Form AP-C

UNIVERSITY OF CENTRAL ARKANSAS
Proposal for Change in Assessment Plans/Processes

NOTE: Changes in assessment plans/processes can be reviewed only during the regular academic year. Action-item proposals must be received by the Academic Assessment Committee at least one month before action is desired.

Department: Biology Date: 10-13-2025

Program for which the change is proposed: MS Degree in Biology

Action Item	Information Item
Select area(s) of change:	Select area(s) of change:
☑ New assessment plan	☐ Minor change of wording
☐ Assessment plan revision	☐ Minor change in assessment criteria
☐ Alternative reporting method	☐ Rubric updates
☐ Other	☐ Curriculum/Curriculum Map Update
	☐ Other

Description of change:

This is a new assessment plan for the MS degree in Biology

Reason for change:

Effective date of change:

Change recommended by (for action items) or noted by (for information items):

	DEPARTMENT CHAIR	DATE 10/13/25
College Curriculum and Assessment Committee	COMMITTEE CHAIR	DATE 11/3/25
	COLLEGE DEAN Stephen R. Addison	DATE 11/3/25
Academic Assessment Committee	COMMITTEE CHAIR	DATE

Rev. Oct. 2021

UNIVERSITY OF CENTRAL ARKANSAS
ACADEMIC ASSESSMENT PLAN
Requirements, Template, and Example

Requirements

1. *Submit with New Program Proposal*
    a. *Programs are encouraged to consult with the Office of University Assessment.*
    b. *Contact information assessment@uca.edu*
2. *Send copy of Assessment Plan to the Office of University Assessment, Wingo 215.*
3. *Update the Program Assessment Plan based upon EAPR or Accreditation Cycles.*

Basic Information

Program Name: Biology MS

College: College of Science and Engineering

Department: Biology

Program Level (check all that apply)

- ☐ Associate's
- ☐ Bachelor's
- ☐ Undergraduate Certificate
- X Master's
- ☐ Doctoral
- ☐ Graduate Certificate

Date Plan Submitted: October 1, 2025

College Dean & email: Dr. Steven Addison saddison@uca.edu
College Curriculum Committee Chairperson & Email: Dr. Will Flatley wflatley@uca.edu
Department Chairperson & email: Dr. Brent Hill bhill@uca.edu
Department Curriculum Committee Chairperson & email: Dr. Arijit Mukherjee amukherjee@uca.edu; Dr. Reid Adams radams@uca.edu (Graduate Program Director)

1. Introduction (identify college, unit, and degree programs)

The Master of Science degree in Biology (COSE) is offered primarily for those who wish to obtain a graduate degree before enrolling in a doctoral or professional program or who seek a terminal degree as preparation for a career in biology. Our program typically has 25-30 students enrolled annually and graduates around 6-12 per year. The degree spans many subdisciplines in biology, and we allow students to tailor courses to their interests by not requiring a core set of specific graduate courses. Instead, our program has two tracks that require a set number of credit hours at the 6000-level.

The Department of Biology offers the Master of Science with two tracks: the MS with thesis, and the MS without thesis. The MS degree is a general one in which breadth is emphasized, but the thesis candidate is expected to acquire depth in a particular area. The thesis track allows students to carry out original research through mentoring from a major professor in that professor's specialty. This track provides training relevant to research-based careers in biology and health sciences. Some examples of career options appropriate for students in this track include research technicians/associates in academic and corporate settings, scientists for state and federal agencies, and doctoral programs. The non-thesis track is an appropriate option for careers that do not require research, but would benefit from advanced biological education. These include practice-focused professional programs (e.g., medicine, optometry, physical therapy), management positions, environmental policy, and teaching at the secondary or community-college level.

2. Student Outcomes

Outcome 1

Written Communication Goal: *Graduate students will demonstrate an ability to communicate biological information in a written form that demonstrates mastery of a specific sub-discipline in biology, including the following Learning Objectives:*
1) to critically evaluate literature associated with a specific subdiscipline of biology,
2) to effectively engage in experimental design, analysis, and presentation of biological findings and data (e.g., Tables, Figures, and Images), and
3) to discuss findings within the context of biological literature and derive insightful conclusions supported by evidence.

Outcome 2

Oral Communication Goal: *Graduate students will demonstrate an ability to communicate biological information effectively through oral presentations to understand and organize biological content to convey a central message, to create/use instructional tools (e.g., PowerPoint slides) that enhance delivery of the central message, and to have a clear, confident, and compelling delivery.*

Outcome 3

Professional Development Goal: *Graduate students will demonstrate professionalism and ethical conduct through responsible data collection, analysis, and reporting, and by engaging in activities that promote their professional growth and career readiness.*

3. Assessment Cycle

We will follow this general timeline:
a. Collect data each academic year as students complete degrees.
b. Summarize and analyze data at the end of the spring semester in alternate years.
c. Share results and trends with the full department in the fall following the spring analysis.
d. Implement any changes to the courses/curriculum along with adjustments to the assessment data collection methodology over the next two academic years.

4. Curriculum Map

Please see Attachment

5. Assessment Methods and Measures (Formative and Summative recommended)

Outcome 1

Written Communication Goal: *Graduate students will demonstrate an ability to communicate biological information in a written form that demonstrates mastery of a specific sub-discipline in biology.*

Assessment Method – The written communication goal will be assessed directly with the Biology MS Written Communication Assessment Rubric (Appendix 1). This rubric will be applied to the thesis document required by all thesis-track students and submitted in their final semester. Non-thesis students will be assessed by applying the rubric to a written artifact collected from a course taken during the second year of the student's program. Ideally, this artifact will come from a 6000-level course taken during the final semester, although a 5000-level course with a substantial writing assignment may also be used.

Learning Objective 1 *Graduate students will critically evaluate literature associated with a specific subdiscipline of biology.*

Assessment Method – Learning Objective 1 will be directly assessed with Criterion 1: Literature Review and Objectives/Hypotheses of the Biology MS Written Communication Assessment Rubric (Appendix 1) applied to the thesis document or course artifact as previously described.

Learning Objective 2 *Graduate students will effectively engage in experimental design, analysis, and presentation of biological findings and data (e.g., Tables, Figures, and Images).*

Assessment Method – Learning Objective 2 will be directly assessed with Criterion 2: Methodology and Criterion 3: Presentation and Analysis of Research Findings of the Biology MS Written Communication Assessment Rubric (Appendix 1) applied to the thesis document or course artifact as previously described.

Learning Objective 3 *Graduate students will discuss findings within the context of biological literature and derive insightful conclusions supported by evidence.*

Assessment Method – Learning Objective 3 will be directly assessed with Criterion 4: Interpretation of Research Findings of the Biology MS Written Communication Assessment Rubric (Appendix 1) applied to the thesis document or course artifact as previously described.

Outcome 2

Oral Communication Goal: ***Learning Objective 1***

Graduate students will demonstrate an ability to communicate biological information effectively through oral presentations to understand and organize biological content to convey a central message, to create/use instructional tools (e.g., PowerPoint slides) that enhance delivery of the central message, and to have a clear, confident, and compelling delivery.

Assessment Method – The oral communication goal will be assessed directly with the Biology MS Oral Communication Assessment Rubric (Appendix 2). This rubric will be applied to the public oral defense presentation required by all thesis-track students and delivered during their final semester. Non-thesis students will be assessed by applying the rubric to an oral presentation delivered during a course taken during the second year of the student's program. Ideally, this presentation will be given in a 6000-level course taken during the final semester, although a 5000-level course that requires oral presentations may also be used.

Outcome 3

Professional Development Goal: *Learning Objective 1*
Graduate students will demonstrate professionalism and ethical conduct through responsible data collection, analysis, and reporting, and by engaging in activities that promote their professional growth and career readiness.

Assessment Method – This objective will be assessed indirectly through performance in Graduate Seminar (BIOL 6102). Students are required to complete at least two seminar courses, and all seminars emphasize aspects of professional development (see Course Map). Achievement will be demonstrated by students earning a grade of B or better in BIOL 6102. Additionally, we will report student participation in professional development activities, including conferences, outreach events, and other activities that enrich professional experiences outside the classroom.

6. Data Collection and Review

- When will data be collected for each outcome?
  Our graduate students complete requirements during fall, spring, and summer terms; therefore, we will need to potentially collect data throughout the academic year depending on when students are graduating.

- How will data be collected for each outcome?
  Data for Outcome 1 Learning Objectives 1-3 will be collected from the Biology MS Written Communication Assessment Rubric (Appendix 1) applied to the thesis document or class project as previously described. Thesis-track students have a graduate committee composed of their primary thesis advisor and at least 2 other persons having graduate faculty status. Each member of the student's graduate committee, excluding the primary thesis advisor, will apply the rubric to the thesis document. The writing artifact collected for non-thesis track students will be scored by the faculty member teaching the course using the written communication rubric.

  Data for Outcome 2 Learning Objective 1 will be collected from the Biology MS Oral Communication Assessment Rubric (Appendix 2) applied to the public oral defense presentation (thesis track) or class project (non-thesis track) as previously described. Our goal is to have three to five faculty in attendance, excluding the primary thesis advisor, score the oral defense presentation using the oral communication rubric. The faculty member instructing the course will apply the rubric to an assignment identified for a non-thesis track student.

Outcome 3 Learning Objective 1 is assessed indirectly by examining grades in Graduate Seminar. Also, data pertaining to student participation in professional development activities will be collected annually from graduate students and their advisors and compiled by the Graduate Director.

- What will be the benchmark/target for each outcome?

  An overall target for Outcome 1 is for all students to score a median/mean of 15 or higher out of 20 on the Biology MS Written Communication Assessment Rubric (Appendix 1). A median/mean score of 3 or higher out of 4 is the target for each corresponding criterion related to Outcome 1 Learning Objectives 1-3 for all students.

  A mean/median score of 12 or higher out of 16 on the Biology MS Oral Communication Assessment Rubric (Appendix 2) is the target for Outcome 2 Learning Objective 1 for all students.

  A grade of B or higher in BIOL 6102 Seminar is the target for Outcome 3 Learning Objective 1. An overall target is for at least 75% of graduate students to participate in at least one professional development activity per year.

- What individuals/groups will be responsible for data collection?

  Members of the student's thesis committee excluding the primary thesis advisor, or instructor of record for the non-thesis artifact, will collect data for Outcome 1 Learning Objectives 1-3 as previously described.

  Attendees at the public oral defense, minus the primary thesis advisor, or course instructor of record will collect data for Outcome 2 Learning Objective 1 as previously described.

  Data for Outcome 3 Learning Objective 1 will be collected by the Graduate Director annually via survey methods.

7. Participation in Assessment Process

- Who will participate in carrying out the assessment plan?
- What will be their specific role/s?

  The Director of the graduate program will initially gather and organize rubric scores from the primary individuals responsible for data collection. Next, the Biology Graduate Committee will evaluate data in relation to the assessment plan and targets.

8. Data Analysis

- How will the data and findings be shared with faculty?

  The data and recommendations from the Department of Biology Graduate Committee will be distributed electronically to the department followed by a presentation at a faculty meeting during the fall semester.

- Who was involved in analyzing the results?

  The Biology Graduate Committee will analyze results.

- How are results aligned to outcomes and benchmarks?

  Given that we expect low sample sizes (e.g., ~ 5-12 students graduate in a given year) in a given year, data summaries will mostly be descriptive (versus application of inferential statistics). Means or Medians and measures of dispersion will be calculated for outcomes and evaluated relative to our target scores.

9. Plan for Using Assessment Results to Improve Program

- How will you use the results to improve your program?

  Assessment results will allow us to identify both strengths and areas for improvement in the program. When outcomes fall below established targets or when performance does not approach full proficiency, the Biology Graduate Committee will review the results and recommend appropriate actions, reaffirming our commitment to the program's success. Potential avenues for improvement include revising course content and/or offering targeted workshops for students and/or advisors and thesis committee members.

10. What are the plans to evaluate students' post-graduate success?

We will implement graduation surveys to determine direct employment rates and acceptance rates to post graduate and professional programs.

11. What are the plans to evaluate teaching effectiveness?

Teaching effectiveness is determined for the department as a whole, via achieving the above benchmarks related directly to student learning. We will also gather information directly from graduates via graduation surveys to further evaluate program effectiveness.

12. Appendices-Required....Curriculum Maps by Program, Assessment Tools (examples: Rubrics, Surveys, Tests, etc.), any other important materials/documentation

Appendix 1 – Biology MS Written Communication Assessment Rubric
Appendix 2 – Biology MS Oral Communication Assessment Rubric
Curriculum Map

13. Submit Assessment Plan

- Send completed form electronically to assessment@uca.edu

For questions or concerns please contact:
Dr. Jacob Held 450-5307 jmheld@uca.edu
Alyson McEntire 450-5086 amcentire@uca.edu

Courses I: introduce R: reinforce E: emphasize	**Outcome 1.** Graduate Students will demonstrate an ability to communicate biological information in a written form, including three specific learning objectives:			**Outcome 2. Learning Objective 1:** Graduate Students will demonstrate an ability to communicate biological information effectively through oral presentations .	**Outcome 3. Learning Objective 1**: Graduate students will demonstrate professionalism and ethical conduct through responsible data collection, analysis, and reporting, and by engaging in activities that promote their professional growth and career readiness.
	Learning Objective 1: to critically evaluate literature associated with a specific subdiscipline of biology	Learning Objective 2: to effectively engage in experimental design, analysis, and presentation of biological findings and data	Learning Objective 3: to write findings within the context of biological literature and derive insightful conclusions supported by evidence		
BIOL 5V00 Field Studies in Biology	Course has not been taught in last 5 years and is not part of our current 2-year course rotation.				
BIOL 5205 Conservation Education	Currently no instructor, goals will change with the instructor.				
BIOL 5210 Seminar in Biology	Course has not been taught in last 5 years and is not part of our current 2-year course rotation.				

BIOL 5250 Scanning Electron Microscopy and Microanalysis	Course has not been taught in last 5 years and is not part of our current 2-year course rotation.				
BIOL 5311 Pathophysiology					R
BIOL 5320 Human Neuroscience Methods	E	R	E	E	R
BIOL 5330 Principles of the Cardiovascular System	E	E	R	R	R
BIOL 5340 Immunology	E		E	R	R
BIOL 5351 General Pharmacology					R
BIOL 5360 Endocrinology	R	R	E	R	R
BIOL 5390, 5490 Special Topics in Biology	Currently no instructor, goals will change with the instructor.				
BIOL 5400 Histology		R			R
BIOL 5401 Invertebrate Zoology		E	E		R
BIOL 5404 Plant Biodiversity		R	R	R	R
BIOL 5405 Developmental Biology	E	E	R	E	R
BIOL 5406 Mammalogy	E	E	E	R	R
BIOL 5407 Ornithology	R	R		R	R
BIOL 5410 Biology of Lower Plants and Fungi	Course has not been taught in last 5 years and is not part of our current 2-year course rotation.				
BIOL 5415 Mechanisms of Evolution	R	E			R
BIOL 5418 Herpetology	R	R	R	E	R
BIOL 5425	R	E	E	R	E

Experimental Neurobiology					
BIOL 5430 Comparative Vertebrate Anatomy	R	E	R	R	R
BIOL 5431 Experimental Molecular Biology	E	E	E	E	E
BIOL 5435 Animal Behavior	Currently no instructor, goals will change with the instructor.				
BIOL 5440 Entomology	R		R	R	R
BIOL 5442 Restoration Ecology: Principles and Application	Currently no instructor, goals will change with the instructor.				
BIOL 5445 Biometry		E		R	E
BIOL 5450 Plant Ecophysiology	R	E	E	E	R
BIOL 5455 Ichthyology	E		R	R	R
BIOL 5460 Animal Physiology	E	E	E		
BIOL 5461 Parasitology		E	R		R
BIOL 5465 Environmental Toxicology	E	R	R	E	R
BIOL 5480 Paleobiology		R	R		
BIOL 6V01 Thesis Research	E	E	E	E	E
BIOL 6V71 Independent Study	Goals vary with the instructor.				
BIOL 6V95 Special Topics in Biology – Applied Ecology	E	E	E	E	E
BIOL 6102 Graduate Seminar - Teaching				E	E
BIOL 6102 Graduate Seminar – Data Science	R	E			E
BIOL 6102 Graduate Seminar - Ethics				R	E
BIOL 6102 Graduate Seminar - Communication	R		R	E	E

BIOL 6102 Graduate Seminar – Professional Skills				R	E
BIOL 6290 Biological Literature	Course has not been taught in last 5 years and is not part of our current 2-year course rotation.				
BIOL 6320 Advanced Evolution	E	R	E	E	R
BIOL 6376 Advanced Immunology	Course has not been taught in last 5 years and is not part of our current 2-year course rotation.				
BIOL 6382 Recent Advances in Molecular Biology	E	E	E	E	R
BIOL 6390 Cellular Dynamics	E	R	R	R	R
BIOL 6430 Protein and Enzyme Biology	Course has not been taught in last 5 years and is not part of our current 2-year course rotation.				
BIOL 6440 Advanced Developmental Biology	Course has not been taught in last 5 years and is not part of our current 2-year course rotation.				
BIOL 6442 Aquatic Ecology	E	E	E	R	R
BIOL 6443 Advanced Ecology	Course is being split into two new courses – Applied Ecology and a course yet to be determined.				
BIOL 6445 Advanced Statistics in R	R	E	E	E	
BIOL 6450 Systematics and Classification	Course has not been taught in last 5 years and is not part of our current 2-year				

	course rotation.				
BIOL 6455 Regulatory Physiology	E	E	R	E	E
BIOL 6480 Advanced Genetics	Course has not been taught in last 5 years and is not part of our current 2-year course rotation.				

Biology MS Thesis Program
University Central Arkansas

Biology MS Written Communication Assessment Rubric

Student Name:

	1	2	3	4
Criterion 1: Literature Review and Objectives/Hypotheses *Did students critically use and evaluate primary literature sources to support their Objectives/Hypotheses?*	The introduction did not have adequate literature support. Objectives/Hypotheses were not stated.	The introduction had minimal supporting literature, relevance was not established, and/or breadth of coverage was insufficient. Objectives/Hypotheses were poorly articulated.	The introduction was supported by adequate literature (but still lacked breadth) and/or was not aligned with Objectives/Hypotheses. Objectives/Hypotheses were reasonably well articulated.	The introduction comprehensively used supporting literature and demonstrated relevant ties to the Objectives/Hypotheses. Objectives/Hypotheses were well articulated.
Criterion 2: Methodology *Does the research design address the Objectives/Hypotheses?*	The methods contained little to no details and/or were not related to the Objectives/Hypotheses.	The methods provided minimal details and/or had poor alignment with Objectives/Hypotheses.	The methods provided adequate details and/or had reasonable alignment with the Objectives/Hypotheses.	The methods provided necessary details for reproducibility and had a clear rationale that aligned well with the Objectives/Hypotheses.
Criterion 3: Presentation and Analysis of Research Findings *Do the artifacts (e.g., Tables, Figures, and Images) and analyses provide sufficient evidence to support conclusions related to Objectives/Hypotheses?*	Insufficient, inaccurate, and/or irrelevant artifacts were provided. If hypothesis-driven research was conducted, data analysis was not performed.	Artifacts provided were minimal and/or poorly related to Objectives/Hypotheses. If hypothesis-driven, data analysis was implemented poorly.	Artifacts provided were adequate but still lacked alignment with Objectives/Hypotheses. If hypothesis-driven, data analysis was adequate, but not in-depth.	Artifacts and analysis were appropriate and in-depth, providing sufficient evidence to support the conclusions related to Objectives/Hypotheses.
Criterion 4: Interpretation of Research Findings *Does the Discussion integrate findings with existing peer-reviewed literature and make appropriate inferences/conclusions (supported by the results) related to the Objectives/Hypotheses?*	The discussion lacked critical components such as a restatement of key results, integration of findings with existing literature, and/or inferences/conclusions.	Research findings were poorly integrated with existing literature. Minimal or inappropriate inferences/conclusions were made.	Research findings were adequately integrated with existing literature. Adequate inferences/conclusions were made but lacked depth and insightfulness.	Research findings were well integrated with existing literature. Inferences/conclusions were insightful, supported by results, and aligned with Objectives/Hypotheses.
Criterion 5: Writing Mechanics, Syntax, and Organization *Was the document professionally prepared and organized for a scientific audience? This includes correct formatting and use of references.*	The document showed serious pattern of error in writing mechanics, biological syntax (e.g., references, scientific names, and terminologies), and/or organization.	Substantive errors in mechanics, biological syntax, and/or mediocre organization led to poor scientific communication.	There were few errors in mechanics and biological syntax, and the organization was sufficient; However, aspects of the writing were ambiguous, impeding clarity of the work.	Writing mechanics, biological syntax, and organization demonstrated clear, appropriate communication virtually error-free.

NOTES:

MS Biology Program
University Central Arkansas

Biology MS Oral Communication Assessment Rubric

Student Name:

Topic: Oral Communication Learning Outcome

	1	2	3	4
Criterion 1: Organization Was the content cohesive with a clear flow of salient points conveying a central message?	Organization pattern was significantly lacking in quality, leading to very unclear content and central message.	Organization pattern was minimal, leading to incomplete development of central message.	Organization pattern was adequate but still lacking clarity and cohesiveness in some aspect of the content and development of central message.	Cohesive content with a clear and logical progression from background/problem statement to discussion/conclusion.
Criterion 2: Understanding of Research Topic Did the presenter demonstrate a thorough understanding of the research topic?	Explanations of presentation content and/or responses to questions were unsatisfactory.	Explanations of presentation content were poor, leading to minimal understanding of research topic.	Adequate understanding of research topic, as some of the explanations of content were incomplete or unclear.	Thorough understanding of research topic demonstrated by explanations of presentation content and responses to questions.
Criterion 3: Instructional Tools Were instructional tools used (e.g., PowerPoint slides) easy to understand and effective?	Unsatisfactory use of instructional tools. For example, slide quality and images presented were extremely difficult to understand.	Poor use of instructional tools. For example, slide quality and images presented were mediocre.	Adequate use of instructional tools. For example, overall slide quality and images used were acceptable, but some were not easy to understand.	Clear and effective use of instructional tools. For example, slide quality and images presented were effective and easy to understand.
Criterion 4: Delivery Was the presenter clear, confident, and compelling in their delivery of the central message?	Delivery was not understandable and/or the speaker appeared unprepared.	Delivery made the presentation marginally clear and/or the speaker was minimally engaged and tentative.	Delivery made the presentation adequate, but the speaker lacked in some aspects of engagement and/or confidence.	Delivery made the presentation clear and compelling. The speaker appeared confident and prepared.

NOTES: