Graduate Student Learning Outcomes Assessment Plan

Biological Sciences
2018-19

I. PhD Program in Biological Sciences

A. PhD Graduate Learning Objectives (GLOs)

Upon completion of a PhD in Biological Sciences, students are expected to:

1. Demonstrate mastery of the subject matter (GLO1)

2. Demonstrate advanced research skills (for example, design and execute a research project) (GLO2)

    a) Master application of existing research methodologies and techniques

    b) Critically analyze and evaluate one's own findings and the findings of others

3. Make an original and substantial contribution to the discipline (GLO3)

4. Demonstrate professional skills (GLO4)

    a) Effective written communication skills

    b) Effective oral communication skills

5. Practice responsible conduct of research (GLO5)

B. Assessment Points for Measuring PhD Graduate Student Learning Outcomes (GSLOs)

The Department of Biological Sciences has four (4) key areas to assess Graduate Student Learning Outcomes (Table 1).

Table 1: Assessing Graduate Student Learning Outcomes

Assessment area for Graduate Student Learning Outcomes (GSLO) (a measure of student attainment of Graduate Learning Objectives)	PhD Graduate Learning Objectives (GLO) addressed	Notes
*Grades in graduate courses	GLO1	Data come from Banner reports; use, e.g., "more than one C" as deficient, "only one C" as marginal, "no grade <B" as satisfactory, "all A's" as excellent
Qualifying Exam	GLO1, GLO4	PhD Qualifying Exam Form
Research Proposal	GLO1, GLO2, GLO3, GLO4, GLO5	PhD Research Proposal and Defense Form
Dissertation and Defense	GLO1, GLO2, GLO3, GLO4, GLO5	PhD Dissertation and Defense Form

*Graded courses only

The PhD advisor will be responsible for filling out the forms and turning them over to the Departmental Coordinator.

II.   MS Program(s)

The Biological Sciences MS program consists of Plan a (thesis), Plan B (report) and Plan C (coursework) options.

1.   MS (thesis/Report)

A. Graduate Learning Objectives (GLOs)

The MS Graduate Learning Objectives of the MS thesis program are:

1. Demonstrate proficiency of the subject matter.
2. Demonstrate research skills, execute a research project.
    a) Apply existing research methodologies and techniques.
    b) Critically analyze and evaluate one's own findings and those of others.

3. Make a contribution to the discipline (MS thesis only).
4. Demonstrate professional skills.
    a) Effective oral communication skills.
    b) Effective written communication skills.
    c) Practice responsible conduct of research.

B)   **Assessment Points for Measuring MS Graduate Student Learning Outcomes (GSLOs)**

The Department has chosen three assessment points for students in the MS (thesis), and three assessment points for students in the MS (report) Programs. They are mapped to the four MS-GLOs as shown in Table 2.

Table 2: Assessing Graduate Student Learning Outcomes (MS-thesis/report)

Assessment Points for Graduate Student Learning Outcomes (GSLO) (a measure of student attainment of Graduate Learning Objectives)	MS Graduate Learning Objectives (GLO) addressed	Notes (form used for evaluation is described)
*Graduate Course Grades	GLO1	Data from BANNER reports; More than 1 C = deficient; one C = marginal; no grade <B = satisfactory; all A's excellent.
Thesis/Report	GLOs 1, 2, 3, 4 (thesis), GLOs 1,2, 4 (report)	MS Thesis/Report Defense Form
Defense	GLOs 1, 2, 3, 4	MS Thesis/Report Defense Form

*Graded courses only

    2.   MS (Coursework)

A)   **Graduate Learning Objectives (GLOs)**

The MS Graduate Learning Objectives of the MS (coursework) program are:

1. Demonstrate proficiency of the subject matter.
2. Knowledge of core competencies in selected, complementing areas of the discipline.
3. Demonstrate professional skills.
    a) Effective oral communication skills.
    b) Effective written communication skills.
4. Practice responsible conduct in the discipline

B) Assessment Points for Measuring MS Graduate Student Learning Outcomes (GSLOs) The Department has chosen three assessment points for students in the MS (coursework) Program. They are mapped to the four MS-GLOs as shown in Table 3.

Table 3: Assessing Graduate Student Learning Outcomes (MS-coursework)

Assessment Points for Graduate Student Learning Outcomes (GSLO) (a measure of student attainment of Graduate Learning Objectives)	MS Graduate Learning Objectives (GLO) addressed	Notes (form used for evaluation is described)
*Graduate Course Grades	GLO1, GLO2	Data from BANNER reports; More than 1 C = deficient; one C = marginal; no grade <B = satisfactory; all A's excellent.
Course Grades from BL5012 and BL 5051	GLO3	Data from BANNER reports; More than 1 C = deficient; one C = marginal; no grade <B = satisfactory; all A's excellent.
Final exam	GLO1, GLO2	MS Coursework Form
Course grade from BL5025 and BL5051	GLO4	Data from BANNER reports; More than 1 C = deficient; one C = marginal; no grade <B = satisfactory; all A's excellent.

*Graded courses only

The final exam is an oral exam administered by the Graduate Program Director. The MS committee and/or the advisor (Plans A and B) or the Graduate Program Director (Plan C) will be responsible for filling out the forms and turning them over to the Departmental Coordinator.

III. Rubrics and Evaluation Form

1. PhD

Graduate Learning Obj.	What is being assessed	Unacceptable	Marginal / Needs Improvement	Satisfactory	Excellent
1 - Demonstrates mastery of the subject matter	Synthesizes existing knowledge.	E.g. 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
2 - Demonstrates advanced research skills	Mastered application of existing methodologies and techniques.	E.g. Misapplies or uses non-standard techniques without adequate rationalization.	Applies standard techniques. Does not recognize limitations of data / techniques were applicable.	Uses appropriate, theory, methods and techniques. Appropriately explains limitations of data / techniques were applicable.	Suggests and utilizes improvements to standard methods and techniques. Limitations are thoroughly and competently discussed.
	Critically analyzes and evaluate their own findings and those of others.	E.g. Does not recognize improbable results.	Relies on others to suggest data that are relevant to solving a problem. Literature review is adequate but not critical.	Identifies weaknesses in own work but discussion is not comprehensive.	Provides critical evaluation of previous works. Identifies and corrects weaknesses or flaws in referenced work. Identifies and discusses shortcomings in own work.
3 - Make an original and substantial contribution to the discipline	Think originally & independently to develop concepts & methodologies; identify new opportunities.	E.g. No independent research. Question or problem is trivial, weak, unoriginal, or previously solved.	Demonstrates competence but is not very original or significant. Displays little creativity, imagination, or insight.	Argument is strong, comprehensive, and coherent. Has some original ideas, insights, and observations.	Has a compelling question or problem. Project is original, ambitious, creative, and thoughtful. Asks or addresses new / important questions.
4 - Demonstrates professional skills	Displays effective written communication skills.	E.g. Writing is disorganized, has frequent spelling and grammatical errors. Illustrations poorly selected or illegible.	Writing is adequate. Structure and organization are weak, but sufficient. Illustrations legible, technically correct, and appropriate.	Well written and organized.	Concise, elegant, engaging. Technical content and graphic design of illustrations well planned / executed.
	… Oral communication skills.	E.g. Disorganized or unable to articulate an argument. Does not grasp intent of questions.	Clear and coherent, partially understands or addresses questions, responses may have some gaps in logic or inconsistencies.	Clear & coherent. Engages appropriate audiences. Grasps intent.	Compelling, persuasive, and accessible to multiple audiences. Articulately addresses questions.
5. 5. Practice responsible conduct of research (field-appropriate)	Understand and abide by the principles of Responsible Conduct of Research (RCR).	Little knowledge and understanding of RCR and/or displays willingness to violate principles of RCR.	Partial but inadequate knowledge and understanding of principles of RCR and/or displays tendency to violate principles of RCR unintentionally or through negligence	Adequate knowledge and understanding of principles of RCR and abides by principles of RCR.	Thorough knowledge and understanding of principles of RCR and strives to promote RCR in his/her own research and the research of others.

2. MS Thesis/Report

Graduate Learning Objective	What is being assessed	Deficient	Marginal / Needs Improvement	Satisfactory	Excellent
1: Demonstrates proficiency of the subject matter	Is proficient in existing knowledge.	Does not understand basic concepts or conventions. Misinterprets or misuses sources.	Displays a basic understanding of the field.	Displays an understanding of the field. Adequate exploration of interesting issues and connections.	Demonstrates proficiency as well as creativity in drawing on multiple sources. Synthetic and interdisciplinary.
2: Demonstrates research skills	Applied existing methodologies and techniques.	Misapplies or uses non-standard techniques without adequate rationalization.	Applies standard techniques. Does not recognize limitations of data / techniques where applicable.	Uses appropriate, techniques. Appropriately explains limitations of data / techniques where applicable.	Suggests and utilizes improvements to standard techniques. Limitations are competently discussed.
	Critically analyzes and evaluate their own findings and those of others.	Does not recognize improbable results.	Relies on others to suggest data that are relevant to solving a problem. Literature review is adequate but not critical.	Identifies weaknesses in own work but discussion is not comprehensive.	Provides critical evaluation of previous works. Identifies and corrects weaknesses or flaws in referenced work. Identifies and discusses shortcomings in own work.
3: Make a contribution to the discipline (thesis only)	Thinks to develop concepts & methodologies; identify opportunities.	Question or problem is trivial, weak, or previously solved.	Demonstrates competence but is not much of a contribution. Displays little insight.	Argument is present with reasonable structure. Is connected to observations.	Argument is strong, comprehensive, and coherent. Has some original ideas, insights, and observations.
4: Demonstrates professional skills	Displays effective written communication skills.	Writing is disorganized, has frequent spelling and grammatical errors. Illustrations poorly selected or illegible.	Writing is adequate. Structure and organization are weak, but sufficient. Illustrations legible, technically correct, and appropriate.	Well written and organized.	Concise, elegant, engaging. Technical content and graphic design of illustrations well planned / executed.
	… Oral communication skills.	Disorganized or unable to articulate an argument. Does not grasp intent of questions.	Clear and coherent, partially understands or addresses questions, responses may have some gaps in logic or inconsistencies. Partial but inadequate.	Clear & coherent. Engages appropriate audiences. Grasps intent.	Compelling, persuasive, and accessible to multiple audiences. Articulately addresses questions.
	Understand and abide by the principles of Responsible Conduct of Research (RCR).	Little knowledge and understanding of RCR and/or displays willingness to violate principles of RCR.	knowledge and understanding of principles of RCR and/or displays tendency to violate principles of RCR unintentionally or through negligence.	Adequate knowledge and understanding of principles of RCR and abides by principles of RCR.	Thorough knowledge and understanding of principles of RCR and strives to promote RCR in his/her own research and the research of others.

3. MS Coursework

Graduate Learning Objective	What is being assessed	Deficient	Marginal / Needs Improvement	Satisfactory	Excellent
1: Demonstrates proficiency of the subject matter	Is proficient in existing knowledge.	Does not understand basic concepts or conventions. Misinterprets or misuses sources.	Displays a basic understanding of the field.	Displays an understanding of the field. Adequate exploration of interesting issues and connections.	Demonstrates proficiency as well as creativity in drawing on multiple sources. Synthetic and interdisciplinary.
2: Knowledge of core competencies in selected, complementing areas of the discipline.	Is proficient in core competencies.	Does not understand basic concepts of the core competencies.	Displays a basic understanding of the core competencies.	Displays an understanding of the core competencies.	Demonstrates proficiency in the core competencies.
3: Demonstrates professional skills	Displays effective written communication skills.	Writing is disorganized, has frequent spelling and grammatical errors. Illustrations poorly selected or illegible.	Writing is adequate. Structure and organization are weak, but sufficient. Illustrations legible, technically correct, and Appropriate.	Well written and organized.	Concise, elegant, engaging. Technical content and graphic design of illustrations well planned / executed.
	…oral communication skills.	Disorganized or unable to articulate an argument. Does not grasp intent of questions.	Clear and coherent, partially understands or addresses questions, responses may have some gaps in logic or inconsistencies through negligence.	Clear & coherent. Engages appropriate audiences. Grasps intent.	Compelling, persuasive, and accessible to multiple audiences. Articulately addresses questions.
4. Practice responsible conduct in the discipline	Understand and abide by the principles of Responsible Conduct within the discipline.	Little knowledge and understanding of academic integrity and/or displays willingness to violate principles of academic integrity.	Partial but inadequate knowledge and understanding of academic integrity and/or displays tendency to violate principles of academic integrity unintentionally or through negligence.	Adequate knowledge and understanding of principles of academic integrity and abides by principles of academic integrity.	Thorough knowledge and understanding of principles of academic integrity and strives to promote academic integrity.

IV.   Data Compilation Plan

The Departmental Graduate Committee will compile and review the graduate student learning outcomes data annually, compare graduate student learning outcomes from prior years to the current year, and compare student learning outcomes against the intended Graduate Learning Objectives. The committee will be responsible for preparing the annual assessment reports, which will be discussed during the Departmental retreat every year.

Information will be collected from the advisors (for PhD and MS thesis/report options) and Graduate Program Director (for MS coursework option), who will fill out the Graduate Students Outcome forms for each of the PhD/MS student they advise. The forms will be available on the Departmental website. The Department coordinator will be responsible for collecting and maintaining the records.

Graduate student outcomes data will be retained by the department, any personal references will be redacted. Access to this data may be requested by external reviewers.

PhD Student Outcome Results: GLO1, Mastery of the subject matter.	% satisfactory + excellent; including number of assessments (n)			
School Year:	2018-2019	2019-2020	2020-2021	2021-2022
Graduate course grades				
Qualifying Exam				
Research Proposal Exam				
Dissertation and Defense				
Comments				

PhD Student Outcome Results: GLO2, Advanced research skills.	% satisfactory + excellent; including number of assessments (n)			
School Year:	2018-2019	2019-2020	2020-2021	2021-2022
Research Proposal Exam				
Dissertation and Defense				
Comments				

PhD Student Outcome Results: GLO3, Contribution to the discipline.	% satisfactory + excellent; including number of assessments (n)			
School Year:	2018-2019	2019-2020	2020-2021	2021-2022
Research Proposal Exam				
Dissertation and Defense				
Comments				

PhD Student Outcome Results: GLO4, Professional skills.	% satisfactory + excellent; including number of assessments (n)			
School Year:	2018-2019	2019-2020	2020-2021	2021-2022
Research Proposal Exam				
Dissertation and Defense				
Comments				

PhD Student Outcome Results: GLO5, Responsible conduct of research.	% satisfactory + excellent; including number of assessments (n)			
School Year:	2018-2019	2019-2020	2020-2021	2021-2022
Research Proposal Exam				
Dissertation and Defense				
Comments				

A) MS (thesis or report option)

MS Student Outcome Results: GLO1, Proficiency of the subject matter	% satisfactory + excellent; including number of assessments (n)			
School Year:	2018-2019	2019-2020	2020-2021	2021-2022
Graduate course grades				
Thesis/Report (thesis/report option only)				
Defense (thesis/report option only)				
Comments:				

MS Student Outcome Results: GLO2, Research skills, execute research project (thesis/report option only)	% satisfactory + excellent; including number of assessments (n)			
School Year:	2018-2019	2019-2020	2020-2021	2021-2022
Thesis/Report (thesis/report option only)				
Defense (thesis/report option only)				
Comments:				

MS Student Outcome Results: GLO3, Make a contribution to the discipline (thesis only)	% satisfactory + excellent; including number of assessments (n)			
School Year:	2018-2019	2019-2020	2020-2021	2021-2022
Thesis/Report (thesis/report option only)				
Defense (thesis/report option only)				
Comments:				

MS Student Outcome Results: GLO4, Professional skills (thesis/report only)	% satisfactory + excellent; including number of assessments (n)			
School Year:	2018-2019	2019-2020	2020-2021	2021-2022
Thesis/Report (thesis/report option only)				
Defense (thesis/report option only)				
Responsible conduct of research				
Comments:				

B) MS (Coursework option)

MS Student Outcome Results: GLO1, Proficiency of the subject matter	% satisfactory + excellent; including number of assessments (n)			
School Year:	2018-2019	2019-2020	2020-2021	2021-2022
Graduate course grades				
Oral exam				
Comments:				

MS Student Outcome Results: GLO2, knowledge of core competencies in selected, complementary areas	% satisfactory + excellent; including number of assessments (n)			
School Year:	2018-2019	2019-2020	2020-2021	2021-2022
Graduate course grades				
Oral Exam				
Comments:				

MS Student Outcome Results: GLO3, Professional skills	% satisfactory + excellent; including number of assessments (n)			
School Year:	2018-2019	2019-2020	2020-2021	2021-2022
Course Grades from BL5012 or/and BL5051				
Oral exam				
Comments:				

MS Student Outcome Results: GLO4, Responsible Conduct	% satisfactory + excellent; including number of assessments (n)			
School Year:	2018-2019	2019-2020	2020-2021	2021-2022
Course Grades from BL5025 and BL5051				
Oral exam				
Comments:				