



UNIVERSITY OF COLORADO DENVER
DEPARTMENT OF INTEGRATIVE BIOLOGY



**GRADUATE PROGRAM POLICIES AND PROCEDURES HANDBOOK
BIOLOGY MS PROGRAM
INTEGRATIVE AND SYSTEMS BIOLOGY PHD PROGRAM**

August 28, 2023

OVERVIEW

The graduate programs in Biology (MS) and in Integrative and Systems Biology (PhD) are research-based programs designed for students with interests in any of a broad range of basic biological science subjects at any level of focus from molecular, cellular, behavioral, population, evolutionary, through to ecological. The Program is jointly administered by the Department of Integrative Biology and the Office of Graduate Education at the University of Colorado Denver.

This handbook details program-specific deviations in standards/policy from the campus-wide policies documented by the [Office of Graduate Education](#). Detailed curriculum requirements and course descriptions for the MS and PhD programs are documented in the [Graduate Catalog](#) for University of Colorado Denver. Students, advisors, and committee members are responsible for understanding and adhering to all procedures, policies, and requirements for the graduate program in which they participate.

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Program Philosophy and Goals

Graduate training in Integrative Biology at the University of Colorado Denver is intended to prepare students to become independently critical problem solvers who are qualified to address biology-related issues at local, regional, national, and/or international levels. The programmatic philosophy recognizes science not as a collection of facts, but rather as a process designed to help make informed decisions about the nature of evidence; scientific methods are used to guide decisions about the relative strength of evidence in support of multiple working hypotheses. The program is designed to equip students with the skills and confidence to generate new ideas and to actively participate in scientific debates, both academically and colloquially. Therefore, the goal is to provide opportunity for advanced training in current concepts, theories, debates, and methods for modern biology, based on a curriculum that emphasizes critical thinking and communication through a series of seminars and research-oriented courses that can be specifically tailored to student research programs.

CURRICULUM AND REQUIREMENTS

All academic and programmatic requirements for the MS and PhD degree programs and associated course descriptions are documented in the Graduate Academic Catalog published for the academic year in which the student matriculates. The [catalog for the current academic year](#) is available online and applies to MS and PhD students who matriculate during the Fall 2023, Spring 2024, and Summer 2024 terms. Students who matriculated in prior terms should consult the [archive of catalogs](#) for their programmatic requirements. The Program Director is responsible for reviewing and approving all degree audits and can specify when deviations from catalog requirements apply to specific programs. For this reason, students and advisors should consult with the Program Director as part of planning for their program tenures.

Progress Schedule and Milestones

Year 1

First Semester:

- Obtain University identification badge
- Secure access/keys for any office and/or laboratory spaces
- Identify and contact suitable advisory/exam committee members

Second Semester:

- Latest semester in which MS, PhD students may form advisory/exam committee
 - Report list of committee members to Program Director for verification and filing
- MS students may complete proposal defense if exam committee is approved by Program Director
- PhD students may complete preliminary exam if exam committee is approved by Program Director

Year 2

Third Semester:

- Latest semester in which all students must have initial meeting with advisory/exam committee
 - Outcome: Discuss research and exam schedules (MS proposal, PhD preliminary)
- Latest semester in which MS students may complete research proposal defense
 - Outcome: Committee majority vote determines Pass, Conditional Pass, or Fail
 - On passing, student begins/resumes research
 - On conditional passing, committee clearly defines requirements for receiving unconditional pass within subsequent 4 months
 - On failing, committee votes to either:
 - Allow retake prior to end of the following semester, or
 - Recommend immediate dismissal
- Latest semester in which PhD students may complete preliminary exam
 - Outcome: Committee majority vote determines Pass, Conditional Pass, or Fail
 - On passing, committee and student identify courses/training to complete prior to comprehensive exam
 - On conditional passing, committee clearly defines requirements for receiving unconditional pass within subsequent 4 months
 - On failing, committee votes to either:
 - Allow retake within subsequent 12 months, or
 - Recommend immediate dismissal

Fourth and Subsequent Semesters:

- MS, PhD students meet with advisory committee at least once in each semester

Year 3

Sixth semester:

- Latest semester in which PhD students may complete comprehensive exam
 - Outcome: Committee majority vote determines Pass, Conditional Pass, or Fail
 - On passing, student advances to Candidacy
 - On conditional passing, committee clearly defines requirements for receiving unconditional pass within subsequent 4 months
 - On failing, committee votes to either:
 - Allow retake within the subsequent 12 months, or
 - Recommend immediate dismissal

Final Year

Final semester:

Alert Program Director of intent to graduate

Apply for graduation prior to deadline

MS students apply for candidacy prior to deadline

Submit public announcement for thesis/dissertation defense to Program Director

Specify time, date, location, and thesis/dissertation title

Submit thesis to Office of Graduate Education for format review prior to deadline

MS students complete Thesis Defense (within 7 calendar years from matriculation)

Outcome: Majority vote determines Pass, Conditional Pass, or Fail

On conditional passing, committee clearly defines requirements for receiving unconditional pass within subsequent 4 months

On failing, committee votes to either:

Allow retake before end of subsequent semester, or

Recommend immediate dismissal

PhD students complete Dissertation Defense (within 8 calendar years from matriculation)

Outcome: Majority vote determines Pass, Conditional Pass, or Fail

On conditional passing, committee clearly defines requirements for receiving unconditional pass within subsequent 60 days

On failing, student may petition Program Director for a time extension, otherwise they may not continue in the program

File approved thesis/dissertation with Proquest/Office of Graduate Education prior to deadline

ADVISORY AND EXAM COMMITTEES

Department of Integrative Biology Policy

Graduate Advisory and Examination Committees

MS in Biology and PhD in Integrative and Systems Biology

Approved by Faculty Vote April 14, 2023

Effective Academic Year 2023-34

Organization and Purpose

Graduate programs in the Department of Integrative Biology are framed by the advisor-advisee approach to training in research where committees of faculty have the responsibility for core training and evaluation. Faculty members participating in the Biology MS and the Integrative and Systems Biology PhD programs must have Graduate Faculty Appointments (GFA) with the University Office of Graduate Education, which are required to serve as primary advisor or co-advisor of a student, to serve on advisory and exam committees, or to serve as instructor of record for any graduate-level course in the Department of Integrative Biology.

Graduate Faculty Appointments are of two types: Regular and Special. Tenured and tenure track faculty members employed by CU Denver are eligible for Regular GFA and are considered the core training faculty for the graduate programs in the Department. Faculty with other positions at CU Denver (research professor, clinical teaching track faculty, instructor, lecturer, adjunct, postdoctoral researcher, retired or emeritus) or with other universities, industry, government, and non-profit organizations are eligible for Special GFA. Appointment types are summarized in the Graduate Faculty Quick Reference Table available from the Office of Graduate Education website and appended to the end of this document.

Nominations for membership in the graduate programs are initiated by the Graduate Program Director. A GFA with membership in the Biology MS and/or Integrative and Systems Biology PhD programs is a revokable privilege, considered permanent until the faculty member is no longer affiliated with CU Denver, or the program indicates that the appointment should be terminated.

Privileges of Regular graduate faculty members of the biology programs include:

- directing (teaching and assigning grades in) graduate-level courses
- supervising graduate research (PhD and MS) as the primary advisor
- serving on and chairing examination committees (PhD and MS)
- serving on academic and administrative graduate education committees
- voting on campus level Graduate Faculty issues

Privileges of Special graduate faculty members of the biology programs include:

- directing (teaching and assigning grades in) graduate-level courses
- serving as co-primary advisor in collaboration with a Regular member (MS and PhD)
- serving on advisory and exam committees (MS and PhD)
- serving on academic and administrative graduate education committees

Graduate Advisory Committee

The purpose of the Advisory Committee is to monitor progress and guide the graduate student towards completion of both the academic and research components required by their degree program. The Advisory Committee is chaired by the Primary Advisor, who must have a Regular GFA with membership in the student's degree program (MS or PhD). The Advisory Committee may be co-chaired by a co-advisor, who

must have a GFA (Regular or Special) with membership in the student's degree program. The Advisory Committee chair is responsible for collaborating with the student (and co-advisor if applicable) to prepare agendas for and regularly schedule meetings with the Committee. The Advisory Committee is responsible for ensuring the graduate students receive fair treatment throughout and that they are provided sufficient opportunity for academic, logistic, and economic support to successfully complete the degree program.

The student must collaborate with the Primary Advisor (and co-advisor if applicable) during their first academic year to identify committee members with experience and/or expertise that would improve the quality and rigor of the academic and/or research programs. The Advisory Committee composition must be reviewed and approved by the Program Director and must meet at least once before the start of the third semester, and at least once each year thereafter.

The Advisory Committee for students in the Biology MS program must include a minimum of three (3) faculty members, at least one of whom must have a Regular GFA and be on the faculty in the Department of Integrative Biology. The remainder of the committee can include faculty from within or outside of the Department, but the majority ($\geq 50\%$) must have a GFA (Regular or Special) with membership in the Biology MS program.

The Advisory Committee for students in the Integrative and Systems Biology (ISB) PhD program must include a minimum of four (4) faculty members, all of whom must have a GFA with the Office of Graduate Education. At least one member must have a Regular GFA and be rostered in the Department of Integrative Biology. The majority ($\geq 50\%$) must have a Regular GFA and be members of the ISB PhD program. The remainder can include faculty with either Regular or Special GFA and who are members of the ISB PhD program.

Examples:

A student doing MS level research with a non-profit partner:

- 1) Primary Advisor in Integrative Biology with *Regular* GFA
- 2) Co-advisor from non-profit with *Special* GFA, member of the Biology MS program
- 3) Biologist from a state agency who does not have a GFA

Student doing PhD level research with the GES Department at UC Denver:

- 1) Primary Advisor in GES with *Regular* GFA, member of ISB PhD program
- 2) Faculty in Integrative Biology with *Regular* GFA, member of ISB PhD program
- 3) Faculty in GES with *Special* GFA, member of ISB PhD program
- 4) Faculty in Integrative Biology with *Special* GFA, member of ISB PhD program

Graduate Examination Committee

The purpose of the Examination Committee is to conduct and report outcomes for all exams required by the degree program (MS or PhD) in which the graduate student is enrolled. The Examination Committee chair is responsible for ensuring that all required exams and associated forms are completed and submitted to the Program and to the Office of Graduate Education by the published deadlines. Examination outcomes are determined by majority ($\geq 50\%$) vote of the Examination Committee members. The Examination Committee is not required but is allowed to be the same as the Advisory Committee. No member of the Examination Committee should have undue influence over another. For example, if the Advisory Committee includes a member from an external research sponsor, that member may not also serve on the Examination Committee; or if a postdoc and their faculty advisor are both members of a student's graduate Advisory Committee, both cannot also be on the Examination Committee. The Examination Committee composition must be reviewed and approved by the Program Director before the start of the third semester.

The Biology MS Examination Committee must include a minimum of three (3) faculty members, including a chair who holds a Regular GFA and is on the faculty in the Department of Integrative Biology. The Primary Advisor is not required to but is allowed to chair the MS Examination Committee. The remainder of the MS Examination Committee can include faculty from within or outside of the Department, but the majority ($\geq 50\%$) must have a GFA (Regular or Special) with membership in the Biology MS program.

The ISB PhD Examination Committee program must include a minimum of four (4) faculty members, all of whom must have a GFA. The PhD Examination Committee cannot be chaired by the Primary Advisor. The chair must have a Regular GFA and be rostered in the Department of Integrative Biology. The majority ($\geq 50\%$) of PhD Examination Committee members must have a Regular GFA and be members of the ISB PhD program. The remainder can include faculty with either Regular or Special GFA and who are members of the ISB PhD program.

Example Examination Committees for the Advisory Committee examples above:

A student doing MS level research with a non-profit partner:

- 1) Exam Chair/Primary Advisor in Integrative Biology with *Regular* GFA
- 2) Co-advisor from non-profit with *Special* GFA, member of the Biology MS program
- 3) Biologist from a state agency who does not have a GFA *and is not a financial sponsor*

Student doing PhD level research with the GES Department at UC Denver:

- 1) Primary Advisor in GES with *Regular* GFA, member of ISB PhD program
- 2) Exam Chair in Integrative Biology with *Regular* GFA, member of ISB PhD program
- 3) Faculty in GES with *Special* GFA, member of ISB PhD program
- 4) Faculty in Integrative Biology with *Special* GFA, member of ISB PhD program

Quick Reference* Table for Membership on PhD, EdD, PsyD and Master's Committees

POSITION	GFA TYPE	PRIMARY MENTOR		CO-MENTOR		COMMITTEE CHAIR		COMMITTEE MEMBER	
		PhD	Masters	PhD	Masters	PhD	Masters	PhD	Masters
Tenured or Tenure-Track Full, Associate, or Assistant Professor with doctorate ¹	Regular ^{3*}	Yes ^{***}	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Full, Associate, or Assistant Professor with professional/clinical doctoral degree ²	Special ^{4*}	No ^{2*}	Yes	Yes	Yes	No	Yes	Yes	Yes
Full, Associate or Assistant Professor with terminal master's degree	mRegular ^{5*}	No	Yes	Yes	Yes	No	Yes	Yes	Yes
<u>Research</u> Full, Associate or Assistant Professors with doctorate OR professional/clinical doctoral degree	Special	No	Yes	Yes	Yes	No	No	Yes	Yes
Clinical Teaching Track Faculty with or without doctorate	Special	No	WPP ^{**}	Yes	Yes	No	No	Yes	Yes
Instructor or Lecturer with or without doctorate	Special	No	WPP ^{**}	WPP ^{**}	Yes	No	No	Yes	Yes
Adjunct Professor with or without doctorate	Special	No	WPP ^{**}	WPP ^{**}	Yes	No	No	Yes	Yes
Postdoctoral Researchers	Special	No	WPP ^{**}	WPP ^{**}	Yes	No	No	Yes	Yes
Retired/Emeritus Tenured or Tenure-Track Faculty	Special	WPP ^{**}	WPP ^{**}	Yes	Yes	No	No	Yes	Yes
All Other Retired/Emeritus Faculty	Special	No	WPP ^{**}	Yes	Yes	No	No	Yes	Yes
Non-Employees of CU Denver Anschutz or its Affiliate Institutions									
University of Colorado Boulder or Colorado Springs Tenured or Tenure-Track Faculty	Special	WPP ^{**}	WPP ^{**}	Yes	Yes	No	No	Yes	Yes
Non-CU Faculty with or without doctorate	Special	No	No	WPP ^{**}	Yes	No	No	Yes	Yes
Industry/non-profit partner with or without doctorate	Special	No	No	WPP ^{**}	Yes	No	No	Yes	Yes
Committee Member no longer employed CU Denver Anschutz ⁶	Special	No	No	Yes	Yes	No	No	Yes	Yes

* Please see the Graduate School Policies & Procedures for details on privileges of Regular and Special graduate faculty

** With program permission

*** Regular Graduate Faculty appointed by masters programs cannot be the primary/sole mentor of a doctoral student unless also appointed by a PhD program.

¹ "Doctorate" is defined here as PhD, DPhil & DSc or equivalent, as well as the doctoral programs that report to the Graduate School at CU Denver|Anschutz: EdD & PsyD

² "Professional and/or clinical doctoral-level degrees" include MD, DPT, DDS, DVM, JD, PharmD, DNP etc. or equivalent; holders of these degrees may receive Regular appointments upon nomination of their program detailing qualifications for PhD training and approval of the Graduate School Dean.

³ Regular appointments are required to be the sole mentor/advisor of a PhD, EdD or PsyD student; typically require a doctorate but may be approved on a case-by-case basis by the Graduate School Dean for those with other qualifications including professional and/or clinical doctoral degrees.

⁴ Faculty with Special Graduate Faculty Appointments may be co-mentor/advisor in conjunction with a Regular GF member; direct, teach or assign grades in graduate classes; serve on but may not be sole chair of advisory or examination committees for PhD doctorates.

⁵ Master's programs may nominate faculty with master's degrees for "mRegular" status if the highest degree in the discipline is normally a "terminal" master's

⁶ Faculty members retain their Regular appointments only until the graduate student(s) whom they are either supervising as primary mentor or upon whose thesis/dissertation advisory and exam committee they sit, complete the requirements for their degree. Subsequent service requires a Special appointment.

PHD PRELIMINARY EXAM POLICY

Department of Integrative Biology Policy

Preliminary Exams for the PhD Program in Integrative and Systems Biology

Approved by IB Faculty Vote May 12, 2023

Effective Academic Year 2023-24

Overview

- 1) The preliminary exam is administered by the student's approved PhD committee exam committee *prior to the end of the third semester*.
- 2) The exam includes written and oral components based on a set of 4 committee-selected papers related broadly to the student's discipline(s).
- 3) Each exam will use a standardized set of questions aligned with the programmatic learning outcomes to equitably administer and evaluate the exam for all students.
- 4) The preliminary exam is a formative assessment. The bar for evaluation will be set at the expectations for a student qualified to advance to candidacy. This bar is not expected to be met by the time the preliminary exam is administered, rather it is to articulate gaps to be addressed prior to the comprehensive exam and advancement to candidacy.
- 5) The outcome of the exam will be based on majority ($\geq 50\%$) vote by the committee. It can result in a "Pass" if the committee can identify a specific plan for continued improvement in preparation for the comprehensive exams. If the committee cannot agree on a specific plan for continued improvement, the result can be either (a) "Pass with Conditions" if reconcilable problems are identified and addressed prior to taking the exam again within one semester; or (b) "Fail" if irreconcilable problems are identified. In the "Fail" case, the committee should guide the student toward best options for exiting the program (e.g. recommending transfer to the MS program, etc.).

Procedure and Content

During a scheduled meeting prior to the end of the third semester, the PhD exam committee assigns four readings from the primary literature that are related to the student's primary field of interest. The student has up to two weeks to complete the written assignment, at which time the oral exam is scheduled.

Written component: For each of the four readings, the student selects one of the following 4 categories to address in a 2-page written statement (up to 8 pages total). The student may not address the same category in writing for more than one reading. The written response is due within two weeks of assignment, at which time the Oral exam is scheduled.

Oral component: The student discusses written answers for the category selected for each reading and is prepared to address any of the other 3 categories for each assigned reading.

Category 1 (aligned with department's learning goal 1 - specialized knowledge)

1. Describe the conceptual framework underlying the paper.
2. What specific hypotheses are the authors evaluating? Phrase this to include any specific parameters that are estimated that quantify the strength/magnitude of the relationship among variables (if empirical), or to include any specific conceptual extensions to extant theory (if theoretical).

Category 2 (aligned with department's learning goal 2 - practice science)

1. What is the rationale for applying the methods chosen by the authors?
2. Based on this paper and your readings in the field, suggest follow-up questions that you would like to see addressed. Propose an appropriate experiment and methods and justify your choices for each.

Category 3 (aligned with department's learning goal 3 - communicate)

1. How well did the authors communicate their findings and what aspects of the structure or style of writing would you consider most effective?
2. Write a short paragraph for a news reporter about what this paper found and why a general audience should care.

Category 4 (aligned with department's learning goal 4 - contextual influence)

1. To what extent was the question the authors asked influenced by social, historical, or cultural context of the scientific (sub)discipline?
2. To what extent was the methodological approach the authors chose influenced by social, historical, or cultural context of the scientific (sub)discipline?

INSTITUTIONAL EMPLOYMENT AND FINANCIAL SUPPORT

Financial support for graduate students in biology is usually from a combination of research grants, fellowships, and teaching appointments. The following list is non-exhaustive; students are expected to discuss financial plans for funding their education program with their advisor, including plans for living expenses, tuition, research expenses, and health insurance.

Teaching Assistantships: The Department of Integrative Biology offers graduate teaching assistantships (GTA) on a competitive basis. GTA appointments are for 10 hrs/week per lab section taught (maximum of 20 hrs/week) and are compensated by a salary and tuition benefits. Any student on GTA must enroll in BIOL 6002 (Pedagogy) during their first semester of teaching. Note: BIOL 6002 is only offered during the Fall semester of the academic year.

Research Assistantships: Individual advisors may offer graduate research assistantships (GRA) that pay a salary and tuition benefits for conducting work on an externally funded research grant. GRA appointments are for up to 20 hrs/week during the academic year, and up to 40 hrs/week during summer.

Research Dissemination: The Department offers a one-time non-competitive \$500 travel grant to each student admitted to the program. This one-time grant may only be used for travel to present research results at professional meetings. The College of Liberal Arts and Sciences and the Office for Graduate Education both also offer support for graduate student research and travel to national meetings to present their thesis or dissertation work. Applications for those awards are reviewed on a rolling basis. Contact the Program Director for more information.

EXPECTATIONS FOR THE ADVISOR/STUDENT RELATIONSHIP

Graduate Advisors

Graduate advisor mentoring should result in students becoming independent scientists. To that end, advisors are expected to work with students to identify thesis topics that match student interests and that build on their strengths. Complementary to this, advisors are expected to guide the development of a program of study for the student, and to assist in managing (but not to determine or entirely facilitate) the schedule of milestones and associated forms required for graduation.

Graduate advisors are expected to mentor students in the design of projects, as well as in all aspects of the implementation and presentation of research. The advisor should encourage students to give frequent presentations at various stages of their research, especially during the proposal development stage. Advisors guide students to develop presentations intended for a range of audiences, from those in the research lab to an audience at an internationally attended professional meeting. When possible, the advisor should attend professional meetings with the student and help the student establish connections with other scientists who might benefit some aspect of the student's research or future career. Advisors are expected to mentor students in scientific writing and in publishing their work in peer-reviewed journals as these activities form the basis for professional network development in the sciences.

Graduate advisors are expected to discuss opportunities for employment and/or other forms of financial support within their research groups, at the University, and across professional networks. Advisors are expected to clearly communicate their mentoring philosophies as related to the student's goals for graduate school. The advisor is expected to identify benchmarks that would indicate satisfactory progress through the program, and to conduct an open discussion about expectations related to intellectual ownership, publication practices, authorship order, and as related to applying for grants to help cover the costs of stipends, tuition, and research expenses. These discussions are expected to occur very early and often in the student program, ideally starting even before the student joins the lab. At the request of either advisor or student, any or all aspects of these discussions may be documented and filed with the Program Director.

Graduate Students

Students are expected to behave independently and to take responsibility for their own learning, including asking appropriate personnel for help when required. Graduate students are expected to communicate regularly with their advisor and their advisory committee about the progress and needs for their research programs. Students are ultimately responsible for developing a defensible research program that will lead to eventual publication of results in a peer-reviewed outlet.

Students are expected to behave professionally. They represent the University, the Graduate Program, the Department of Integrative Biology, and their advisor. Students should actively engage as part of their advisor's research group and collaborate with other students and faculty in the graduate program as appropriate. Students are expected to network with other students and faculty in the Program and at other Universities and Organizations by presenting their research at professional conferences. Students are expected to become aware of and pursue funding opportunities to enhance their research programs.

Students are expected to manage their time wisely so that they can meet deadlines that are either self-imposed or that are established by their advisor, by their advisory committee, by course instructors, by the Graduate Program, or by the Office of Graduate Education. Students are expected to understand Department, Program, and Office of Graduate Education policies as they relate to student conduct, requirements, and timelines.

Students are expected to arrange for health insurance through the ACA or other means and to maintain other insurance needed for their graduate school activities. If students are anticipating being without coverage, they should discuss this potential with their advisor to identify options for continuing their insurance coverage through their tenure in the program.

Students are ultimately responsible for understanding and adhering to all requirements for graduation, and (of course) are *expected to enjoy their time in graduate school*.

Research Assistantships

If the position involves a paid research assistantship or other contractual work, the advisor and student should work together to develop (and document) reasonable and realistic expectations for work hours, vacation days, holidays, milestones, and other important work/progress expectations. If desired by either party, a written document can be placed on file with the Program Director.

Teaching Assistantships

If the position involves a paid teaching assistantship or other contractual work unrelated to the research, the advisor and student should work together to adjust (and document) reasonable and realistic expectations for research progress that fairly accounts for the time required to complete the outside work. If desired by either party, a written document can be placed on file with the Program Director.