

# Biology 479 – Biology Portfolio Checklist

## Version F23 – For Students Matriculating in AY 2023-24

**Student's Name:** \_\_\_\_\_

**Student's Royal ID:** \_\_\_\_\_

**Student's Academic Advisor:** \_\_\_\_\_

### Introduction

While classrooms provide an essential site for the delivery, discussion, and integration of content and competencies related to biological science education, learning can also take place in a variety of venues. The goal of this Portfolio Checklist is to guarantee that students use these alternate avenues for intellectual and professional development. This program is designed to provide concrete guidelines for implementing student engagement in a variety of learning activities that will ensure that their undergraduate education will consist of both curricular and extracurricular activity. In addition, the Portfolio Checklist provides the department with a way to track the progress of students and to implement assessment mechanisms to improve our major.

BIOL 479 is a required, zero-credit course for which each Biology major must register and receive a satisfactory grade (of S) as a necessary part of completing the requirements for the Biology degree. Typically, the student registers for BIOL 479 in their final semester. A satisfactory grade in BIOL 479 is achieved by documenting, in consultation with the student's Academic Advisor, successful completion of the five Programmatic Learning Outcomes that are listed and described on the following pages. Upon completion of the Portfolio Checklist, both the student and the Advisor must sign this checklist, attach supporting documentation, and submit the Portfolio Checklist to the Biology Chair, who will verify its successful completion and assign the grade for BIOL 479.

The student should review progress on completion of the Portfolio Checklist at each semester's preregistration advising meeting to ensure that a successful plan for its completion is in place.

### List of attached supporting documentation:

- |          |          |
|----------|----------|
| 1. _____ | 4. _____ |
| 2. _____ | 5. _____ |
| 3. _____ | 6. _____ |

**Student's Post-graduation Plans** \_\_\_\_\_

\_\_\_\_\_  
**Student's signature**

\_\_\_\_\_  
**Date**

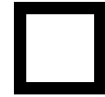
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**Advisor's signature**

\_\_\_\_\_  
**Date**

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**Biology Chair's signature**

\_\_\_\_\_  
**Date**

# 1. Demonstrate mastery of content across the broad field of modern biology



Biology majors are required to take the two-semester general biology course with laboratories (BIOL 141-142 and BIOL 141L-142L). In addition to this 9-credit sequence, biology majors will select a minimum of 27 credits of biology electives, with at least four credits in courses at the 200-level or higher that deal primarily with phenomena in each of the three *content areas* listed below.

BIOL 141 and 141L

BIOL 142 and 142L

**Total Credit Count from all courses below (must be at least 27 credits): \_\_\_\_\_**

Credit count for each course is indicated in parentheses

**MC**  Molecular & Cellular Elective (minimum of 4 credits) CREDIT COUNT \_\_\_\_\_

- |   |   |
|---|---|
| <input type="checkbox"/> BIOL 250 Microbiology (3)                        | <input type="checkbox"/> BIOL 384 ST Topics in Molecular Biology (3)              |
| <input type="checkbox"/> BIOL250L Microbiology Lab (2)                    | <input type="checkbox"/> BIOL 384 L ST Topics in Molecular Biology Laboratory (2) |
| <input type="checkbox"/> BIOL 260 Genetics (3)                            | <input type="checkbox"/> BIOL 384 ST Neurogenetics (3)                            |
| <input type="checkbox"/> BIOL 260L Genetics Lab (1.5)                     | <input type="checkbox"/> BIOL 484 ST Biotechnology (3)                            |
| <input type="checkbox"/> BIOL 344 Immunology (3)                          | <input type="checkbox"/> BIOL 484L ST Biotechnology Laboratory (2)                |
| <input type="checkbox"/> BIOL 350 Cellular Biology (3)                    |   |
| <input type="checkbox"/> BIOL 350L Cellular Biology Lab (2)               |   |
| <input type="checkbox"/> BIOL 358 Cellular and Molecular Neurobiology (3) |   |
| <input type="checkbox"/> BIOL 364 Molecular Virology (3)                  |   |

**S**  Systems Electives (minimum of 4 credits) CREDIT COUNT \_\_\_\_\_

- |   |  |
|---|--|
| <input type="checkbox"/> BIOL 245 General Physiology (3)                  | <input type="checkbox"/> BIOL 348 Functional Neuroanatomy (3)          |
| <input type="checkbox"/> BIOL 245L General Physiology Lab (1.5)           | <input type="checkbox"/> BIOL 349L Plant Physiology (3)                |
| <input type="checkbox"/> BIOL 255 Animal Nutrition and Metabolism (3)     | <input type="checkbox"/> BIOL 349L Plant Physiology Lab (2)            |
| <input type="checkbox"/> BIOL 272 Invertebrate Biology (3)                | <input type="checkbox"/> BIOL 351 Developmental Biology (3)            |
| <input type="checkbox"/> BIOL 272L Invertebrate Biology Lab (2)           | <input type="checkbox"/> BIOL 351L Developmental Biol. Lab (2)         |
| <input type="checkbox"/> BIOL 279 Animal Ecophysiology (3)                | <input type="checkbox"/> BIOL 352 Histology (3)                        |
| <input type="checkbox"/> BIOL 341 Comparative Vertebrate Anatomy (3)      | <input type="checkbox"/> BIOL 352L Histology Lab (2)                   |
| <input type="checkbox"/> BIOL 341L Comparative Vertebrate Anatomy Lab (2) | <input type="checkbox"/> BIOL 357 Develop. Neuroscience (3)            |
| <input type="checkbox"/> BIOL 342 Comparative Biomechanics (4)            | <input type="checkbox"/> BIOL 395 Extreme Physiology (3)               |
| <input type="checkbox"/> BIOL 346 Endocrinol. & Reproduction (3)          | <input type="checkbox"/> BIOL 444 Sensory Biology (3)                  |
|   | <input type="checkbox"/> BIOL 446 Cardiovascular Physiology (3)        |
|   | <input type="checkbox"/> BIOL 453 Skeletal Biology (3)                 |
|   | <input type="checkbox"/> BIOL 384 ST Behavioral Neuroendocrinology (3) |

**MO**  Multi-Organismal Electives (minimum of 4 credits) CREDIT COUNT \_\_\_\_\_

- |  |   |
|--|---|
| <input type="checkbox"/> BIOL 271 Entomology (3)                   | <input type="checkbox"/> BIOL 371 Ecology (3)                 |
| <input type="checkbox"/> BIOL 271L Entomology Lab (1.5)            | <input type="checkbox"/> BIOL 371L Ecology Lab (2)            |
| <input type="checkbox"/> BIOL 273 Marine Ecology (3)               | <input type="checkbox"/> BIOL 374 Vertebrate Biology (3)      |
| <input type="checkbox"/> BIOL 274 Conservation Biology (3)         | <input type="checkbox"/> BIOL 374L Vertebrate Biology Lab (2) |
| <input type="checkbox"/> BIOL 296 Terrestrial Tropical Ecology (3) | <input type="checkbox"/> BIOL 375 Evolution (3)               |
| <input type="checkbox"/> BIOL 368 Neuroethology (4)                | <input type="checkbox"/> BIOL 284 ST Parasitology (3)         |
| <input type="checkbox"/> BIOL 370 Animal Behavior (3)              |   |
| <input type="checkbox"/> BIOL 370L Animal Behavior Lab (2)         |   |

**Major Electives (in addition to courses checked above)**

Fill in the box below and write the total credit count here: \_\_\_\_\_

Write down the courses that count towards the major electives. Courses must be BIOL.

Course	Credits

## 2. Laboratory Expertise



Because hands-on experiences are at the core of the scientific method and enhance active learning, biology majors must pass *three laboratory courses* at the 200 level or above from at least two of the three content areas (Molecular/Cellular, Systems, and Multi-Organismal). Students should consult the department's website and their advisors for the lists of courses that fulfill these requirements.

### Check **THREE** boxes below:

Lab experience 1 \_\_\_\_\_

Content Area: MC \_\_\_\_ S \_\_\_\_ MO \_\_\_\_

Lab experience 2 \_\_\_\_\_

Content Area: MC \_\_\_\_ S \_\_\_\_ MO \_\_\_\_

Lab experience 3 \_\_\_\_\_

Content Area: MC \_\_\_\_ S \_\_\_\_ MO \_\_\_\_

One of the following may be substituted for a lab experience. **Supporting documentation**, such as a paper or report written by the student, slides from an oral presentation authored or co-authored by the student, a poster authored or co-authored by the student, or a letter from the mentor summarizing the experience, **must be attached**.

- Defend an Honors Thesis (BIOL488H/489H) or a thesis in the Magis Honors Program in STEM (BIOL 487S/489S) involving research that generated original data.
- Complete a fellowship or internship for summer research in a life science-related project.
- Complete Undergraduate Research (BIOL 393 or BIOL 394).

**The advancement of biological inquiry also depends upon the proper execution of the scientific method, which ordinarily includes designing a hypothesis and protocol, gathering data, analyzing and interpreting results, developing conclusions, and formulating directions for further investigation. To gain experience with the scientific method, students should also complete the following PLOs.**

### 3. Critically evaluate biological data (two courses or experiences)



The advancement of biological inquiry depends upon the critical analysis and evaluation of biological data. Students must gain expertise in acquiring data either first-hand, from primary literature sources, or from bioinformatics databases, and in analyzing, evaluating, and interpreting the data.

Students must complete two of the following courses or experiences:

#### Check ANY TWO boxes below:

Courses approved by the department that fulfill this requirement.

<input type="checkbox"/> BIOL 245L General Physiology Lab	<input type="checkbox"/> BIOL 371L Ecology Lab
<input type="checkbox"/> BIOL 271L Entomology Lab	<input type="checkbox"/> BIOL 374L Vertebrate Biology Lab
<input type="checkbox"/> BIOL 272L Invertebrate Biology Lab	<input type="checkbox"/> BIOL 379 Biostatistics
<input type="checkbox"/> BIOL 273 Marine Ecology	<input type="checkbox"/> BIOL 395 Extreme Physiology
<input type="checkbox"/> BIOL 279 Animal Ecophysiology	<input type="checkbox"/> BIOL 446 Cardiovascular Physiology
<input type="checkbox"/> BIOL 296 Terrestrial Tropical Ecology	<input type="checkbox"/> BIOL 284 ST Parasitology
<input type="checkbox"/> BIOL 342 Comparative Biomechanics	<input type="checkbox"/> BIOL 384 ST Neurogenetics
<input type="checkbox"/> BIOL 350L Cellular Biology Lab	<input type="checkbox"/> BIOL 384L ST Topics in Molecular Biology Laboratory
<input type="checkbox"/> BIOL 351L Developmental Biol. Lab	<input type="checkbox"/> BIOL 484L ST Biotechnology Lab
<input type="checkbox"/> BIOL 368 Neuroethology	
<input type="checkbox"/> BIOL 370L Animal Behavior Lab	

One of the following may be substituted for a lab experience. **Supporting documentation**, such as a paper or report written by the student, slides from an oral presentation authored or co-authored by the student, a poster authored or co-authored by the student, or a letter from the mentor summarizing the experience, **must be attached**.

- Defend an Honors Thesis (BIOL488H/489H) or a thesis in the Magis Honors Program in STEM (BIOL 487S/489S) that involves analysis, evaluation, and interpretation of data.
- Complete a fellowship or internship for summer research in a life science-related project that involves the analysis, evaluation, and interpretation of data.
- Complete a faculty-directed research project of at least one semester in duration that involves the analysis, evaluation, and interpretation of data.

#### 4. Effectively communicate biological information in writing (two courses or experiences)



Communication is essential for the scientific process. Writing is one effective way to communicate. Products that satisfy this requirement must be individually authored papers written in the style of an article for a scientific journal. The majority of citations must be from the primary literature.

*Students must complete two of the following courses or experiences:*

**Check ANY TWO of the boxes below**

Courses approved by the department that fulfill this requirement.

<input type="checkbox"/> BIOL 245L General Physiology Lab <input type="checkbox"/> BIOL 250L Microbiology Lab <input type="checkbox"/> BIOL 271 Entomology <input type="checkbox"/> BIOL 272 Invertebrate Biology <input type="checkbox"/> BIOL 273 Marine Ecology <input type="checkbox"/> BIOL 279 Animal Ecophysiology <input type="checkbox"/> BIOL 342 Comparative Biomechanics <input type="checkbox"/> BIOL 350L Cellular Biology Lab <input type="checkbox"/> BIOL 358 Cellular and Molecular Neurobiology <input type="checkbox"/> BIOL 364 Molecular Virology <input type="checkbox"/> BIOL 368 Neuroethology	<input type="checkbox"/> BIOL 370L Animal Behavior Lab <input type="checkbox"/> BIOL 371L Ecology Lab <input type="checkbox"/> BIOL 374L Vertebrate Biology Lab <input type="checkbox"/> BIOL 375 Evolution <input type="checkbox"/> BIOL 284 ST Parasitology <input type="checkbox"/> BIOL 384 ST Neurogenetics <input type="checkbox"/> BIOL 384L ST Topics in Molecular Biology
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The following can be substituted for the required courses that fulfill this experience; **supporting documentation must be attached.**

- Defend an Honors Thesis (BIOL488H/489H) or a thesis in the Magis Honors Program in STEM (BIOL 487S/489S) that involves analysis, evaluation, and interpretation of data.
- Complete a fellowship or internship for research in a life science-related project that produces a document that satisfies the criteria listed above.
- Complete a faculty-directed research project of at least one semester in duration that produces a document that satisfies the criteria listed above.
- Complete a document that meets the above criteria either in a class or independently under the direction of a biology faculty mentor.
- Complete a document that meets the above criteria either in a class or independently under the direction of a biology faculty mentor.

## 5. Effectively communicate biological information orally (two course or experiences)



Communication is essential for the scientific process. Delivering an oral presentation is one effective way to communicate. Each student must give two oral presentations, each in a different course or experience on a different topic. For each, they must speak for at least 10 minutes without relying heavily on reading from notes or slides to an audience of at least 5 individuals, one of whom must be the instructor of record.

*Students must complete two of the following courses or experiences:*

**Check ANY TWO of the boxes below:**

Courses approved by the department that fulfill this requirement.

<input type="checkbox"/> BIOL 255 Animal Nutrition & Metabolism	<input type="checkbox"/> BIOL 395 Extreme Physiology
<input type="checkbox"/> BIOL 271 Entomology	<input type="checkbox"/> BIOL 446 Cardiovascular Physiology
<input type="checkbox"/> BIOL 272L Invertebrate Biology Lab	<input type="checkbox"/> BIOL 453 Skeletal Biology
<input type="checkbox"/> BIOL 296 Terrestrial Tropical Ecology	<input type="checkbox"/> BIOL 384 ST Neurogenetics
<input type="checkbox"/> BIOL 342 Comparative Biomechanics	<input type="checkbox"/> BIOL 384L ST Topics in Molecular Biology Lab
<input type="checkbox"/> BIOL 346 Endocrinol. & Reproduction	<input type="checkbox"/> BIOL 484L ST Biotechnology Lab
<input type="checkbox"/> BIOL 351L Developmental Biology Lab	
<input type="checkbox"/> BIOL 352 Histology	
<input type="checkbox"/> BIOL 368 Neuroethology	

The following can be substituted for the required courses that fulfill this experience; **supporting documentation must be attached.**

- Defend an Honors Thesis (BIOL488H/489H) or a thesis in the Magis Honors Program in STEM (BIOL 487S/489S) that involves analysis, evaluation, and interpretation of data.
- Make a presentation that meets the above criteria either in a class or outside of class under the direction of a biology faculty mentor.
- Make a presentation that meets the above criteria either in a class or outside of class under the direction of a biology faculty mentor.