

# Department of Biology New Mexico State University Graduate Student Handbook

Last Updated August 2024

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WELCOME! This guide was written with one major goal: to provide you a general reference containing information to help you progress to your graduate degree. There is a lot of information, but we have tried to keep it as user friendly as possible. Included in this packet are excerpts from the NMSU Graduate School Catalog regarding rules and guidelines in place for a Masters in Science (M.S.) and Doctorate in Philosophy (Ph.D.) degrees. Each graduate student in Biology is subject to the regulations and guidelines in the NMSU Graduate Catalog specific to the most current admission date corresponding to her/his own date of admission (<https://catalogs.nmsu.edu/nmsu/>). Please check the NMSU Graduate Catalog for the year in which you were admitted to be informed of guidelines, procedures, forms and timelines imposed by the Graduate School (go to the catalogs link above, then scroll down to find an archived version of the catalog for the year in which you were admitted). The Graduate School website (<https://gradschool.nmsu.edu/>) also has useful information on topics relevant to procedures covered in this Handbook including the [Academic Calendar](#) with current deadlines and information on [Degree Audits](#).

The Biology Department establishes the details of its graduate programs in compliance with Graduate School requirements. This Handbook contains information about the general requirements to successfully complete your M.S. or Ph.D. program in Biology including: assembling your Graduate Advisory Committee, generating an annual Individual Development Plan (IDP) in collaboration with your major advisor, scheduling annual committee meetings to assess your progress, defining your coursework plan, preparing for the required Qualifying (Ph.D. candidates only), Comprehensive (Ph.D. candidates only) and final Oral and Written Exams (both M.S. and Ph.D.), and generating a timeline to schedule each of these milestones so that you complete your graduate training in a timely manner.

The relatively free-form nature of graduate education, the necessity to become a self-motivator, and the diverse challenges of research and teaching can cause stress, anxiety, and self-doubt. Keeping the lines of communication open between you and your faculty advisor, between you and your fellow students, and between you and your Graduate Advisory Committee members, will help in making your graduate training a positive experience. Please do not hesitate to contact us, the Graduate Ombudsperson (Dr. Jen Curtiss) or any faculty member of the Biology Department, regarding any concerns, questions, or suggestions that you may have about the Biology graduate degree program.

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## The BIOLOGY GRADUATE STUDENT ORGANIZATION (BGSO) <https://wordpress.nmsu.edu/bgso/home/>

Every Biology graduate student is automatically a member of the Biology Graduate Student Organization (BGSO). The BGSO serves several purposes, such as promoting interactions among the graduate students, providing information about the department and the university to the graduate students, and representing graduate student concerns to the faculty and other campus organizations. The BGSO is the graduate student representative body within the Biology Department at NMSU. Through the BGSO, graduate students are provided a venue to discuss and express concerns and ideas related to graduate student life within the Department and at NMSU. The BGSO participates in numerous activities within the university and the community, including science fairs, fundraisers, and other volunteer activities. Through participation in these activities the BGSO garners funds that can be used for group activities or to expand the BGSO library. The BGSO actively participates with the Department in sponsoring an annual departmental Biosymposium where students and faculty present their research through informative presentations and posters. The BGSO also holds occasional informal social gatherings and activities. The BGSO welcomes all new graduate students to the Department and to NMSU. We hope you look into the BGSO and become an active member. One of the many benefits of being an active member is eligibility to apply for travel funds through the Graduate Student Council (GSC) and through ASNMSU.

### Subscribe to the Biology Listserv

To keep up-to-date on all that goes on in the department as well as get important information regarding safety requirements, funding opportunities, graduate seminars and activities that benefit your training, you must subscribe to the Biology Listserv and the Biology Grad Listserv. The Graduate Coordinator will ensure that email addresses for new students are incorporated into the Biology Grad Listserv, and that email addresses for students who have completed their degree are removed. If you find you are not receiving information from this Listserv please alert Graduate Coordinator Tim Wright ([wright@nmsu.edu](mailto:wright@nmsu.edu)). Gloria Talamontes is in charge of maintaining the Biology Listserv; please contact her at [gfranke@nmsu.edu](mailto:gfranke@nmsu.edu) to be placed on that list.

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### TYPES OF GRADUATE PROGRAMS IN BIOLOGY

Students may obtain a graduate degree in Biology by completing one of the following:

- Thesis Masters research program in Biology (M.S.)
- Non-thesis Masters program in Biology (M.S.)
- Non-thesis Masters in Biotechnology (M.S.)
- Doctorate research program in Biology (Ph.D.)

Many of the requirements listed in this handbook also appear in the Graduate School Catalog (<https://catalogs.nmsu.edu/nmsu/>). Incoming students should familiarize themselves with all applicable regulations and begin planning their programs accordingly. Any questions concerning the interpretation of a specific requirement should be addressed to the Department Head, the Graduate Coordinator, your major advisor or any member of the Graduate Education Committee (GEC). Faculty membership in the GEC rotate; feel free to ask the Department Head about current membership. **The faculty are here to help, but the final responsibility for meeting all requirements rests solely with the student.**

## THE GRADUATE PROGRAM

The ultimate goals of graduate students are to obtain a M.S. or a Ph.D. and to enter a professional career in science. A "professional career in science" can be many things, e.g., a professor in a research university, small liberal arts college, or community college, a research position in industry, government or a nongovernmental organization, or science communication, administration or entrepreneurship, to name a few. Anyone who is admitted to the Biology graduate program at NMSU already has the preparation needed to successfully complete a Master's or Doctorate degree. However, self-motivation, self-discipline, and guidance from faculty and peers are also necessary ingredients. The purpose of this guide is to outline the general steps toward obtaining your degree and to reassure you that the attainment of this goal is both possible and rewarding.

In graduate school, there are few formal courses, as most training is done outside of the formal classroom in lab meetings, laboratories or the field. You will have quantitative assessments of your performance (e.g., exam grades, course grades), and each assessment is of critical importance. Your rate of progress will depend largely on your own initiative and hard work. Obtaining an M.S. or Ph.D. requires you to develop a set of technical and intellectual skills; how and where you learn those skills may differ for each student.

## ESSENTIAL SKILLS FOR ALL GRADUATE STUDENTS

**Communication Skills.** You need to learn to write clearly, concisely, and professionally in English in order to generate peer-reviewed publications, which will help you to advance in your professional career. If you struggle to write clearly, consider taking a course in technical writing or find another way to improve your writing ability (ask your major advisor, the graduate coordinator or other graduate students if you are unsure how to do this).

You also need to learn to give oral presentations about your research that are articulate, engaging and informative. The best way to improve your skills is by giving plenty of talks in both formal and informal contexts. These contexts include presentations at local, regional, national and international conferences, each of which may require somewhat different depth of coverage. The more opportunities to present your research at these different levels, the greater will be your ability to move on in your professional career as a scientist. Take advantage of any opportunity to give an oral presentation about your research (e.g. the local NMSU Biosymposium, local NMSU seminar courses, regional, national and international conferences).

Many regional, national and international conferences will require funds for registration, travel and lodging. Your major advisor may be able to help out with this. In addition, the NMSU Graduate School has a funding page [here](#), the Graduate Student Council a page [here](#) and the College of Arts and Science a page [here](#) with applications to request funding for travel to regional, national and international conferences (keep an eye out in your email account for up-to-date information and deadlines). In addition, many academic societies (e.g. the Genetics Society of America) have funding to support student travel.

Besides written and oral presentation of your own research, you need to be able to teach students who know far less than you do. Working as a Teaching Assistant, and taking the job seriously, is an excellent way to improve your teaching skills. NMSU also has a variety of workshops to help in this task (check offerings by the [Teaching Academy](#)).

Finally, you need to be able to interact informally and comfortably with other professionals – both scientists and non-scientists. The best way to improve these communication skills and build your professional network is to take opportunities to discuss science with your colleagues, visiting seminar

speakers, and members of your broader scientific community through meetings and conferences.

**Analytical Skills.** You will need to develop a set of analytical skills that allow you to evaluate the logic of scientific arguments; develop a research project that is tightly reasoned, realistic and feasible and fundable; and collect and analyze data and/or develop theoretical models, often under less than ideal conditions. The specifics of these skills will depend on your interests and the details of your thesis or dissertation project, and are likely to be developed over the course of your graduate career, not all at once. Another essential analytical skill is to critically evaluate scientific papers. You should read papers related to your research area not just to obtain additional background information, but to also be able to evaluate each paper's data and conclusions (i.e., why are they good and/or what are their shortcomings). This is a skill you will develop in both classes and in informal settings like journal clubs and lab meetings.

**Experimental Skills.** Regardless of the lab in which you ultimately carry out your dissertation research, you will be expected to master a number of experimental procedures. Generally other members of the lab and your advisor are your primary resource for providing hands-on training. However, additional information on experimental approaches is typically available in the literature, or from other labs at NMSU or beyond. Successful graduate students seek to learn about both their projects and the methods used. Understanding the theoretical and technical aspects of your work may help you to find either more robust or simpler approaches and ultimately lead to higher levels of success.

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## GRADUATE ACADEMIC PROGRAMS IN BIOLOGY

Below are described the graduate academic programs available in Biology, containing excerpts from the NMSU System Academic Regulations & Policies in the current (2023-2024) NMSU Graduate School Academic Catalog (<https://catalogs.nmsu.edu/nmsu/>). Students are tied to the Academic Regulations & Policies of the catalog year in which they were admitted.

### THE ACADEMIC PROGRAM: MASTER'S IN SCIENCE (M.S.)

#### Helpful Links

- <https://catalogs.nmsu.edu/nmsu/regulations-policies/#academicprogramsofstudytext>
- <https://gradschool.nmsu.edu/Current%20Students/Graduate%20Forms.html>

A Master of Science in Biology requires that you demonstrate a high-order proficiency in one of the specific emphases offered in the Biology Department (see Biology Department Emphases below). The M.S. degree is preparatory for a doctoral program in the subject or for careers that call for a specialized body of theoretical and/or applied knowledge in biology.

The Master of Science in Biology degree can be obtained through either a thesis option or a non-thesis option. Both options require 30 credits of graduate (450 level and above) course work, with at least 15 credits in Biology graduate (450 level and above) courses. In addition, a thesis Master's degree must include a minimum of 4 and a maximum of 6 thesis credits (BIOL 599 Master's Thesis). The non-thesis Masters in Biotechnology may be completed as an accelerated (one-year) program concentrating on biotechnology (<https://bio.nmsu.edu/students/biotech-professional-masters-degree-program.html>).

Students in the M.S. in Biology program are expected to complete their degree in two years, although exceptional circumstances may require a longer degree program. Students should meet with their Graduate Advisory Committee on a yearly basis to provide progress reports and for guidance on meeting requirements for completion of the degree program.

**Thesis Masters program in Biology.** The general requirements from the NMSU Graduate School are similar for each area of specialization (except for course requirements) and include:

1. Completing basic coursework (see below for examples of courses that are regularly offered)
2. Completing a Program of Study
  - a. Before completion of 12 credits of graduate coursework and in consultation with your advisor
  - b. Student must have a minimum cumulative GPA of 3.0
  - c. Required Program of Study Form (for establishing your initial program of study)
  - d. Program of Study Change Form (for amending your program of study if necessary)
  - e. Submission of the Program of Study to the Graduate School constitutes your Application to Candidacy
3. Assembling a Graduate Advisory Committee
  - a. Minimum of 3 faculty members with who hold at least a Master's degree
  - b. Please see the graduate catalog [here](#) , as well as the Handbook below, for more information about the requirements for choosing committee members for a Master's Degree with a Thesis option.
4. Completion of research and coursework and preparation of the M.S. Thesis
5. Passing defense of the Thesis through a final Oral Examination
  - a. The thesis must be submitted to committee members 10 working days prior to the defense.
  - b. For graduation in a particular semester, the last day to complete the thesis defense and submit the thesis to the graduate school is announced near the beginning of the semester, and generally falls near the middle of the semester.
  - c. Student must be enrolled for at least 1 credit during the semester in which the thesis defense occurs.
  - d. Required Masters Final Examination Form available [here](#)
    - i. Must be submitted to the Graduate School at least 10 working days before the date of the exam
6. Filing Thesis with the Graduate School
  - a. Form and style must comply with regulations, information available [here](#)

**Non-Thesis Masters program in Biology.** The general requirements from the Graduate School are similar for each area of specialization (except for course requirements) and include:

1. Completion of basic coursework (see below for examples of courses that are regularly offered)
2. Passing final Oral and Written Examinations
  - a. Student must have a cumulative GPA of at least 3.0
    - i. Cumulative GPA calculated from NMSU graduate course work only
  - b. Student must be enrolled for at least 1 credit during the semester in which the final oral and written examinations occur.
  - c. Required Report of Written Exam Results for Masters Non-Thesis Students available

[here](#)

**Non-Thesis Masters program in Biotechnology.** The non-thesis Masters in Biotechnology requires 30 credits for graduation. The curriculum consists of 12-15 credits per semester over two semesters with an optional summer internship. The general requirements include:

1. Completion of basic coursework (see below for examples of courses that are regularly offered)
2. Completing a Program of Study
  - a. Before completion of 12 credits of graduate coursework and in consultation with your advisor
  - b. Student must have a minimum cumulative GPA of 3.0
  - c. Required Program of Study Form [here](#) (for establishing your initial program of study)
  - d. Program of Study Change Form [here](#) (for amending your program of study if necessary)
  - e. Submission of the Program of Study to the Graduate School constitutes your Application to Candidacy
3. Passing final Oral and Written Examinations
  - a. The Examining Committee will consist of the Biotech Master's Committee.
  - b. Student must have a cumulative GPA of at least 3.0
    - i. Cumulative GPA calculated from NMSU graduate coursework only
  - c. Student must be enrolled for at least 1 credit during the semester in which the final oral and written examinations occur.
  - d. Required Report of Written Exam Results for Masters Non-Thesis Students available [here](#)

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## THE ACADEMIC PROGRAM: DOCTORATE IN PHILOSOPHY (Ph.D.)

### Helpful Links

- <https://catalogs.nmsu.edu/nmsu/regulations-policies/#academicprogramsofstudytext>
- <https://gradschool.nmsu.edu/Current%20Students/Graduate%20Forms.html>

The Ph.D. degree in Biology requires that you demonstrate a mastery of biology at the graduate level in your area of emphasis, and a substantial ability to carry out original research resulting in peer-reviewed publications.

The degree requires 30 credits of graduate (450 level and above) course work, and includes the preparation of a dissertation. In addition to the coursework credits, the degree requires at least 18 credits of dissertation work (700-level).

You may expect that your PhD studies to last for approximately five to six years. The duration may vary depending on a number of factors, including your level of preparation and the nature of your research project. During the first three years the emphasis is typically on coursework and reading in preparation for the Qualifying and Comprehensive examinations, and on initiating your research project. The remaining three years are typically devoted primarily to research and to the completion of the Dissertation, although some students may take additional coursework during this period.

The general requirements from the NMSU Graduate School include:

1. Completing basic coursework (see below for examples of courses that are regularly offered)
2. Assembling a Graduate Advisory Committee
  - a. Minimum of 4 graduate faculty members with a doctoral degree
  - b. Please see the graduate catalog [here](#) for more information about the requirements for choosing a Doctoral Graduate Committee.
3. Passing the Qualifying Examination (from the Graduate Catalog)
  - a. Students without an M.S.: after 12 credits of graduate coursework
  - b. Students with an M.S. from a different university:  
before completion of 1 semester of graduate work
  - c. Students with an M.S. from NMSU:  
M.S. thesis defense can serve as the doctoral qualifying exam
  - d. Required form available [here](#)
  - e. Potential outcomes of Qualifying Examination
    - i. Admit the student to further work toward the doctorate
    - ii. Recommend that the program be limited to the master's degree
    - iii. Recommend a re-evaluation of the student's progress after the lapse of one semester
    - iv. Recommend a discontinuation of graduate work
4. Upon passing the Qualifying Examination: Admission to the Doctoral Program
5. Completing a Program of Study
  - a. To be filed upon:
    - i. Successful completion of 1 year of enrollment while at NMSU beyond the master's degree
    - ii. Successful completion of the Qualifying Examination
  - b. Required Program of Study and Committee for Doctoral Students Form [here](#)
    - i. Be sure to include at least 18 credits of dissertation work (700 level)
  - c. Program of Study Change Form [here](#)
6. Passing the Comprehensive Examination
  - a. Comprehensive Examination is to be taken after:
    - i. Completion of adequate course work
    - ii. Graduate committee determines the student is adequately prepared
    - iii. Normative time to Comprehensive Examination: no later than 5 semesters after entering the Ph.D. program.
  - b. Required Doctorate of Philosophy Examination Form [here](#)
    - i. Form must reach the office of the Graduate School at least 10 working days before the exam date
  - c. Student must be registered for 3 credits of graduate coursework during the semester in which they take the comprehensive examination, or for 1 credit if they take the Comprehensive Exam in the summer
  - d. Potential outcomes of the Comprehensive Examination: Any student who fails the comprehensive examination may either be terminated from the doctoral program or upon recommendation of the committee and approval of the Dean of the Graduate School, be granted a second examination after a lapse of at least one semester.
  - e. 700-level dissertation hours can be taken after a student successfully completes the

- comprehensive exam.
7. Completion of research project and preparation of the Ph.D. Dissertation
  8. Passing defense of the Dissertation through a Final Oral Examination
    - a. The thesis must be submitted to committee members 10 working days prior to the defense.
    - b. For graduation in a particular semester, the last day to complete the thesis defense and submit the thesis to the graduate school is announced near the beginning of the semester, and generally falls near the middle of the semester.
    - c. Required Doctorate of Philosophy Examination Form [here](#)
      - i. Form must reach the office of the Graduate School at least 10 working days before the exam date
    - d. Student must be registered for at least 1 credit if they take the Final Oral Examination in the summer
  9. Filing Thesis with the Graduate School
    - a. Form and style must comply with regulations [here](#).
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## GENERAL DEPARTMENTAL POLICIES

### Satisfactory Academic Progress

For Biology graduate degrees your program of study is planned in consultation with your Graduate Advisory Committee and your primary faculty mentor. You should meet with your primary faculty member regularly; ideally at least once weekly. ***You should meet with your Graduate Advisory Committee at least once a year to discuss and evaluate your progress.*** Items such as courses taken and those to be taken, research progress, exam scheduling, and work as a teaching or research assistant should be discussed. The Graduate Advisory Committee is responsible for making specific recommendations concerning your progress. The Graduate Advisory Committee may also approve exceptions to the normal time schedule occasioned by unusual circumstances. At the end of this meeting, your faculty mentor should complete the Graduate Student Committee Report Form [here](#) circulated to all committee members for additions and/or corrections, and signed and dated by all committee members. It is then sent to the graduate coordinator for review. A copy will be given to you and the original will be kept in your file in the departmental office. This form is used for Ph.D., Thesis Masters, and Non-thesis Masters students.

### Unsatisfactory Academic Progress

It is hoped that you will make good progress in your degree program. Failing to do so will have serious consequences for your career in graduate school. For example, if as a Ph.D. student you do not reach deadlines such as Qualifying and Comprehensive Exams in a timely fashion (see General Requirements for a Ph.D. degree in the section above), if your GPA drops below the minimum level of 3.0, or if you have 12 or more units of "I" grades, you may no longer be eligible to receive funding through the Department or the Graduate School.

### Dismissal from the Graduate Program

Graduate students are subject to the rules and regulations with respect to disciplinary probation and suspension as listed in the "Student Code of Conduct" section of the Student Handbook:

<https://studenthandbook.nmsu.edu>. Involuntary dismissal from the graduate program can result from unsatisfactory academic progress or unethical behavior. In the case of inadequate performance in research or courses, you will be warned, in writing, by your committee and given one semester to rectify your behavior. The warning should specifically state the work or actions required of you. In cases of academic dishonesty, scientific misconduct, and other prohibited conduct described in the **Administrative Rules and Procedures (ARP) Conduct Standards**, failure upon reexamination in the qualifying exam, or violation of safety regulations, dismissal requires no warning.

**Leave of Absence/Continuous Enrollment.** Students working on advanced degrees who plan an interruption in studies for a calendar year should address a request for leave of absence to the Graduate School, via the Department Head.

- Required **Leave of Absence form**

A graduate student on leave of absence will be expected not to use university facilities and place no demands upon the university faculty and staff, and, therefore will pay no fees. Time spent in leave-of-absence status will not be counted toward time limits (see below). If you fail to register for one calendar year without obtaining a leave of absence from the Graduate School you will be considered withdrawn from the university.

### **Financial Support**

Employment of graduate students as graduate assistants at NMSU is governed by the Collective Bargaining Agreement (CBA) between the Regents of NMSU and the United Electrical, Radio and Machine Workers of America (hereafter “the Union”). Details on the CBA are [here](#). Graduate students in Biology are generally supported by a Graduate Assistantship (GA) during the academic year. A GA may come in the form of either a Teaching Assistantship (TA), which is provided by the Biology department, or of a Research Assistantship (RA), which is provided by a fellowship, scholarship or by a student’s faculty advisor’s grant. The graduate coordinator endeavors to ensure that all students have some sort of GA during the academic year, but there can be no guarantees of support.

As per Article 11 of the CBA, To be eligible for a GA, a student must be enrolled full-time (9 credits) each semester. The one exception is during a student’s last semester, when it is possible to enroll for fewer credits and still be eligible for a GA. This requires that a student submit a **Graduate Assistant Part-Time Enrollment Waiver form**.

There is very little financial support provided for graduate students by the Biology department during the summer, though a student’s faculty advisor may provide support. There are generally a small number of TAs needed in the summer.

Graduate students must pay tuition and health insurance per NMSU policy. There are a few awards and funding opportunities available to help with tuition, as well as fellowships that may cover an RA. Please find more information [here](#).

### **Time Limit**

The following limits are in place for GA support awarded from the New Mexico State General Fund

- Students enrolled in a 2-year master’s degree program (less than 40 required credits)
  - 2 years of GA support (the Biology Department can appeal for a 5<sup>th</sup> semester of support)

- Entering Ph.D. students without a master's degree in the field of study
  - 5 years of GA support (the Biology Department can appeal for a 6<sup>th</sup> year of support)
- Entering Ph.D. students with a master's degree in the field of study
  - 4 years of GA support (the Biology Department can appeal for a 5<sup>th</sup> year of support)

You may receive support from other sources (e.g. a research grant to your advisor) if you do not finish within the time limits specified above.

Also, please keep in mind that if more than five years have elapsed since the date of your Comprehensive Examination, you will be required to take another Comprehensive Examination before you are admitted to the Final Examination.

### **Safety in Research Activities**

The CBA mandates that NMSU provide a safe working environment that complies with State and Federal laws. To comply, graduate students must take all necessary safety training courses offered by **NMSU Environmental Health and Safety** prior to beginning work in a lab. At a minimum you must take the following:

- **Annual Compliance Training**
- **Hazard Communication**
- **Fundamentals of Laboratory Safety**

You may need to take additional training, depending on your area of research. For instance, if you are working with live animals, you must take the Animal Worker Safety course. Please see the NMSU Environmental Health and Safety Training Requirement for Laboratory and Research Areas website for additional information.

Further, you are required to take a Laboratory Safety Refresher class annually after the initial Laboratory Standard or Fundamentals of Laboratory Safety class, and you must also take the annual Biology Department Safety Seminar. Both of these occur in the Fall semester during the regular Departmental Seminar Series time (see below).

### **Teaching Assistant Training**

If you work as a Teaching Assistant (TA), you must take the required TA orientation, offered by Dr. Amy Marion ([amarion@nmsu.edu](mailto:amarion@nmsu.edu)), which is generally offered each semester on the Monday and Tuesday before classes start.

### **Student Conduct**

Graduate students are expected to observe and maintain the highest academic, ethical, and professional standards of conduct. Students should consult "**Academic Code of Conduct**" in the Student Handbook (<https://studenthandbook.nmsu.edu>) for more specific information regarding the rules of conduct and definitions of misconduct such as plagiarism, cheating, nondisclosure or misrepresentation of academic credentials, fabrication of data, or other forms of academic misconduct.

### **Conflict Resolution**

Occasional disagreements or conflicts may arise between students and their mentors or other members of the Biology Department. The Department has several routes to resolving such conflicts.

The first should be to attempt open and frank discussions between the parties concerned. If such discussions are not possible, or do not lead to a resolution, then the student should consider talking to the Biology Ombudspersons (Dr. Jen Curtiss [curtij01@nmsu.edu](mailto:curtij01@nmsu.edu)). The ombudspersons serve as neutral parties who can provide advice and mediate between disputants. The Biology Graduate Coordinator (Dr. Tim Wright [wright@nmsu.edu](mailto:wright@nmsu.edu)) is always available to discuss issues and concerns and work towards a fruitful resolution of conflicts; if necessary he will consult with the Department Head (Dr. Brad Shuster [cshuster@nmsu.edu](mailto:cshuster@nmsu.edu)). Grievances regarding matters governed by the CBA are governed by the CBA and should be handled according to the procedures outlined [here](#).

*It is your responsibility to review the graduate catalog [here](#) and the CBA [here](#) often for updates on all rules and policies.*

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## BIOLOGY GRADUATE COURSEWORK

As described above, Master's students are required to have 30 credits of coursework 450 and above. Ph.D. students need at least 12 credits of coursework beyond what is expected for Master's students. Required courses are listed in the NMSU Catalog under the College of Arts and Sciences. (Overview: <https://catalogs.nmsu.edu/nmsu/arts-sciences/biology/>, Master of Science in Biology & Biotechnology Program: <https://catalogs.nmsu.edu/nmsu/arts-sciences/biology/biology-master-science/>, Doctor of Philosophy in Biology: <https://catalogs.nmsu.edu/nmsu/arts-sciences/biology/biology-doctor-philosophy/>).

**Core (graduate core) courses.** It is highly recommended that you complete your core courses during your first four semesters. If you wish to request an exemption, you must submit a written request for an exemption to your Graduate Advisory Committee justifying the reason for the exemption. Where possible, the semester in which a particular course is usually offered is given, but you should check course offerings regularly.

- BIOL 510, Current Topics in Biology (3 credits), **Fall semester**
- BIOL 540, Science and Ethics (1-3 credits), **Spring semester**

Additional suggestions for all Biology Graduate Students:

- At least one Genetics course from the following list:
  - BIOL 478, Molecular Biology of Microorganisms (3 cr)
  - BIOL 488, Principles of Conservation Genetics (3 cr)
  - BIOL 489, Genetic Aspects of Population Biology (3 cr)
  - BIOL 545, Molecular and Biochemical Genetics (3 cr), **Spring semester**
  - BIOL 562, Genomics (3 cr)
- Students who have not previously taken a course in evolution are encouraged to take BIOL 467 Evolution, **Fall semester, Spring semester, sometimes Summer** or BIOL 589 Speciation and Adaptation (offered **alternate Fall semesters**).
- BIOL 542, Advanced Bioinformatics (3 cr)
- A ST 505, Statistical Inference I (4 cr) OR BIOL 455 Biometry (3 cr)
- A ST 502, Statistical Inference II (3 cr)
- BIOL 541, Professional Development Seminar (1 cr)

◆ **Cell and Organismal Emphasis.** The cell and organismal curriculum is appropriate for graduate students who wish to emphasize those areas of biology that integrate function and structure in cells, tissues, and organisms. This curriculum includes courses in cell and molecular biology, neurobiology, developmental biology, and physiology. Our goal is to prepare students for careers in this field through research experiences and formal coursework, as well as through seminars and discussion groups.

Courses offered/suggested:

- BIOL 470, Developmental Biology (3 cr), **Fall semester**
- BIOL 474, Immunology (3 cr), **Fall semester**
- BIOL 490, Neurobiology (3 cr), **Varies**
- BIOL 520, Molecular Cell Biology (3 cr), **Spring semester**
- BIOL 533, Environmental Physiology of Plants (3 cr)
- BIOL 536, Advanced Vector Biology (3 cr)
- BCHE 542, Biochemistry (3 cr), **Fall semester**
- BIOL 560, Seminar in Cell and Organismal Biology (1 cr) OR MOLB 590: Discussions in Molecular Biology (1 cr), **Fall semester and Spring Semester**
  - Students are expected to present their research once per year in one of these courses
- BIOL 581, Physiology of Animals (3 cr)
- BIOL 590, Neuroscience (1-3 cr)

◆ **Ecology and Evolution Emphasis.** The Ecology/Evolution core curriculum is appropriate for graduate students who wish to specialize in areas of biology that study the various processes that encompass the ecology and evolution and behavior of living and extinct taxa.

Courses offered/suggested:

- BIOL 450/550, Seminar in Behavior, Ecology, Evolution, Systematics and Taxonomy (1 cr)
- BIOL 480, Animal Behavior (3 cr)
- BIOL 484, Animal Communication (3 cr)
- BIOL 567, Individuals and Populations (3 cr)
- BIOL 568, Communities and Ecosystems (3 cr)
- BIOL 587, Behavioral and Evolutionary Ecology (3 cr)
- BIOL 588, Principles of Evolutionary Genetics (3 cr)
- BIOL 589, Speciation and Adaptation (3 cr)

◆ **Microbiology Emphasis.** The Microbiology core curriculum is appropriate for graduate students who wish to specialize in areas of biology that study the various processes that occur in microbes (bacteria, viruses, fungi and protists) such as their physiology, ecology, development or evolution.

Courses offered/suggested:

- BIOL450/550, Microbiology Research Seminar (1 cr)
- BIOL 451, Microbial Physiology (3 cr), **Spring semester in odd years**
- BIOL 469, Emerging Infections Disease (3 cr), **Fall semester in odd years**
- BIOL 474, Immunology (3 cr), **Fall semester**
- BIOL 475, Virology (3 cr), **Spring semester in odd years**

- BIOL 478, Molecular Biology of Microorganisms (3 cr), **Fall semester**
- BIOL 479, Medical Microbiology (3 cr), **Spring semester**
- BIOL 479L, Medical Microbiology Lab (1 cr) **Spring semester**
- BIOL 527, Symbiosis

**Advanced graduate courses.** As mentioned above, the Master of Science in Biology (either thesis or non-thesis) requires 30 credits of graduate (450 level and above) course work, with at least 15 credits in Biology graduate (450 level and above) courses. The PhD requires 12 credits of coursework (450 level and above) beyond what is expected for master's students. In addition to the courses listed above, the department offers advanced graduate courses on special topics (see list below). If you are struggling to find enough course credits to cover your degree you may use BIOL 498 or BIOL 598 credits to do so. In addition, if you are a Biology Master's thesis student you need a minimum of 4 but no more than 6 thesis credits (BIOL 599 Master's Thesis) to complete your degree. Biology PhD students may enroll in BIOL 600 prior to the Comprehensive Exam, and need to enroll for at least 18 credits of dissertation work (700-level) BIOL 700 after the Comprehensive Exam. You should check with your advisor for approval. You are strongly advised to meet each semester with your advisor(s) and your committee to discuss core courses and non-core courses that will optimize your graduate training preparation.

- BIOL 498. Biology Research Programs (1-3 cr). Directed studies and research experiences, by arrangement with instructor. May be repeated for a maximum of 6 credits.
- BIOL 598. Special Research Programs (1-9 cr). Individual investigations either analytical or experimental.
- BIOL 599. Master's Thesis (0-88 cr). Thesis research.
- BIOL 600. Doctoral Research (1-88 cr). Research units performed pre-Comprehensive Exam.
- BIO 697. University Teaching Experience (1-3 cr)
- BIOL 700. Doctoral Dissertation (0-88 cr). Research units performed post-Comprehensive Exam

**Departmental Seminar Series.** Every semester, the Departmental Seminar Series is scheduled on Thursday afternoons at 4:00 in Foster Hall 231. During each seminar, scientists from NMSU as well as other universities deliver scientific talks. **All graduate students are expected to attend these seminars.**

### **INDIVIDUAL DEVELOPMENT PLANS**

All graduate students are required to complete an Individual Development Plan (IDP) using the current form once per year. Students should work together with their major advisors to complete these plans, which must be submitted to the Graduate Coordinator ([wright@nmsu.edu](mailto:wright@nmsu.edu)) every year by February 15. Students who are co-advised by a faculty member outside the Biology Department are advised that their IDP must be developed in collaboration with and signed by their Biology mentor, not the advisor outside the Biology Department. Please find the current IDP forms here: <https://bio.nmsu.edu/students/grads.html>.

### **GRADUATE ADVISORY COMMITTEE**

In your first semester of graduate school you should select your graduate advisory committee members. This should be done in consultation with your primary faculty advisor and take into account

your research and career interests, the individual specialties of the faculty, and the time constraints of the faculty. Pending approval by the Biology faculty, graduate students may be co-advised by a faculty member from outside the Biology Department; however, you must enroll in research credits (for example, BIOL 598) with your Biology mentor, and the Biology mentor must also sign your annual IDP. In addition, you are only allowed to list one “official” advisor when your thesis or dissertation is submitted. You will need to ask faculty whether they are willing to serve as a member of your committee – a good approach is to email a potential committee member to set up a time to discuss this possibility with them. Be prepared to discuss your research and professional goals as part of this meeting. One member of your committee must serve as the Dean's representative. The Dean's representative can be either the member from the related area or minor area or an independent member appointed by the Dean of the Graduate School but must not be from your own department. In programs where more than one department is a participant, the Dean's representative may not be from any of those departments.

You and your primary faculty advisor may structure your advisory committee to include more than the minimum number of members as long as the stated conditions of membership are satisfied (see the “Graduate Committee for Thesis Option under “Master’s Degree”, or “Doctoral Graduate Committee” in the **NMSU Graduate Catalog**. Additional voting and nonvoting members may be any person approved or appointed by the Dean of the Graduate School. Changes in committee membership are often necessary due to faculty travel, sabbatical, or any other cause for inability to responsibly and efficiently serve as a committee member. However, no change in membership of the doctoral committee may be made without prior approval from the Dean of the Graduate School.

It is possible to include non-NMSU scientists on your committee. This requires appointment of that person to the NMSU Graduate Faculty. Instructions and the necessary form are available **here**. Note that the appointment must be approved by the Biology Department Head, the Dean of Arts & Sciences, and the Graduate Faculty Review Committee.

Should your primary faculty advisor become unavailable to mentor you, whether through departure from the University, death, or other cause, it will be your responsibility to identify a new faculty advisor. Because of the nature of graduate study, it is not possible to remain within the Biology Department graduate program without a primary faculty mentor. You must identify a new advisor by the beginning of the Fall semester that follows this change in mentoring status and follow the procedures outlined below for changing mentors in order to remain in the program; failing to do so will result in the loss of assistantship support and dismissal from the program.

**Graduate Committee: Thesis Masters.** The master's degree committee will consist of a minimum of three graduate faculty members holding at least master's degrees. The committee chair must be graduate faculty from the Biology Department (generally your primary research advisor). The second committee member is usually graduate faculty from the Biology Department, however for students with a declared minor the second committee member may be graduate faculty from the minor Department. The third committee member must serve as the representative for the Dean of the Graduate School. The Dean's representative may be graduate faculty in a related Department (recommended by the committee chair) or be appointed independently by the Dean of the Graduate School, but cannot be faculty from the Biology Department.

**Graduate Committee: Doctoral.** The doctoral committee will be composed of at least four members

of the graduate faculty holding doctoral degrees. At least three committee members must be from doctoral-granting departments. The committee chair must be graduate faculty from the Biology Department (generally your primary research mentor). At least one other committee member must be graduate faculty from the Biology Department. For students with a declared minor, one (but no more than two) of the committee members must be graduate faculty from the minor Department. One committee member must serve as the Dean's representative, who may come from a related area (recommended by the committee chair) or be appointed independently by the Dean of the Graduate School. The Dean's representative may be graduate faculty in a related Department (recommended by the committee chair) or be appointed independently by the Dean of the Graduate School, but cannot be faculty from the Biology Department.

Members of the Graduate Advisory Committee for the Qualifying Exam may or may not serve as future members of your committee for your Comprehensive and Dissertation Defense Committees. Students are encouraged to include faculty from at least two of the Department's three thematic research areas on the Qualifying Exam Committee.

As mandated by the Graduate School, all members of the Graduate Advisory Committee for the Comprehensive Exam will also serve in the Defense for the Dissertation Oral Examination. No change in membership of the doctoral committee may be made without prior approval of the Dean of the Graduate School. Your Graduate Advisory Committee may include more than the minimum number of members as long as the stated conditions of membership are satisfied. Additional voting and nonvoting members may be any person approved or appointed by the Dean of the Graduate School.

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## **ROLE OF INDIVIDUALS INVOLVED IN GRADUATE TRAINING IN THE BIOLOGY DEPARTMENT**

### **Faculty advisor – student relationship**

Selecting your primary faculty advisor is a crucial step in your graduate student career. It is one of the most important elements in maintaining normal progress toward your Ph.D. or M.S. degree. In the Biology Department, your faculty advisor may be any rank (Assistant Professor, Associate Professor, Professor), but you must have an advisor or co-advisor who has their primary appointment in the Biology Department. As a graduate student, you should proactively seek mentors for research, creative activities, teaching, and career development to enrich your graduate study at NMSU. Choose mentors carefully to address your interests and needs, and work hard to build a trusting, mutually respectful, comfortable, professional relationship. Your mentors may not only provide you with knowledge and skills in graduate school, but may also offer support and guidance throughout your future career.

In addition to your primary research advisors, you may need to seek out additional faculty members who can provide you with other elements of these relationships. Graduate students are known to benefit from having multiple mentors. For example, both senior and junior faculty may assist your academic development – senior faculty may be of greater help with teaching and career networking, while junior faculty may be more knowledgeable about new interdisciplinary research in your field. Every faculty advisor and graduate student is unique because each partner's experience, personality, and professional development track will differ.

Open, regular, timely, respectful and professional communication between you and your primary faculty advisor will facilitate a positive relationship. Communication should be frequent and both

parties should be accessible to one another in order to be effective. Faculty and students should work together to clearly delineate the roles and expectations of each party in relation to specific activities, such as course work, dissertation completion, professional training, and academic performance.

### **Changing Primary Faculty Advisor/Degree (MS/PhD)/Department.**

There may arise situations in which you and/or your mentor decide that a different lab is a better fit for you, or that you would like to switch between the MS and PhD programs. The instructions below outline the procedures for completing each of these changes.

If you would like to change degrees (PhD to MS), but remain in the Biology Department with the same advisor:

- Submit the Change of Degree Request Form [here](#) This form must be signed by you, your major advisor, and the Department Head. There are no required Graduate Schools forms for this change.
- Change from MS to PhD requires a new application on Slate.

If you would like to change Mentors/Labs *within the Biology Department*:

- Submit the Biology Department Change of Major Advisor Form [here](#). This form must be signed by you, your original major advisor, your new major advisor, and the Department Head. There are no required Graduate Schools forms for this change.

If you would like to change Mentors/Labs to a Mentor *outside of the Biology Department*:

- You and your original mentor are each required to send an email to the graduate coordinator (Dr. Tim Wright, [wright@nmsu.edu](mailto:wright@nmsu.edu)) indicating your agreement with the proposed arrangement, and your plans for the future.
- If you plan to change your major department, you must apply to that department via the Grad School's admissions procedure in Slate, and consult with your proposed mentor and department about requirements for admission to that program.
- If you wish to change your lab to a department at NMSU that does not have a Ph.D. program, but still wish to finish your Ph.D. in NMSU Biology, you **must** have a member of the NMSU Biology graduate faculty serve as your Primary Faculty Advisor. The mentor from the other department may be a co-advisor.

If you plan to leave the graduate program without graduating:

- You and your former mentor are each required to send an email to the graduate coordinator (Dr. Tim Wright, [wright@nmsu.edu](mailto:wright@nmsu.edu)) indicating your agreement with the proposed arrangement.

**Department of Biology Ombudsperson** (Dr. Jen Curtiss) Ombudspersons serve as a trusted intermediary between you and the faculty whenever differences of opinion arise that need to be resolved. You should feel free to contact the ombudsperson should you want to discuss such situations or need help resolving them.

### **The Role of the Graduate Student**

- Know and follow the programmatic requirements

- Understand the advising process
- Carefully consider the advice of faculty
- Understand and abide by the highest standards of ethical behavior
- Review the graduate catalog and departmental guidelines/handbook for all policies and deadlines

### **The Role of all Biology Graduate Faculty (especially those on your graduate committee)**

- Foster the intellectual development of graduate students
- Teach strategies for accessing research literature to students
- Know the programmatic requirements of deadlines
- Assist students to think independently, critically, and creatively
- Expose the graduate students to the latest trends in their field
- Advise the student on the selection of dissertation, thesis committees
- Assist students in the selection/design of a timely and significant dissertation/thesis topic
- Evaluate and help students resolve problems encountered in their program
- Provide timely feedback on assignments
- Support students in their career development
- Inform students of funding opportunities
- Provide opportunities for students to develop successful grant writing skills
- Assure that students understand and comply with the standards of safety/moral/ethical behavior within their research discipline

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### **MILESTONES IN YOUR GRADUATE PROGRAM (Ph.D.)**

The basic milestones listed below can be used to reflect satisfactory progress in your graduate training. Because this document has been written for a diverse group, this timeline depends on many factors and may shift (e.g. if you spend a semester abroad doing fieldwork). In addition, there may be additional interest-area-specific or lab-group-specific expectations that may require completion of a doctorate program beyond 5 years.

#### **YEAR ONE**

##### **• Semester 1.**

Plan to hit the ground running. Plan to take the required BIOL 510 as an introduction to the Biology department, and discuss other courses with your mentor to develop a preliminary coursework plan. Begin reading the primary literature in your selected field, and become involved with a journal club if one is available. Get to know the faculty and students who work in your general area of interest. Learn the specific expectations for the lab you are in. Read through some recent doctoral dissertations to get a sense for their scope. Ask your advisor for recommendations on classes, reading, and other forms of training. Get into the lab and start learning lab techniques. Form your Graduate Advisory Committee.

##### **• Semester 2.**

Continue with courses, learning appropriate techniques and devising a specific research plan. Work with your advisor on your Individual Development Plan (IDP) as those are due Feb. 15 each year (<https://bio.nmsu.edu/students/grads.html>). Again, know the expectations for your lab. By the end of your 2<sup>nd</sup> semester, you should have a good idea of what your specific research area is. In addition,

you should have shown significant improvement in reading the primary literature in your research area. You should plan to take BIOL 540 Science and Ethics if possible.

Meet with your Graduate Advisory Committee. Faculty schedules are often hectic, and so you should start scheduling this meeting well in advance. During this initial meeting, you should apprise committee members of your progress with your research, discuss a schedule for your remaining courses and discuss when to take your Qualifying Exam (ideally by the end of your 2<sup>nd</sup> semester. The goal of the qualifying exam is two-fold: 1) to make sure you have the basic communication skills and fundamental knowledge in your field to be able to succeed in the graduate program and 2) to help your committee ascertain your areas of weakness so that they can recommend appropriate coursework or training.

Qualifying exams vary somewhat depending on your research area, but generally entail the following two parts:

- (1) A written document to enable evaluation of your ability to analyze and synthesize an area of research and present it in a clear and concise manner in writing.
- (2) An oral exam in which you will be asked to answer questions about any other topic the committee deems relevant. Goals: a) to evaluate your ability to orally explain basic concepts and the more advanced ones behind your proposal research, b) to evaluate your ability to think on your feet; and c) to refine the plan of action, including additional coursework, towards completion of your Ph.D. degree.

Your committee should approve the written and oral portions of this exam. Most students find this exam a nerve-wracking, humbling, yet constructive experience. Note that students are expected to continue carrying out some research, course work, and/or teaching at the same time as they prepare for their Qualifying Exam. Keep in touch with your lab and your committee members and make sure you know their expectations. Once you have completed 12 graduate credits from NMSU and have successfully completed the Qualifying Exam you should file the Program of Study Form and Committee to the Graduate School.

- ***Summer Semester.***

You should be working to become proficient in a set of basic research techniques, as well as reading, thinking and discussing with your mentor and other members of the research community with the goal of to identify the specific scientific question that you will address in your Ph.D. research. This first research project is usually developed in close consultation with your research advisor, and this conversation should involve mapping out publication goals. As you gain experience, you will be expected to take on a larger role in determining the direction of the project(s).

## **YEAR TWO**

- ***Semester 1.***

Take relevant classes as determined in consultation with your committee. Continue your lab/field/literature work to develop a defensible Ph.D. project proposal in close collaboration with your faculty mentor.

- ***Semester 2.***

Update your Individual Development Plan (IDP) and begin to develop your dissertation project. In addition to specific course work, you should be working towards obtaining

preliminary data for your dissertation. These data can be used for the following:

- (1) Obtain sufficient data to present at local scientific meetings (e.g., Annual Biology Symposium and the Graduate Research and Arts Symposium) and make a presentation. During the meeting, you should attend talks and interact with students and professors from other universities. Goals: make important contacts that could serve you well in the future, and develop oral communication skills.
- (2) You should plan to give an informal seminar in your field of study in an existing journal club that is not your lab meeting. Goal: learn to give well-organized presentations to your peers who may not be expert in your specific field of research.
- (3) Begin to prepare you for your Comprehensive exams (see below).
- (4) Have a committee meeting and discuss your progress with your project as well as the format of your upcoming Comprehensive exam.

• **Summer Semester.**

Dissertation research should be progressing in earnest. Continue to participate in journal clubs or make use of other strategies to encourage you to maintain your reading the literature in your field.

**YEAR 3**

Take your Comprehensive Exam. This exam evaluates the student's knowledge of biology at the graduate level in the student's emphasis area, and his/her potential to complete original doctoral research. See details below. The comprehensive exam is mandated by the Graduate School and must include a written and an oral component. As part of this exam, the student should demonstrate knowledge of the primary literature and the ability to formulate hypotheses and design experiments at a level appropriate with previous research experience (typically 1-2 years of lab or field work). Ultimately, the breadth of the comprehensive exam should be left to the discretion of the committee. This examination must be part written and part oral.

In addition, this is the year you should begin to develop your independence and expertise. Most of your efforts should be devoted to improving your skills at writing, data collection, and data analysis. Complete all course work, and continue to participate in lab meetings, journal clubs, and seminars. Update your Individual Development Plan (IDP) in the Spring semester. Ideally, you should be preparing or will have published a manuscript and will attend and present at a national meeting in your field.

**YEAR FOUR**

Continue to develop as an independent scholar and scientist. By now you should be very comfortable doing your research and talking about it in both an informal and formal way. You should expect to be contributing to your lab in many ways, including new ideas or interpretations of data, sharing data, generating reagents or new methodologies, and finding interesting papers others in your lab may have missed. You should be writing a manuscript on your own work, and attending/presenting at a national meeting. Have a committee meeting to discuss progress on your degree. Update your Individual Development Plan (IDP) in the Spring semester.

**YEAR FIVE**

Make a plan, including (1) writing your dissertation; (2) writing up and publishing your

remaining papers; (3) finding a career path and begin applying for jobs, internships, or postdoctoral fellowships. Have a committee meeting to discuss progress on your degree and to plan for your Ph.D. defense. Update your Individual Development Plan (IDP) in the Spring semester.

**Note:** You should determine what best fits your own career goals, your lab's expectations, and your lab's financial situation. Some research projects are simply too exciting, and students may wish to stay to produce the subsequent projects, which can extend the length of the Ph.D. time line.

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## **PH.D. EXAM FORMATS: QUALIFYING EXAM**

**Objective.** The Graduate School mandates the qualifying exam. The Department of Biology implements the qualifying exam as a diagnostic exam that evaluates the student's knowledge of biology at an undergraduate level and his/her ability to assimilate knowledge at the graduate level. This test is designed to assess the academic future of students individually. The results are used to:

- design the graduate plan of study
- provide recommendations for improvement of written communication skills
- provide recommendations for improvement of oral presentation skills

**Outcome.** As per the graduate school, the exam has the following potential outcomes: (a) admit the student to further work toward the doctorate; (b) recommend that the program be limited to the master's degree; (c) recommend a re-evaluation of the student's progress after the lapse of one semester; or (d) recommend a discontinuation of graduate work. To pass the exam a student must receive a positive vote from at least 50% of the committee members.

**Deadline of Qualifying Exam.** The qualifying exam should be completed by the end of the second semester. Students entering the program with a Master's degree may elect to schedule this exam during the first semester. The student is responsible for identifying a date and a room for the exam. Exams should be scheduled for a 120-minute period.

**Preparation for Qualifying Exam.** Students should refresh their knowledge of biology for the oral component of the exam. Students are strongly encouraged to consult with their faculty mentor and committee members to be better informed of expected topics of inquiry during the exam.

**Supporting Materials.** Five working days prior to the qualifying exam, students should submit a portfolio to all committee members comprising a current CV, unofficial undergraduate and graduate transcripts, a tentative course plan of study, a statement of research interest and specialization and a statement of professional career goals.

**Qualifying Exam Written Component.** Ten working days prior to the qualifying exam, students should submit the written component of their exam to their committee if one is to be completed. The objective of the written portion of the qualifying exam is to assess scientific writing skills, in order to provide recommendations for improvement if needed. Suggested format: students should prepare a 3-5 page single-spaced essay that describes a research area of interest and potential dissertation projects. The essay should be properly referenced.

**Qualifying Exam Oral Component.** The exam will follow a round robin question format. Questions will emphasize, but will not be restricted to, the student's research area.

- Students should prepare a 10-15 minute talk with supporting slides that can be used to assess oral presentation skills. The talk can be on a subject that could form the basis for a thesis project.
- After determining the exam outcome, the committee will recommend a plan of study and research that takes into account the professional and scientific goals of the student.
- Students will be provided with feedback about deficiencies in oral and written communication skills identified during the examination process, as well as recommendations for how to improve these skills.
- The faculty advisor is responsible for bringing the paperwork for the exam to the meeting.

#### **Post Exam**

- The faculty advisor is responsible for notifying the Graduate School of the results of the exam using the departmental qualifying exam form. Copies of the form should be given to the student and a copy should be placed in the student's file. A separate report should be prepared and placed in the student's file using the departmental report of student committee meeting form.

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#### **PH.D. EXAM FORMATS: COMPREHENSIVE EXAM**

**Objective.** The comprehensive exam is mandated by the Graduate School and must include a written and an oral component. This exam evaluates the student's knowledge of biology at the graduate level in the student's emphasis area, and his/her potential to complete original doctoral research. As part of this exam, the student should demonstrate knowledge of the primary literature and the ability to formulate hypotheses and design experiments at a level appropriate with previous research experience (typically 1-2 years of lab or field work). The breadth of the comprehensive exam is generally left to the discretion of the committee.

**Outcomes.** The committee members will evaluate the student's accomplishments on the written and the oral components when making decisions regarding the outcome of the exam. As per the graduate school, possible exam outcomes include: advancement to candidacy, adjourn, or failure.

- The Graduate School policies for counting votes are as follows. A student will pass the examination if all votes but one are to pass. A student will fail if there are two or more votes to fail, and the examination will be adjourned if there are two or more votes to adjourn. Two votes to fail override two votes to adjourn. One vote to fail and one vote to adjourn are not acceptable and an additional ballot or ballots must be cast.
- If the vote is to adjourn, the examination must reconvene within three weeks.
- Any applicant for candidacy who fails the comprehensive exam may, upon recommendation of the committee and approval of the Graduate Dean, (1) be granted a second examination after a lapse of one semester or (2) be terminated from the doctoral program.
- A committee member may move to delete the designation of a minor with the concurrence of the committee.

- Some additional courses may be recommended for the plan of study after the comprehensive exam is passed, but it is expected that if a student is advanced to candidacy, he/she will take few courses after this exam and will instead focus on dissertation research.
- Students who pass the comprehensive exam and have completed 30 hours of course work at NMSU may petition for an M.S. degree. This is not an option for students who have already received an M.S. degree in biology from NMSU).

**Scheduling.** The comprehensive exam should be completed before the beginning of the sixth semester. **At least 10 working days prior to the oral examination, students must submit the written component of their exam to their committee and also submit the doctorate of philosophy examination form to the grad school.** Students entering the doctoral program with a Master's degree in biology or a related field are encouraged to schedule the comprehensive exam sooner. The student is responsible for informing the committee that he/she wishes to take the comprehensive exam and to begin the exam process that comprises two parts, written and oral. After the written portion is completed, students are responsible for identifying a date and room for the exam. Comprehensive exams should be scheduled for a two- to three-hour period, depending on the wishes of the advisor and committee. The advisor is responsible for coordinating all features of the exam after the student identifies a time and room. Students are encouraged to meet with their committee or to contact committee members to discuss an appropriate time to schedule the comprehensive exam.

**Comprehensive Exam: *Written Component.*** A written component is a required part of the Comprehensive examination. The student, his/her faculty advisor, and the committee together determine the format of the exam. Commonly used formats include:

Grant Proposal. The grant proposal can be on any topic decided upon by the student and his/her committee, including the student's thesis topic. The proposal should be written in NSF or NIH format and should be limited to a maximum of eight single-spaced pages excluding references and other supporting material. All committee members are expected to evaluate the proposal.

Essay Exam. Each committee member (excluding the Dean's Rep, who may participate if he/she wishes) will write at least one essay question for the student. Committee members will stipulate whether the questions are to be answered in closed book or open book format and are welcome to suggest an appropriate length for each essay answer. Questions will be provided to the student on a single day agreed upon by the committee and the student. The student will have a maximum of three weeks to answer the questions. At the completion of the exam, the student will provide each faculty member with all questions and answers. Each committee member will be responsible for grading the answers to his/her questions.

**Comprehensive Exam: *Oral Component.*** Students should prepare a 15-20 minute presentation on their research. The oral exam may follow a round robin question format or other format, depending on the committee. Questions will emphasize but will not be restricted to the student's research area, reading list, classes and research proposal/essay answers.

**Post Exam.** The Dean's Representative is responsible for bringing exam paperwork to the oral examination and filing the paperwork with the Graduate School after completion of the exam.

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## PH.D. EXAM FORMAT: DISSERTATION DEFENSE

**Objective.** The Graduate School mandates an oral defense that is open to the public. This means that the oral defense time and date must occur on a non-holiday weekday during normal working hours, and the time and date must be announced in advance. Generally, the student gives an oral presentation of their work in public, followed by a defense attended by the student and committee members only. A dissertation cannot be officially accepted until it has been defended. Once your Academic Supervisor feels the thesis is ready to defend, you are responsible for coordinating an acceptable date for all committee members to attend the defense. Once the date is set and your Academic Supervisor has signed the Thesis Defense Approval Form, you should contact Dr. Amy Marion ([amarion@nmsu.edu](mailto:amarion@nmsu.edu)) or Academic Scheduling to book a room.

***If you have a committee member who is unable to attend the defense, then the committee member should submit written comments and questions to your Academic Supervisor prior to the defense.***

You will be expected to give a summary (30 to 45 min long) of the research and work upon which your dissertation is based. Your talk should define the scientific question your research addressed, how you addressed that question and what results you obtained. You need not go into each and every point discussed in your thesis. The objective is to show your command of the material and to explain to the audience (who may not have read your thesis) the main results of your work. More generally, your aim is to make your presentation concise, interesting, informative and professional.

**Post Exam.** The Dean's Representative is responsible for bringing exam paperwork, in hard copy or electronic form, to the oral examination and filing the paperwork with the Graduate School after completion of the exam.

**Outcomes.** The committee members will evaluate the student's accomplishments when making decisions regarding the outcome of the oral presentation. A defense has several possible outcomes. As per the graduate school, possible exam outcomes include:

- If the committee deems the student's work outstanding, the student will pass with distinction.
- The committee may pass the student pending changes to the written dissertation before submitting the dissertation for binding.
- If the dissertation requires major changes, the committee may defer a pass until a specific date by which time the student must submit an acceptable final draft.
- A student will fail if there are two or more votes to fail, and the examination will be adjourned if there are two or more votes to adjourn. Two votes to fail override two votes to adjourn. One vote to fail and one vote to adjourn are not acceptable and an additional ballot or ballots must be cast.

**Scheduling.** The student is responsible for informing the committee that they wish to defend their dissertation. The student is responsible for identifying a date and a room for the exam. Exams should be scheduled for a three-hour period.

**Supporting Materials.** Ten days before the exam, students should submit a portfolio to all committee members comprising the written dissertation and current CV.

## Outline of Target Dates for Thesis M.S. degree

Student Name \_\_\_\_\_

Chair of Graduate Advisory Committee \_\_\_\_\_

Entered degree program \_\_\_\_\_

	Target Date	Date Completed
<b>Year 1</b>		
Select faculty research mentor and name Graduate Advisory Committee	Semester 1	_____
Complete & File a Program of Study	Semester 1	_____
Define & initiate research project	Semester 1	_____
Develop an IDP	Semester 2	_____
Annual review of progress by Graduate Advisory Committee and submission of Graduate Student Committee Report to Biology Department	Semester 2	_____
<b>Year 2</b>		
Apply for Ph.D. program (if planned)	Semester 3	_____
File graduation paperwork with Graduate School	Semester 4	_____
Update your IDP	Semester 4	_____
Apply for jobs (if planned)	Semester 4	_____
Defend thesis	Semester 4	_____
File Thesis with Graduate School	Semester 4	_____
Final annual review of progress by Graduate Advisory Committee and submission of Graduate Student Committee Report to Biology Department	Semester 6	_____

## Outline of Target Dates for Non-Thesis M.S. in Biology degree

Student Name \_\_\_\_\_

Chair of Graduate Advisory Committee \_\_\_\_\_

Entered degree program \_\_\_\_\_

	Target Date	Date Completed
<b>Year 1</b>		
Select faculty research mentor and name Graduate Advisory Committee	Semester 1	_____
Define course work	Semester 1	_____
Develop an IDP	Semester 2	_____
Annual review of progress by Graduate Advisory Committee and submission of Graduate Student Committee Report to Biology Department	Semester 2	_____
<b>Year 2</b>		
Apply for Ph.D. program (if planned)	Semester 3	_____
File graduation paperwork with Graduate School	Semester 4	_____
Update your IDP	Semester 4	_____
Apply for jobs	Semester 4	_____
Oral and Written Final Exams	Semester 4	_____
Final annual review of progress by Graduate Advisory Committee and submission of Graduate Student Committee Report to Biology Department online	Semester 4	_____

## Outline of Target Dates for Ph.D. degree

Student Name \_\_\_\_\_

Chair of Graduate Advisory Committee \_\_\_\_\_

Entered degree program \_\_\_\_\_

	Target Date	Date Completed
<b>Year 1</b>		
Select faculty research mentor and name Graduate Advisory Committee for Qualifying Exam	Semester 1	_____
Develop an IDP	Semester 2	_____
Annual review of progress by Qualifying Exam Committee and submission of Graduate Student Committee Report to Biology Department	Semester 2	_____
Submission of Program of Study (after you pass the Qualifying Exam)	Semester 2	_____
<b>Year 2</b>		
Name Graduate Advisory Committee for Comprehensive Exams	Semester 3	
Update your IDP	Semester 4	
Annual review of progress by Graduate Advisory Committee and submission of Graduate Student Committee Report to Biology Department	Semester 4	_____
<b>Year 3</b>		
Comprehensive Exam	Semester 5	_____
Update your IDP	Semester 6	
Annual review of progress by Graduate Advisory Committee and submission of Graduate Student Committee Report to Biology Department	Semester 6	_____
<b>Year 4</b>		
Update your IDP	Semester 8	
Annual review of progress by Graduate Advisory Committee and submission of Graduate Student Committee Report to Biology Department	Semester 8	_____
Apply for post-docs or jobs	Semester 8 (or before)	_____
<b>Year 5</b>		
Update your IDP	Semester 10	
File graduation paperwork with Graduate School	Semester 10	_____
Defend Dissertation	Semester 10	_____
File Dissertation with Graduate School	Semester 10	_____

## RESEARCH RESOURCES AVAILABLE ON THE NMSU CAMPUS:

- Core University Research Resources Laboratory (CURRL)  
<https://research.nmsu.edu/ResearchCores/MICS.html>
  - Microscopic Imaging Core Suite (Skeen Hall)
    - confocal microscope, table-top SEM, SEM, TEM, AFM
  - Molecular Biology Molecular Analysis Support Unit (Chem/Biochem)
    - ABI DNA sequencing
    - ABI Fragment Analysis
  - X-ray Diffraction Laboratory (Gardiner Hall)
    - X-ray diffractometry
- Chemical Analysis and Instrumentation Laboratory  
<https://research.nmsu.edu/ResearchCores/CAIL.html>
  - FT-ICR Mass Spectrometer
  - Liquid Chromatography/Mass Spectrometry
  - Ultra Performance Liquid Chromatography
  - Gas Chromatography/Mass Spectrometry
  - Inductively Coupled Plasma/Mass Spectrometry
- Vertebrate Museum, contact Peter Houde  
<http://lithornis.nmsu.edu/~phoude/vertmus.htm>
- Biology (NMC) and Animal Range (NMCR) Herbaria, contact Donovan Bailey 646-7012 <http://aces.nmsu.edu/herbarium/index.html>
- Arthropod Museum, contact Scott Bundy 646-3171 <https://arthropods.nmsu.edu/>
- ICT Supercomputing <https://hpc.nmsu.edu/>
- NMSU Library <http://lib.nmsu.edu/>
- RISE Experimental Tools <https://rise.nmsu.edu/resources/experimental-tools.html>
  - Equipment
  - Software