	<p>Thorough knowledge and understanding of principles of RCR and strives to promote RCR in his/her own research and the research of others.</p>