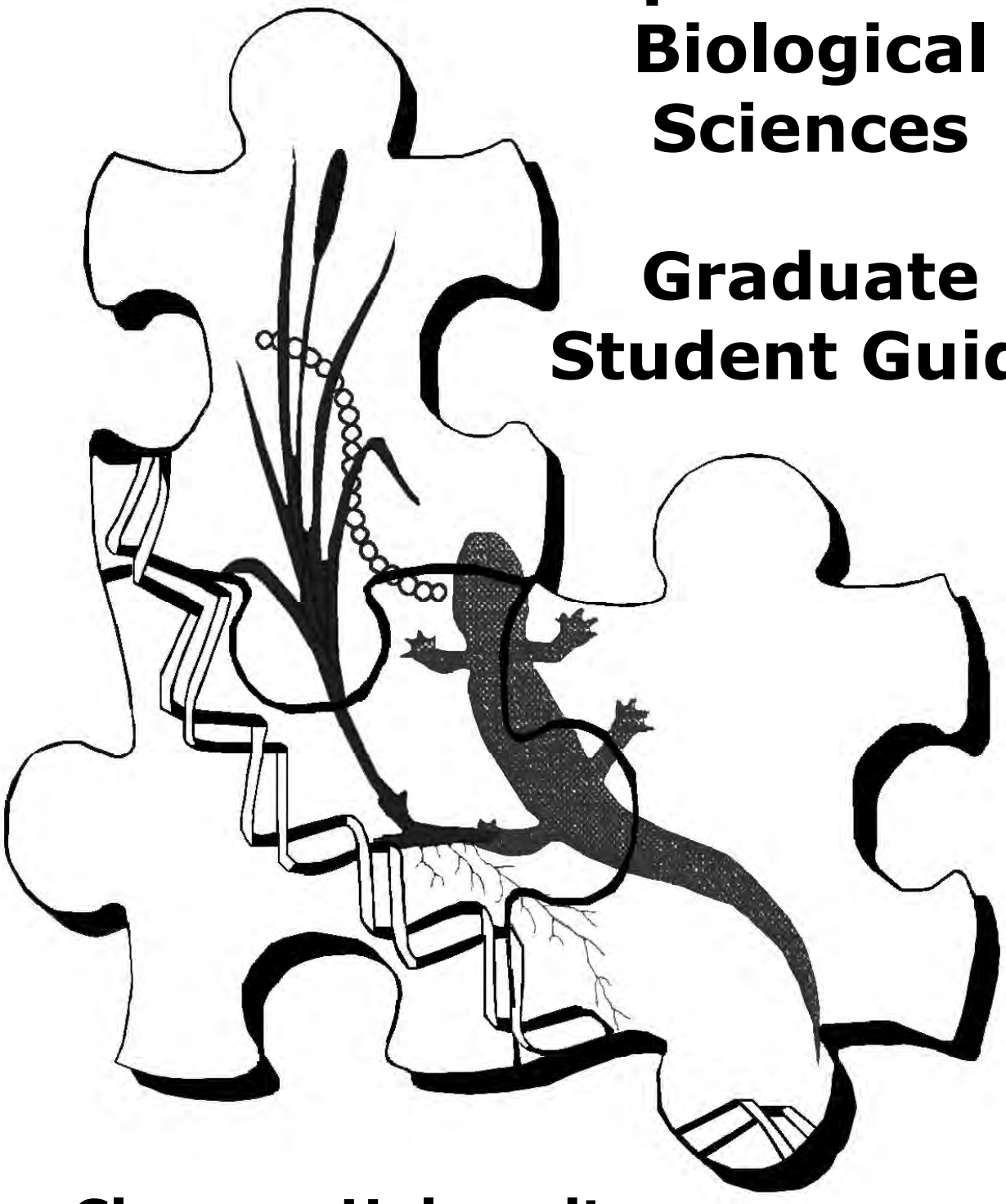
Department of Biological Sciences

Graduate Student Guide



Clemson University

2021-2022

Welcome to the Graduate Programs in the Department of Biological Sciences

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Web: www.clemson.edu/biosci/ This Grad Student Guide, last updated 08/10/2021, can be found on our BioSci website by clicking this link or in BOX (All Files>BioSci Resources>BioSci Graduate Student Resources>_Grad Student Handbook F21)

Department of
BIOLOGICAL SCIENCES
Clemson® University

This guide is designed to provide information for graduate students in the Department of Biological Sciences, with specific requirements for those students in the following programs:

Biological Sciences, M.S. (thesis)

Biological Sciences, M.S. (non-thesis)

Biological Sciences, Ph.D.

Environmental Toxicology, M.S.

Environmental Toxicology, Ph.D.

Microbiology, M.S.

Microbiology, Ph.D.

Graduate Student Guide
2021-2022
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Welcome and Introduction

The Faculty of the Department of Biological Sciences welcomes you into your graduate program. There are many exciting and challenging disciplines within our department. As a graduate of either the Biological Sciences, Environmental Toxicology, or Microbiology Programs you will be a qualified professional, capable of addressing and seeking solutions to many of the critical problems facing society, both nationally and globally. We are pleased that you have chosen one of our graduate programs for your graduate experience and we look forward to helping you reach your full potential.

These Guidelines are provided to assist you in accomplishing your academic and career objectives and to help you comply with the expectations for students pursuing a graduate degree in our department. Thus, these Guidelines constitute a Program supplement to the Clemson University Graduate School Policy Handbook: http://www.clemson.edu/graduate/. It is important to note that these Guidelines do not replace the Graduate School's policies and procedures. Graduate students are expected to review a copy of the Graduate School's policies and procedures and familiarize themselves with all relevant sections. It is the graduate student's responsibility to become familiar with and comply with all policies, procedures, and regulations pertaining to graduate study. The Graduate School's Policy Handbook sets a minimum standard for the University. Because these minimum standards may be exceeded by requirements of the Biological Sciences, Environmental Toxicology, or Microbiology Program, there may be cases where the policies contained in these Guidelines differ from those written in the Graduate Policy Handbook.

These Guidelines provide a statement of the Graduate Program expectations, resources, and procedures. Therefore, you must familiarize yourself with these Guidelines and the Program policies and expectations. The Program Coordinator and your Major Professor/Advisor are available to assist you in interpreting these Guidelines. It is your responsibility to use these resources and to comply with the requirements and expectations detailed in these Guidelines.

A graduate student checklist of important milestones is included in these Guidelines and summarizes the primary deadlines that you must meet.

I. Organizational Structure Relevant to Graduate Students

A graduate student's primary interface with the University on a day-to-day basis will be via the student's Major Professor/Advisor and other faculty, particularly those comprising the Advisory Committee. Other Administrative entities exist, and their roles and responsibilities are briefly summarized here.

1. Major Professor/Advisor: Chosen by mutual interest, consent and agreement of the student and that faculty member and approved by the Program Coordinator. The Major Professor advises the graduate student in the selection of courses, directs the student's research, serves as an advocate in all academic matters, and often provides financial support for the student in the form of a research assistantship.

2. Advisory Committee: The Advisory Committee is chaired by the Major Professor. Other committee members are selected by the student in consultation with the Major Professor and are approved by the Graduate Program Coordinator.

3. Graduate Programs Coordinator: The Graduate Programs Coordinator chairs the Graduate Advisory Committee (GAC – see below), oversees the Graduate Programs in Biological Sciences, Environmental Toxicology, and Microbiology, and coordinates assessment of the graduate programs. The Graduate Programs Coordinator, together with the GAC, administers compliance with these Graduate Student Guidelines and revisions as deemed appropriate by the Program Faculty. **Graduate Programs Coordinator: Dr. Barbara Campbell**

4. Graduate Program Coordinator (GPC) for Biological Sciences: The Biological Sciences Program Coordinator coordinates graduate admissions and current graduate students in the on-campus M.S. and Ph.D. degree programs in Biological Sciences. **Biological Sciences GPC: Dr. Bill Baldwin**

5. Graduate Program Coordinator (GPC) for Environmental Toxicology: The Environmental Toxicology Program Coordinator coordinates graduate admissions and current graduate students in the on-campus M.S. and Ph.D. degree programs in Environmental Toxicology. **Environmental Toxicology GPC: Dr. Peter van den Hurk**

6. Graduate Program Coordinator (GPC) for Microbiology: The Microbiology Program Coordinator coordinates graduate admissions and current graduate students in the M.S. and Ph.D. degree programs in Microbiology. **Microbiology GPC: Dr. Barbara Campbell**

7. Graduate Advisory Committee (GAC): Evaluates applications and makes recommendations for student admissions, interprets Program policies and guidelines, approves course substitutions and waivers in special cases, and recommends changes in the Guidelines to the faculty. **GAC Members: Dr. Christopher Parkinson (BioSci), Dr. Michael Sears (BioSci), Dr. Lisa Bain (ENTOX/BioSci), Dr. Jeremy Tzeng (Micro), Dr. Harry Kurtz (Micro)**

8. Dean for the College of Science: Administers teaching activities and faculty responsibilities in the College, administers College scholarships and fellowships, and approves all graduate student Committee Selections and Plans of Study. **Dean: Dr. Cynthia Young**

9. Dean of the Graduate School: Administers and approves all official graduate student work, formulates policy and standards, unifies administrative procedures relevant to graduate study to include admissions policies, graduate programs, university-wide scholarships and fellowships and granting of degrees. **Dean: Dr. John Lopes**

II. Ph.D. and M.S. Program Information

A. Common Components to Ph.D. and M.S. Programs in Biological Sciences, Microbiology and Environmental Toxicology

Graduate school policies and procedures

The final authority resides with the Graduate School. Their policies and procedures can be found here: Graduate School Policy Handbook.

Full-time Status

Graduate students on assistantships must register for a minimum of nine (9) credit hours during the fall and spring semesters to be considered full-time. If a student's assistantship continues into the summer, then the student must be enrolled in three (3) credit hours in each summer session or six (6) credit hours in the Long Summer Session. Students may take up to a maximum of 15 credit hours during the fall or spring semester.

Coursework

Specific coursework requirements based on degree program (Ph.D. vs. M.S.) are discussed in later sections. This section outlines coursework required by all (most) students. Clemson's Directory of Classes and on-line registration can be found through the iRoar portal. The Graduate Student Catalog can be found at http://www.registrar.clemson.edu/html/catalogGrad.htm.

Seminar. The Department of Biological Sciences hosts a weekly guest lecturer as part of the Departmental Seminar series (BIOL 8120). For 2021-2022, the seminar will be held on Mondays from 11:15 – 12:05 pm. A wide variety of topics from across all disciplines in Biological Sciences, ranging from microbiology, ecology, evolutionary biology, cell and molecular biology, developmental biology, and others, are presented. This seminar series is to be attended by graduate students in the Biological Sciences and Microbiology programs. The Environmental Toxicology graduate students sign up for ETOX 8610 and are encouraged to attend these seminars as well. Ph.D. students are required to pass BIOL 8120 both Fall and Spring semesters for their first 3 years or up to 6 semesters between their MS and PhD; M.S. students for their first two years or 4 semesters. Exemption from this policy requires approval by the Graduate Programs Coordinator.

To pass BIOL 8120 or ETOX 8610, enrolled graduate students are required to attend a minimum of 8 of the 10+ Departmental or other approved seminars each semester; absences beyond this

level will result in a Fail. Seminars presented in other departments may count towards meeting this requirement, but the student is responsible for informing the faculty coordinator for BIOL 8120 or ETOX 8610 of the substitution and documenting attendance by signing in with the coordinator of the seminar they attend. Excused absences (e.g. attendance at scientific meetings, family emergencies) must be approved by the Seminar Coordinator. **2021-202 BIOL 8120 Seminar Coordinator: Dr. Zhicheng Dou** (zdou@clemson.edu), **ETOX 8610 Seminar Coordinator: Dr. Peter van den Hurk** (pvdhurk@clemson.edu).

Reading Groups/Journal Clubs. One of the most profitable and enjoyable aspects of the graduate training program is the student's participation in one or more Reading Groups. Such discussion groups will teach, develop and perfect a student's ability to critically read, interpret, discuss, and present scientific literature and results.

Graduate students in both Microbiology and Biological Sciences degree programs are required to pass the Reading Group course (BIOL 8070 or MICR 8070) both Fall and Spring semesters for their first 2 years for MS students; first 3 years in the PhD; or up to 6 semesters between the MS and PhD degrees if both are completed at Clemson. Participation includes attendance as well as leading the discussion at least once per semester. Although the format may vary among the various sections of BIOL 8070 and MICR 8070, each involves a meeting of the faculty and students working in areas of mutual interest to discuss recent developments, findings, and techniques that relate to their research interests. Any exemption from the policy for Reading Groups requires approval of the Graduate Programs Coordinator.

Entox readings are incorporated into the core Entox classes/curriculum; but Entox students are encouraged to sign up for any BIOL or MICR reading group as appropriate.

***Research Credits*.** Every enrolled graduate student must enroll in *at least* one (1) credit of MICR, ENTX, or BIOL 8910 or 9910 each semester**.** Exemption from this policy requires approval from the Graduate Programs Coordinator.

All GTAs are required to register for and pass BIOL 8130. This colloquium is a 1-hour pass/fail course for all students who have not yet taught as a GTA but ***will be*** teaching assistants in the Fall or ***might be*** teaching assistants at some time in the future. All new graduate TAs in the department must register for BIOL 8130.

Undergraduate Deficiencies. Any undergraduate deficiencies will be annotated in the acceptance letter to the student. These courses should be completed as soon as possible after starting the program.

Annual Progress Reports

Graduate students annually self-report on their progress in research, accomplishments of milestones towards degree (e.g. completion of Program of Study, Proposal Defense, or Comprehensive Exams), awards and honors received, and dissemination of results (papers published, presentations made). This annual progress report serves two important purposes. First, it allows the Program Coordinators and GAC to keep tabs on the progress of graduate students in the program and spot struggling students early. Second, it allows for better

assessment of the programs in terms of student measures of success such as dissemination of research results. It is also recommended that this progress report also be emailed by the student to all committee members each year.

An email is sent out each year with a link to a form that must be filled out no later than two weeks following receipt.

Failure to file a progress report annually is considered as lack of adequate progress towards degree and will result in the student's file being reviewed by GAC to determine the consequences of this failure. At a minimum, a letter will be sent to both student and faculty mentor.

B. Ph.D. Program Rules, Requirements, and Policies

Below are degree requirements for students who enter the Biological Sciences, Environmental Toxicology, or Microbiology Ph.D. Programs in the Department of Biological Sciences.

The Doctor of Philosophy degree is the highest degree offered by Clemson University. It is conferred only for work of distinction in which the student displays original scholarship. The major emphasis of the doctoral program in Biological Sciences, Environmental Toxicology, or Microbiology is to provide an environment for the student to learn how to think critically, pose questions and answer them by experimentation, perform library research, write and communicate in scientific formats, and develop into a mature, articulate, and competent scientist.

It is the graduate student's responsibility to stay in touch with his/her major advisor and graduate advisory committee and ensure all requirements are fulfilled. The faculty may not remind students of all the procedures, deadlines, etc. Likewise, the student is ultimately responsible for complying with the regulations of the Department of Biological Sciences and Clemson University Graduate School. Graduate School policies and procedures can be found in the Graduate School Policy Handbook.

Ph.D. Program Requirements

The Doctoral Program involves:

- Advisory Committee Selection
- Preparing a Plan of Study (Filing GS2, Appendix 1)
- Filing Annual Progress Reports (APR)
- Dissertation Proposal Preparation and Defense (Proposal Defense Verification Form, here, Appendix 2)
- Coursework including Seminar (BIOL 8120/ ETOX 8610) and Reading Group (BIOL/MICR 8070)
- Comprehensive Exam (Filing GS5D)
- Research and Dissertation
- Dissertation Defense (Filing GS7D)

Each of these requirements is discussed in more detail below.

Ph.D. Advisory Committee Selection

The advisory committee is *established no later than the end of the third semester after* the student has begun to his/her program. This committee is expected to meet *at least* once per year and as needed.

The advisory committee approves the student's degree curriculum, supervises the graduate program, administers the Ph.D. comprehensive exams, administers the final oral examination during the dissertation defense, and initiates the recommendation for the awarding of the Ph.D. degree. One member of the committee is designated as chair or major advisor and normally directs the student's dissertation or thesis, if required. A minimum of four faculty members are to be selected by a student seeking a doctoral degree. For Environmental Toxicology graduate students at least half of the committee members need to be associated with the Environmental Toxicology curriculum.

See *Section VI* for more instructions on selecting committee members.

Ph.D. Committee Meeting Times

The committee will meet at a minimum at the following times:

- No later than the end of the third semester to review the student's planned research and to approve the student's Plan of Study.
- No later than end of the second year for the Oral Defense of the Dissertation Proposal (Proposal Defense Verification Form, here, Appendix 2).
- Beginning of third year to choose option for Comprehensive Exam format.
- No later than end of third year for Comprehensive Exam orals (filing GS5D).
- A minimum of one time in the fourth and fifth years to review progress.
- No later than the end of 5 years after filing the GS5 for the Dissertation Defense (filing GS7D).

Ph.D. Plan of Study and Course Work

Ph.D. students must have a minimum of 60 credits hours in order to graduate; 30 of these credits must be beyond the Master's degree if one was previously obtained; and 18 semester hours of dissertation research (BIOL or MICR 9910/ETOX 9910) are required for completion of the Ph.D. At least 12 credit hours of coursework must be taken by students who are pursuing a Ph.D. without having a M.S. degree. For Environmental Toxicology students this is covered by the required core courses (see below). Coursework encompassing the breadth and depth in associated life science areas is expected of all candidates. An appropriate plan of coursework to fulfill this requirement will be developed by the student and his/her advisory committee and submitted in the Plan of Study by the end of the third semester. The Plan of Study must reflect the required 60 credit hours necessary for graduation. See *Section VI* for instructions on filing the Plan of Study.

Seminar enrollment and attendance: Ph.D. students will enroll in BIOL 8120 or ETOX 8610 (1 credit per semester; Pass/Fail) for a minimum of 6 credits and a maximum of 8 credits.

Students with credit for BIOL 8120 from their MS degree are required to take up to 6 credits between the two degrees. Attendance of seminars even when not enrolled is highly encouraged.

Seminar Presentation: Ph.D. students will conduct at least one seminar per year starting in their second year. The seminar may be at an official conference, a seminar to the department, or a research report/update to their committee.

Reading Group: As noted in Section A, enrollment in a reading group course (BIOL or MICR 8070; 1 credit per semester; Pass/Fail) is required for degree minimum of 6 credits and a maximum of 8 credits. Students with credit for a reading group from their MS degree are required to take up to 6 credits between the two degrees. Attendance at reading groups even when not enrolled is highly encouraged. Because a reading group experience in incorporated in several ETOX courses, and because of the course load of required core courses, Environmental Toxicology students are not required to enroll in a reading group.

Coursework specific to a program (but can be taken by ANY graduate student)

Biological Sciences:

A 3-credit core course in either Molecular Cellular and Developmental Biology or Ecology and Evolutionary Biology is required for incoming students; both are offered in the Fall semester:

BIOL 8000 Concepts in Evolution, Ecology and Organismal Biology

BIOL 8010 Concepts in Molecular, Cellular and Developmental Biology

Environmental Toxicology:

A minimum core of courses chosen to ensure that graduates will be well-rounded toxicologists capable of excelling within a broad interdisciplinary context of Environmental Toxicology will be taken by each Ph.D. candidate. These are as follows:

EES 8430 or 8450	Environmental Engineering Chemistry I or II
ETOX 6300	Toxicology
ETOX 6370	Ecotoxicology
Statistics	STAT 8010, STAT 8050, or another appropriate course
ETOX 8610	Seminar in Environmental Toxicology
ETOX 9910	Doctoral Research minimum of 18 credits (graded pass/fail)

Microbiology:

A minimum core of courses chosen to ensure that graduates will be well-rounded microbiologists capable of excelling within the broad interdisciplinary context of Microbiology will be taken by each Ph.D. candidate. For students entering the **Ph.D. program in Microbiology** directly from a bachelor's program, graduate coursework must include courses from at least three of the following areas:

- Genetics, Physiology and Metabolism
- Pathogenic Microbiology
- Environmental and Ecological Microbiology

- Technology
- Bioinformatics, Genomics and Statistics

Our two core courses offered to satisfy these areas include:

Fall, MICR 8000 (3 cr.) - Microbial Structure and Function; Bacterial Physiology/Diversity; Environmental and Ecological Microbiology

Spring, MICR 8010 (3 cr.) - Bacterial Genetics; Microbial Evolution/Genomics; Eukaryotic and Prokaryotic Pathogenesis

One additional specialty course in one of the above emphasis areas is offered either in fall or spring semesters.

Although there is no required number of credits of coursework for the Ph.D. in Microbiology beyond the 18 credits of dissertation research for students entering with a MS degree, a core of graduate coursework including courses from the above emphasis areas is expected during the program or taken prior at the M.S. level.

Ph.D. Dissertation Proposal Preparation and Defense

All graduate students in Biological Sciences, Environmental Toxicology, or Microbiology must prepare a written research proposal outlining the student's dissertation research project for discussion and approval by the Advisory Committee by the end of the second year. The proposal will be written in federal grant style (NIH, NSF, USDA, etc.) as chosen by the student and advisor. **The proposal must be provided to the committee *at least* 14 days before the defense. An email should be sent to the appropriate GPC stating that the proposal has been sent.**

An oral seminar outlining the research plan will be presented in an open forum to the Advisory Committee members and the Department of Biological Sciences. See *Section VII* for details on how to organize and publicize this seminar. Following the proposal seminar, the student will orally defend the proposed topic in a closed session with the Advisory Committee.

Upon successful defense by the student, the student and committee members will fill out and submit the Proposal Defense Verification Form fillable form to the grad school with a copy to the Graduate Student Services Coordinator, biolgrad@clemson.edu. Students may be asked to revise their proposals and re-defend with the advisory committee, if the committee feels such actions are warranted as a result of their first defense.

Ph.D. Comprehensive Exam

The comprehensive exam determines whether a student has the requisite knowledge and abilities to successfully pursue the Ph.D. degree and a career in science. Passing the comprehensive exam and filing the GS5D form with the graduate school are requirements for Ph.D. candidacy.

The student is required to complete the comprehensive exam no later than the end of year 3 after initiation of the program. There are two formats of the exam that can be taken. A Ph.D. student will choose the format in consultation with their faculty advisor and advisory committee. The two formats are described in detail in Appendix 3.

According to the Graduate School, satisfactory completion of the comprehensive examination must occur no more than five years and at least six months prior to the date of graduation.

The committee will assess the biological/microbiological knowledge of the student using a set of rubrics on a form (examples in Appendix 4/5/6). Please use the forms available in box in the graduate student resources folder. The advisor will turn in one form with the committee's consensus evaluation after the comprehensive exams to the Graduate Student Services Coordinator, biolgrad@clemson.edu.

Ph.D. Research and Dissertation Defense

The emphasis of the doctoral program is research, and time spent in research will increase each year. A student will choose a project in consultation with his/her advisory committee that, upon completion, will merit the awarding of the doctoral degree. **The research should be an original contribution to the student's field of choice and should result in at least one publication in a quality, peer-reviewed journal prior to the defense.** The student is expected to devote a considerable amount of time to research, even while completing coursework and teaching. A key part of developing into a scientist is to be able to manage time commitments and responsibilities of multiple demands on one's time.

See the instructions in *Section VIII* for scheduling the final defense. The dissertation *must* be provided to the committee **at least 14 days before the defense**. **An email should be sent to the appropriate GPC stating that the dissertation has been sent.** The defense must also occur at least 1 full week (7 days) before the final manuscript is due to the Graduate School.

The defense will include a public departmental seminar in which the student presents the results of his/her research and followed by a "closed-door" oral defense of the research with the advisory committee. A successful "Pass" of the defense will result in filing the GS7D form with the Graduate School. The committee will assess the student for departmental assessment purposes using a set of rubrics on a form (examples in Appendix 10/11/12). Please use the forms available in box in the graduate student resources folder. The advisor will turn in one form (the committee's consensus) after the defense to the Graduate Student Services Coordinator, biolgrad@clemson.edu.

Formatting for defense announcements should be as follows:

Title of Thesis or Title of Dissertation
(Title should be in 12 point Arial or Times New Roman font and centered)

Author's name

M.S. Defense or Ph.D. Defense

Advisor's name:

Names of committee members:

Date & Time

Location – zoom link or physical location. Information between here and title should be in 11 point Arial or Times New Roman font and centered.

The abstract, less than 1 page, if possible, should be included.
The text of the above should be included in an email and as a separate PDF for distribution.
Small photos and/or graphics can be included.

Ph.D. Student Financial Support / Tuition / Fees

Teaching and Research Assistantships

Graduate students accepted into the Biological Sciences or Microbiology graduate programs are either awarded support through the Department of Biological Sciences as Graduate Teaching Assistants (GTAs) or from individual Faculty Advisors' sponsored grant funds as Graduate Research Assistants (GRAs). To be eligible for a GTA or GRA, a student must be enrolled full-time. Full-time status entails being enrolled in at least nine (9) graduate-level credit hours in fall and spring. Graduate students on an assistantship in the summer must enroll in three (3) credits each of the two summer sessions. A GTA/GRA can be terminated at any time for substandard, unsatisfactory, or unethical performance. The annual progress report letter sent by GAC each August identifies problems with performance or progress toward the degree and sets deadlines for resolving the problems.

GTAs are awarded upon acceptance to the program and may be renewed annually based upon performance in teaching and satisfactory progress towards degree for up to 5 years for Ph.D. students. The current rate for a 9-month appointment (no teaching in summer) is $22,000 for Ph.D. students before they pass the Comprehensive Exam. Ph.D. students who have successfully passed the Comprehensive Exams and submitted the GS5 form to the Graduate School will receive a 9-month rate of at least $24,000 per year, starting as soon after the form is filed, and the change of pay can be processed. Annual GTA stipends may be supplemented by Faculty Advisors' grant funds or from other sources.

GRAs are awarded by individual Faculty Advisors from funds available on research grants upon acceptance to the program. Individual stipend amounts and conditions of renewal are determined by individual Faculty Advisors, but currently funded GRA stipends normally range from $22,000 to $27,000 depending upon the tenure of the student (years in program) and availability of supplemental funds. GRA support is negotiated by prospective students with individual Faculty Advisors.

A limited number of university fellowships are available on a competitive basis. Additional information can be found at this site: http://www.clemson.edu/graduate/finance-tuition/fellowships.html.

We also encourage graduate students submit proposals for outside funding, such as an NSF GFA. Email Jenny LaMonte (jlamont@clemson.edu)for more information.

Ph.D. Program Timetable

Requirement	Relevant Form	Deadline (deadline for students entering Fall 2021)
Advisory Committee Selection	Online	By end of Semester 3 (December 2022)
Plan of Study	Online	By end of Semester 3 (December 2022)
Dissertation Proposal and Defense	Proposal Defense Verification	By end of Year 2 (July 2023)
Comprehensive Exam	GS5D, Rubric	By end of Year 3 (July 2024)
Dissertation Submission / Defense	GS7D, Rubric	No more than 5 years after filing GS5
Annual Progress Report (APR)	APR	Every year
Research Presentation	APR	Every year
Seminar Attendance (BIOL 8120)	APR	Must be enrolled up to 6 credits at CU. Recommended attendance otherwise.
Reading Group Attendance (BIOL 8070/MICR 8070)	APR	Must be enrolled up to 6 credits at CU. Suggested attendance otherwise.

APR = Annual Progress Report

C. M.S. Program Rules, Requirements, and Policies

The Master of Science (M.S.) degree is conferred to those who have demonstrated mastery of general biology and of advanced biology in areas of concentration. The major emphasis of the Master's programs in Biological Sciences, Environmental Toxicology, and Microbiology is to provide an environment for the student to learn how to think critically, pose questions and answer them by experimentation, perform library research, write and communicate in scientific formats, and develop into a mature, articulate, and competent scientist.

It is the graduate student's responsibility to stay in touch with his/her major advisor and graduate advisory committee and ensure all requirements are fulfilled. The faculty may not remind students of all the procedures, deadlines, etc. Likewise, the student is ultimately responsible for complying with the regulations of the Department of Biological Sciences and Clemson University Graduate School. Graduate School policies and procedures can be found in the Graduate School Policy Handbook.

M.S. Program Requirements

The Master's Program involves:

- Advisory Committee Selection
- Plan of Study (Appendix 1)
- Filing Annual Progress Reports (APR)
- Thesis Proposal Preparation and Defense (Filing Proposal Defense Verification Form, Appendix 2; fillable form)
- Coursework including Seminars and Reading Groups
- Research and Thesis
- Thesis Defense (Filing GS7M)

M.S. Advisory Committee Selection

The advisory committee should *be established by the end of the first semester*, but no later than by the end of the second, after the student has begun to identify his/her research area.

The advisory committee approves the student's degree curriculum, supervises the graduate program, administers the final oral examination during the thesis defense, and initiates the recommendation for the awarding of the M.S. degree. One member of the committee is designated as chair or major advisor and normally directs the student's dissertation or thesis, if required. A minimum of three faculty members are to be selected by a student seeking a M.S. degree. For Environmental Toxicology graduate students at least half of the committee members need to be associated with the Environmental Toxicology curriculum.

See *Section VI* for more instructions on selecting a committee.

M.S. Committee Meeting Times

The committee will meet at a minimum at the following times:

- Prior to the end of the second semester to review the student's planned research and to approve the student's Plan of Study.
- During the third semester or earlier for the Oral Defense of the Thesis Proposal.
- At least once in the fourth and any subsequent semesters to review progress.

- The final semester for the thesis defense (filing GS7M).

M.S. Plan of Study (GS2) and Course Work

The M.S. degree program requires a total of 30 semester hours of graduate credits: 24 of these hours are course work (with at least 12 from 8000-level courses) and a minimum of 6 hours of thesis research (BIOL or MICR 8910/ETOX 8910).

An appropriate plan of coursework to fulfill this requirement will be completed by the student and his/her advisory committee and submitted in the Plan of Study for approval by the Graduate School ***no later than the middle of the second semester***. The Plan of Study must reflect the required 30 credit hours necessary for graduation. See *Section VI* for instructions for filing it.

Seminar enrollment and attendance: M.S. students will enroll in BIOL 8120/ETOX 8610 (1 credit per semester; Pass/Fail) each semester of their first two years. If the M.S. program continues beyond the second year, enrollment is optional, but attendance is mandatory.

Seminar presentation: M.S. students should conduct at least one seminar per year starting in their second year. The seminar may be at an official conference, a seminar to the department, or a research report/update to their committee.

Reading group: As noted in Section A, M.S. students will enroll in BIOL 8070 or MICR 8070 (1 credit per semester; Pass/Fail) each semester of their first two years. If the M.S. program continues beyond the second year, enrollment is optional, but attendance is highly encouraged. Environmental Toxicology MS students are not required to enroll in a reading group.

Coursework specific to a program (but can be taken by ANY graduate student)

Biological Sciences:

A 3-credit core course in either Molecular Cellular and Developmental Biology or Ecology and Evolutionary Biology is required for incoming students; both are offered in the Fall semester:

BIOL 8000 Concepts in Evolution, Ecology and Organismal Biology

BIOL 8010 Concepts in Molecular, Cellular and Developmental Biology

Environmental Toxicology:

A minimum core of courses chosen to ensure that graduates will be well-rounded toxicologists capable of excelling within a broad interdisciplinary context will be taken by each M.S. degree candidate. These are as follows:

EES 8430 or 8450	Environmental Engineering Chemistry I or II
ETOX 6300	Toxicology
ETOX 6370	Ecotoxicology
Statistics	STAT 8010, STAT 8050, or other as determined by committee
ETOX 8610	Seminar in Environmental Toxicology
ETOX 8910	Masters Research minimum of 6 credits (graded pass/fail)

Microbiology:

A minimum core of courses chosen to ensure that graduates will be well-rounded microbiologists capable of excelling within the broad interdisciplinary context of Microbiology will be taken by each M.S. candidate. Graduate coursework must include courses from at least three of the following areas:

- Genetics, Physiology and Metabolism
- Pathogenic Microbiology
- Environmental and Ecological Microbiology
- Technology
- Bioinformatics, Genomics and Statistics

Our two core courses offered to satisfy these requirements include:

Fall, MICR 8000 (3 cr.) - Microbial Structure and Function; Bacterial Physiology/Diversity; Environmental and Ecological Microbiology

Spring, MICR 8010 (3 cr.) - Bacterial Genetics; Microbial Evolution/Genomics; Eukaryotic and Prokaryotic Pathogenesis

At least one additional specialty course (6000/8000 level) in one of the above emphasis areas offered either in fall or spring semesters.

M.S. Thesis Proposal Preparation and Defense

No later than the end of the third semester, a research proposal outlining the student's thesis research project must be prepared for discussion and approval by the Advisory Committee. The proposal will be written in federal grant style (NIH, NSF, USDA, etc.).

See the instructions in *Section VIII* for scheduling the proposal defense. The proposal *must* be provided to the committee ***at least* 14 days before the defense**. The student should email the appropriate GPC at this time stating that the proposal has been provided to the committee.

An oral seminar outlining the research plan is presented to the Advisory Committee and orally defended by the student for final approval following the proposal seminar. Master's students are not required to make this an open seminar but may do so if they so choose.

Upon successful defense by the student, the student and committee members will fill out and submit the Proposal Defense Verification Form fillable form (https://www.clemson.edu/graduate/files/pdfs/GS-ResearchApproval.pdf) to the grad school with a copy to the Graduate Student Services Coordinator, biolgrad@clemson.edu . Students may be asked to revise their proposals and re-defend with the advisory committee, if the committee feels such actions are warranted as a result of their first defense.

M.S. Research and Thesis Defense

Master's students are expected to generate a satisfactory thesis based upon results of a research project designed by the student in conjunction with his/her advisory committee. The research should be an original contribution to the student's field of choice, and it is highly recommended that the scope of the project be sufficient to result in at least one publication in a quality peer-reviewed journal. GAC expects students to submit a manuscript from their thesis within one year of graduation.

At the end of his/her program, a student will defend their thesis research. The defense will include a public departmental seminar in which the student presents the results of his/her research and followed by a "closed-door" oral defense of the research with the advisory committee and interested members of the departmental faculty. See the instructions in *Section VIII* for scheduling the thesis defense. The thesis *must* be provided to the committee ***at least* 14 days** before the defense. **The student should email the appropriate GPC stating that the thesis has been provided to the committee at this time.**

This final **Oral Exam** consists of general questions covering the discipline and mastery of skills and questions challenging the thesis. Students should prepare for the general questions through review of their class notes, exams, general biology and disciplinary texts, and by remaining current in the literature related to their field of study. The defense of the thesis will focus on the hypotheses, methods, results, and conclusions in the thesis. The student should be thoroughly conversant with all aspects of the research and be able to defend the methods, data, and conclusions. A successful "Pass" of the defense will result in filing the GS7M form with the Graduate School. The committee will assess the student for departmental assessment purposes using a set of rubrics on a form found in Appendix 7/8/9. Please use the forms available in box in the graduate student resources folder. The advisor will turn in one form (the committee's consensus) after the defense to the Graduate Student Services Coordinator, biolgrad@clemson.edu.

Formatting for defense announcements should be as follows:

Title of Thesis or Title of Dissertation
(Title should be in 12 point Arial or Times New Roman font and centered)

Author's name

M.S. Defense or Ph.D. Defense

Advisor's name:

Names of committee members:

Date & Time

Location – zoom link and physical location (if appropriate). Information between here and title should be in 11 point Arial or Times New Roman font and centered.

The abstract, less than 1 page, if possible, should be included.

The text of the above should be included in an email and as a separate PDF for distribution.
Small photos and/or graphics can be included.

M.S. Student Financial Support / Tuition / Fees

Teaching and Research Assistantships

Graduate students accepted into the Biological Sciences or Microbiology graduate programs are either awarded support through the Department of Biological Sciences as Graduate Teaching Assistants (GTAs) or from individual Faculty Advisors' sponsored grant funds as Graduate Research Assistants (GRAs). GTAs are awarded upon acceptance to the program and may be renewed annually based upon performance in teaching and satisfactory progress towards degree for up to 3 years for M.S. candidates. A GTA/GRA can be terminated at any time for substandard, unsatisfactory, or unethical performance. The annual progress report letter sent by GAC each August identifies problems with performance or progress toward the degree and sets deadlines for resolving the problems.

The current rate for a 9-month appointment (no teaching in summer) is $22,000 for M.S. students. Annual GTA stipends may be supplemented by Faculty Advisors' grant funds.

GRAs are awarded by individual Advisors from funds available on research grants upon acceptance to the program. Individual stipend amounts and conditions of renewal are determined by individual Advisors, but GRA stipends normally range from $22,000 – $24,000 depending upon tenure of the student (years in program) and availability of supplemental funds. GRA support is negotiated by prospective students with individual Advisors.

A limited number of University fellowships are available on a competitive basis. Additional information can be found here (http://www.clemson.edu/graduate/finance-tuition/fellowships.html).

M.S. Program Timetable

Requirement	Relevant Form	Deadline (deadline for students entering Fall 2021)
Advisory Committee Selection	Online	By end of Semester 1 (December 2021)
Plan of Study	Online	By end of Semester 2 (May 2022)
Thesis Proposal and Defense	Proposal Defense Verification	By end of Semester 3 (December 2022)
Thesis Submission / Defense	GS7M, Rubric	By end of Year 3 (May 2024)
Annual Progress Report (APR)	APR	Every year
Research Presentation	APR	Every year
Seminar Attendance (BIOL 8120)	APR	Must be enrolled in years 1 and 2. Recommended attendance otherwise.
Reading Group Attendance (BIOL 8070 or MICR 8070)	APR	Must be enrolled in years 1 and 2. Suggested attendance otherwise.

APR = Annual Progress Report

D. M.S. *en route* to Ph.D. program

Clemson has adopted a process by which a doctoral student *may* be granted a master's degree in his/her same discipline while progressing towards a doctoral degree. This process is called the '*en route*' master's to distinguish it from the 'normal' Master's degree for students who matriculated into Master's degree programs. The '*en route*' process is neither automatic nor mandatory; however, there is no difference in requirements for either the M.S. or an '*en route*' M.S. degree. The *en route* M.S. is not an avenue for students who seek only a M.S. degree and who do not plan to pursue the Ph.D. degree. The *en route* M.S. provides greater flexibility for students in case they elect to pursue a Ph.D. in another program or at another institution after fulfilling the requirements for the M.S. degree.

Students must be enrolled as a Ph.D. student to utilize this mechanism. To change to a M.S. *en route* program, a Graduate School Form (GS2-14) should be submitted to document 1) the fulfillment of requirements for an *en route* M.S. degree and 2) the faculty's recommendation to award the *en route* M.S. degree. Normal university deadlines apply in all cases.

The M.S. *en route* program is used primarily for the following situation:

Good Academic Standing/Taken and Passed Comps/ Master's Threshold Achieved.

A *doctoral* student who has enough credit hours to receive a master's degree and has satisfied all the requirements for the master's degree, and who has a >3.0 GPA. The student will take and pass the M.S. oral exam (at the M.S. thesis defense) before being awarded the '*en route*' M.S.

Program Guidelines

Students who enter the M.S. *en route* to Ph.D. program in the Department of Biological Sciences will be considered M.S. students until defense of the thesis. After a successful defense, they will be considered doctoral students.

Students who wish to obtain the M.S. *en route* to their Ph.D. must take and pass the oral exam at the Master's thesis defense before award of the M.S.

During the M.S. portion of the program, the guidelines and regulations of the standard departmental Master's Program apply including required coursework for the M.S. degree.

E. M.S. Bypass to Ph.D. Program

Students admitted and enrolled in the M.S. program can bypass the M.S. degree and proceed directly to the Ph.D. upon petition to GAC. The M.S. bypass is intended for students whose research has expanded to the point that a Ph.D. degree is more appropriate. M.S. bypass requests should typically be submitted *in the third semester* of the M.S. program.
The following procedure must be followed if a student wishes to bypass the M.S. degree:

a) The student must have successfully completed a minimum of 2 semesters of academic work in the M.S. program, accumulating a minimum of 6 credit hours of BIOL/ENTX/MICR coursework at the 8000 level plus 3 credit hours of thesis research (BIOL/ENTX/MICR 8910) while maintaining a minimum GPA of 3.0. The student must also have met the M.S. program's requirements pertaining to enrollment in Seminar and Reading Groups and have made significant progress toward their research goals. The student should also have formed a committee of at least four eligible faculty (see Ph.D. Advisory Committee Selection), met with their committee, and submitted a Plan of Study for the M.S. degree.

b) Following discussions between the student and his/her advisory committee, the student will submit a short (1-2 pages) written request to GAC to bypass the M.S. degree. This request should outline the student's progress in the M.S. program and must justify why a bypass is appropriate. Supplementary materials, such as a CV, reprints of published papers or published abstracts, completed manuscripts, or a list of other formal presentations, can be included with the request. The advisor should also submit a letter, written in consultation with the student's advisory committee, supporting the student's request.

c) GAC will either approve or disapprove the initial request. In the case of initial approval, GAC will provide a 1 semester extension of the M.S. (potentially Ph.D.) proposal defense, which is normally due by the end of the third semester.

d) The student will then write their research proposal as if it were for a Ph.D. and present a Ph.D. proposal defense seminar open to the department within 8 weeks of the beginning of the fourth semester. At least two members of GAC, apart from any members of the student's advisory committee, will attend the proposal defense. In the seminar, the student must present evidence of significant research progress, outline a specific research plan for the Ph.D., and demonstrate sufficient communication skills. The student will then meet in a closed-door session with his/her advisory committee.

e) Following the seminar presentation, the student's advisory committee will submit a written recommendation to GAC as to whether the student is prepared to move directly to the Ph.D. A final decision of the application to bypass the M.S. degree will then be made by GAC.

f) If the request is not approved, the earliest a M.S. student could defend their thesis is the following semester because of the dates for applying for graduation.

g) If the student is approved to switch to the Ph.D., the Graduate Programs Coordinator will notify the Graduate School and a GS14 form will be submitted. A new faculty advisory committee must be selected to meet the requirement of a minimum of 4 advisory committee members for Ph.D. students, and the Plan of Study must be re-filed reflecting the student's new status in the Ph.D. program. Students admitted to the Ph.D. program in this way are expected to fulfill all current Ph.D. requirements.

h) Students who use this option are not awarded the M.S. degree.

F. Non-thesis M.S. in Biological Sciences

The non-thesis M.S. in Biological Sciences is designed primarily for K-12 teachers and others interested in biological sciences education. Students generally are not provided financial support by the Department of Biological Sciences if they are pursuing a non-thesis M.S. Students must be accepted into the non-thesis option at the time of admittance or appeal to the GAC to switch from the thesis to the non-thesis option. Switching to the non-thesis option will be allowed only in unforeseen, exceptional circumstances that prohibit the student from finishing the research or the thesis, such as a serious health issue or loss of advisor. In such cases, the student must write a formal request to the GAC, endorsed by their advisory committee, and have met all deadlines and requirements for the degree program they were pursuing at the time of the request.

Candidates for the non-thesis option must complete a total of 30 credit hours of graduate coursework. At least 18 of the 30 hours must be at the 8000-level. A research proposal and project whose results are presented in written format is also a requirement. The scope of the research project is not as extensive as the thesis required in the thesis MS program; however, it is expected that students will conduct original scientific research and write a document of the caliber of a manuscript suitable for submission to a peer-reviewed journal. The student and the student's graduate committee will determine the subject of the research project. The timeline for accomplishing these tasks is the same as for the thesis option of the M.S. degree (see page 18).

III. Starting Graduate School

A. New Student Hiring Directions

1. All new graduate assistants to be hired by Biological Sciences should provide a completed New Employee Data Sheet to the Graduate Student Services Coordinator; currently to Ms. Nancy Brown (nbrown4@clemson.edu; 132A Long Hall).

2. I-9: Completing an I-9 form is a federal requirement and provides proof of authorization to work in the United States. The I-9 document contains a list of acceptable documents. From that list you will need to present either 1 official document from list A OR 1 from list B + list C.

a. **U.S. citizens:** Nancy Brown will contact you regarding how you can provide your documents to her for verification, providing alternatives to in-person meetings if needed.

b. **International students:** A meeting with the International Employment division in Human Resources is required. The student must schedule an appointment using the online scheduling tool at: https://www.genbook.com/bookings/slot/reservation/30204286?category=723087917. When scheduling the appointment, please select International Employment and **enter the reason for the appointment** (new hire, rehire, reverification, etc.) in the Additional Information section.

3. HR and Payroll also asks that you supply a copy of your social security card. The Social Security Administration requires employers to enter all employee names into the payroll system as it appears on the employee's social security card.

Once your employment record is entered into the HR/Payroll database, you will be notified by email with instructions for setting up direct deposit for your pay, your tax withholding, viewing your paystub, and signing up to receive your W-2 tax form online (if desired).

Graduate Assistants should not exceed work hour limitations:
- 28 paid service hours per week for U.S. Citizens / 20 paid service hours per week for international students.
- Special provisions may apply for camps / seasonal programs meeting specific criteria.

Graduate Assistants must accurately report paid service hours worked in a timely manner.
Log in to the https://hr.app.clemson.edu/tcs/ to report paid service hours worked.

1. Click link
2. Enter ID and password
3. Enter paid service hours or check the box to certify you did not work
4. Click submit

Action(s) taken for missed entries:
To comply with the Affordable Care Act (ACA), we must obtain, and report paid service hours accurately and in a timely manner.
- The Office of Human Resources will send a reminder each month regarding required entries.
- Missed entries after the deadline may result in disciplinary action (reference the guidelines for specifics) for those weeks being calculated based on full-time work hours for the purposes of the ACA.

If at any time, you work as Graduate Student Hourly or Graduate Student Summer Employee, you should enter your hours in Kronos.

Summer Graduate hourly students will report their hours in Kronos. Log in to Kronos, Kronos Workforce Central(R) (works best in Chrome)

1. Log in using your Clemson credentials.
2. Find the current date and "punch in" for your start time and "punch out" when you leave.
3. On the 1st and 16th of every month, you'll need to approve your timecard for hours worked the previous 15 days.
4. To approve timecard, chose "previous pay period" on the top right side of your timecard. Review your hours and click approve timecard in the top left corner.

Training videos for Kronos can be viewed here.

B. Payroll, Fees, and Benefits Information

Payroll

Graduate teaching (GTAs) and research (GRAs) assistants receive semimonthly payments throughout the year. Most appointments are 9-month annual appointments beginning around August 15th of each year to around May 15th. They will receive 9 semi-monthly payments for Fall, and 9 semi-monthly payments for Spring. Paydays are the 15th of the month and the last day of the month unless the date falls on a weekend or holiday. Paychecks must be directly deposited into a local checking or savings account.

Directions for initiating your direct deposit can be found at: http://www.clemson.edu/humanres/compensation/direct_deposit.html. It is possible to direct deposit in up to 5 different accounts. Students who have questions/problems with their payroll should contact the Graduate Student Services Coordinator, currently Ms. Brown (132A Long Hall: nbrown4@clemson.edu).

Fees

Each semester, there are various fees that each student must pay that include access to the health center, gymnasium (Fike), and software. For 2019-20, the amount was $1137/semester for students on an assistantship; check here to calculate the most up to date amount. Health insurance is not included in these fees and must be purchased separately (see below). Students who have insurance through a relative must submit a waiver.

Fees can be drafted from a bank account in six consecutive installments each semester, except for the first semester a student is enrolled. The fees will be withdrawn every two weeks. Here is a link to the fee calculator. Most graduate students will be on an assistantship and therefore the relevant section of that site is found under "Full-Time Graduate Assistant Fees per Semester". Go to http://www.clemson.edu/employment/compensation/direct_deposit.html for instructions on how to complete the payroll Deduction Authorization Form.

Health Benefits

Clemson University requires all full-time (9 hours or more), on-campus graduate students to have health insurance coverage. It may be purchased through Clemson University or though other insurance policies that meet the University requirements. The Graduate School subsidizes the cost of health insurance. See the section "Full-Time Graduate and Graduate Assistant Insurance Rates" of this website for the cost of health insurance for the year: http://www.clemson.edu/finance/student-financials/tuition-fees/index.html. See this site for more information about the insurance: http://www.clemson.edu/campus-life/student-health/. If you have any questions about health and medical insurance, contact Dawn Perry (dawnp@clemson.edu or 656-3561) at Redfern Health Center.

C. New Student Orientation

All new graduate students are required to attend Graduate Student Orientation, which is generally held in the week prior to the start of classes. Orientation includes TA training, safety training, Departmental orientation (with the Chair and members of the Departmental office and lab staff), and meetings with some current graduate students. If you are unable to attend orientation, you must contact the appropriate Graduate Program Coordinator (Biological Sciences: biolgrad@clemson.edu, Environmental Toxicology: entoxgrad@clemson.edu, or Microbiology: micrograd@clemson.edu to make separate arrangements. In addition to department-specific orientation, there is also College and University orientations that you will be expected to attend. Details about these orientations will be sent to you typically within one month of the start of the semester.

Need-to-Know Information

A. Graduate Student Associations

Biological Sciences Graduate Student Association (BSGSA)

The Biological Sciences Graduate Student Association (BSGSA), organized by the departmental graduate students, sponsors a speaker each year, organizes various social events, provides travel awards, helps recruit new graduate students, and assists with departmental functions as requested. The BSGSA also serves as a liaison between graduate students and the Department. More information about BSGSA can be found at https://sites.google.com/a/g.clemson.edu/bsgsa/home.

The BSGSA offers Travel Awards, on a competitive basis, of up to $400 each, twice yearly to dues-paying members who have completed a minimum service requirement. Application forms and instructions can be obtained from a BSGSA officer. The current BSGSA officer roster can

be obtained from the Graduate Student Services Coordinator (biolgrad@clemson.edu). BSGSA also has a group on Facebook.

University Graduate Student Government (GSG)

The goals of GSG are to:

1) Increase graduate student involvement
2) Act as a liaison between the University and graduate students
3) Act as a channel for graduate students to collaborate and enhance their education
4) Provide opportunities for graduate students to develop professionally and academically

If you are interested in learning more about GSG you can find more information on the website: (http://www.grad.clemson.edu/gsg/_).

The GSG offers travel awards of up to $750 (domestic) and $1000 (international), each on a competitive basis during fall and spring semesters. Specific award details and instructions are subject to change. More information about the Graduate Travel Grant Service is found here.

B. Computing

Computing Services. The University's Center for Computing and Information Technology (CCIT) is responsible for all computing issues on campus. New students are assigned a user ID and a temporary password upon admission to the University. CCIT maintains a number of computer labs throughout campus that are open to students. Wireless access is also available in many buildings throughout campus.

Students can have personal computers set up with appropriate email software and wireless setup by taking the computer to the CCIT help desk (Second Floor of Cooper Library) or emailing ithelp@clemson.edu to set up an appointment.

Poster printing. Poster printing is handled through CCIT and students have access through their website: https://ccit.clemson.edu/support/current-students/printing-plotting/.

C. Office Information

Graduate students are sometimes assigned a desk in research labs located in Jordan Hall. However, desks and filing cabinet space is also available in the graduate student office in 230/234 Long Hall. Contact the BSGSA Secretary for assistance. Students whose labs are located in the Life Sciences Facility are assigned desks in a common graduate student office in that facility. Ask your advisor and contact Rick Moseley (remosel@clemson.edu) for assistance.

Mail. Graduate student mailboxes are located in 141 Long Hall. Mail should be addressed to Your Name, Department of Biological Sciences, 132 Long Hall, Clemson University, Clemson, SC 29634-0314. Please check your mailboxes regularly as messages, seminar notices, announcements, etc. are distributed in student mailboxes. Outgoing mail can be placed in the appropriate bin in 133 Long Hall. All personal U.S. mail must be stamped.

Building Access. Long Hall, Jordan Hall and LSF are card accessible. Access must be requested by your advisor, via email, to Mike Moore (mmore@clemson.edu), Building Manager for Long and Jordan Halls or to Rick Moseley, Building Manager for LSF (remosel@clemson.edu). Keys for access to laboratories and offices, in Long Hall and Jordan Hall, are assigned through the Biological Sciences main office. Please see Teri Elliott in 132 Long Hall. Keys to specific laboratories require the approval of the laboratory principal investigator. Contact the instructor or course coordinator to acquire keys to specific teaching laboratories.

Keys to conference rooms and classrooms can be signed out from the departmental office as needed on a limited basis.

You are responsible for all keys given to you and for ensuring that all areas used by you are locked when you leave. Please return keys when they are no longer needed.

Office Materials. Office materials (including printer paper) are available to you for class or research use through the appropriate teaching or research professor. See administrative assistants in the departmental office (Long 132) to obtain these materials.

Photocopies. Photocopy machines are located in 135 and 149 Long Hall. Personal copying may not be done on the departmental copier. Ms. Teri Elliott can show you how to scan, print, and copy from these machines. Copiers are available in the library and at commercial sites downtown (e.g., Copy Shop, 189 Old Greenville Hwy Suite A., Clemson, SC.) for personal copying.

Phone / Fax. To make a local call, just dial directly by entering the 7-digit phone number. Long distance calls (except 800 numbers) require a 9-digit code. Your research advisor can provide you this code for work-related calls/faxes. The departmental fax number is 864-656-0435 and the fax machine is located in the front main office, 132 Long Hall, should you need to fax something.

Sending Express Shipments. To send an express package, contact your advisor/lab manager. You must provide an account number to pay for the shipment (available from your faculty advisor).

Departmental Vehicles. The department maintains three trucks, three18 passenger vans and two golf carts for departmental teaching and research use. You must be a licensed driver in order to drive a SC State vehicle. Be sure you are aware of all state regulations regarding the use of vehicles. Any ticket you receive will be your responsibility whether on campus or on the road. To reserve a departmental vehicle, contact Ms. Teri Elliott (telltt@clemson.edu) in the departmental office.

D. Transportation and Parking

All CAT buses are free. They have campus routes as well as routes servicing Clemson, Central, and other surrounding areas. For information and routes visit CAT http://www.catbus.com/.

Commuter student parking is in the orange spaces and by permit only. Permits can be obtained from Parking Services in the University Union and information can be obtained at http://www.clemson.edu/campus-life/parking/.

E. Facilities

Departmental Facilities

Research and teaching for the Department of Biological Sciences takes place primarily in Long and Jordan Halls and the Life Sciences Facility (Microbiology teaching labs).

Laboratories. No smoking, eating or drinking is allowed in either the teaching or research laboratories. All personnel working in labs with hazardous chemicals must have all skin areas covered; lab coats are required; sandals are not allowed. Laboratories, both teaching and research are to be kept clean and in order.

Teaching Laboratories. Undergraduate students may not be left in teaching laboratories without supervision. Building and equipment security is your responsibility. Be sure doors and windows are closed and locked following lab. Do not leave building doors propped open after hours for any reason.

Common Departmental Equipment. Students should not use common equipment until they have been trained to do so.

Sterilization (autoclaves) and glass-washing facilities, walk-in cold rooms and environmental chambers are available on each floor in Jordan and in many locations in the Life Sciences Facility. Students should receive training in operating this equipment from either the course coordinator (teaching labs) or their research advisor prior to use.

Microscopy, Imaging, *Flow Cytometry.* The Light Imaging Facility is located Suite 030 of the Life Sciences Facility. Information regarding the use of this equipment can be obtained from Dr. Terri Bruce (terri@clemson.edu). See here (http://www.clemson.edu/centers-institutes/light-imaging/index.html) for more details.

University Facilities

Specialized fee-based campus facilities are also available to all departmental researchers. These include animal facilities, green house facilities, imaging facilities, a DNA sequencing facility, and genomics/proteomics capabilities. A description and contact information for major resources is found below.

Advanced Materials Research Laboratory (Research Park – AMRL). Additional electron microscopy facilities are available at AMRL. Equipment at this center includes SEM, TEM, STEM and FESEM capabilities. Information regarding training and use of this facility can be found here: http://www.clemson.edu/centers-institutes/cuadvancedmaterialscenter/electron-microscope/index.html or by contacting Dr. Lax Saraf (lsaraf@clemson.edu).

Clemson University Genomics and Bioinformatics Facility (CUGBF). This facility offers sequencing, ddPCR, nucleic acid quantification and bioinformatics support. The Director is Dr. Christopher Parkinson (viper@clemson.edu).

South Carolina Botanical Garden. The South Carolina Botanical Garden has field areas (old fields, woods, a small stream, etc.) on a 7-acre site for programmatic use.

Clemson Experimental Forest. The Clemson Experimental Forest's 17,500 acres are dedicated to education, research, and demonstration to better understand and manage forest resources for the benefit of society. With approval, the Experimental Forest may be available for research and teaching purposes (contact Russell Hardee, Forest Manager, 266B Lehotsky Hall, rhardee@clemson.edu, 656-4833).

University Greenhouses. Greenhouse space is available for research purposes. The department operates greenhouses on the roof of Jordan Hall and rented space in the Biosystems Research Center (BRC) greenhouse facility. Dr. Matt Koski (mkoski@clemson.edu) oversees the teaching collection in the greenhouses. See here http://www.clemson.edu/cafls/brc/ for information about the BRC greenhouse, which has space to rent for research purposes.

Bob and Betsy Campbell Museum of Natural History. The vertebrate collection is in the Bob and Betsy Campbell Museum of Natural History. The collection is available for use in teaching and research. Contact Ms. Melissa Fuentes (fuente2@clemson.edu, 656-3456), curator, for questions regarding the museum or its collections.

Herbarium. The Herbarium is also located in the Bob and Betsy Campbell Museum of Natural History. It maintains an excellent collection of local, regional, and worldwide floras. All qualified graduate students are invited to utilize the herbarium. Ms. Lorena Endar (, 656-7234) is the current curator in charge of the herbarium.

Aquatic Animal Research Facility. Located in P&A, Room 26 and the adjacent corridors. Mr. John Smink (smink@clemson.edu) is the Facilities Coordinator. Rooms are available for short-term projects involving aquatic animals housed in aquaria, stock tanks, and raceway channels. Re-circulating tanks and raceways can be used for freshwater or sea water research projects. Requests for research space in this facility should be made by your faculty advisor to Mr. Smink.

Godley Snell Animal Research Facility. GSRC is managed by the Office of Research Services and provides centralized laboratory animal facilities, equipment, caging, and veterinary and technical support to facilitate diverse campus-wide animal research and teaching programs. Services available include: Animal Procurement and Maintenance, Animal Care and Health Surveillance, Project Cost Analysis, Project Development and Veterinary Consultation, Technical Services (blood collection, veterinary care, euthanasia, and sample collection), and Surgical Services. For more information contact Melody C. Willey, Director of Operations, mclrk@clemson.edu.

Other department personnel who may be of assistance are listed in Appendix 15.

F. Safety Manuals and Training

All personnel working or teaching in laboratories must complete the Chemical Safety course administered online by the campus Occupational and Environmental Safety. Safety requirements

vary based on your research area. Your advisor will provide you a list of required safety modules that must be completed for your research area. See Appendix 16.

Safety training, including chemical, biological, and radiation training modules can be completed on-line at the Occupational and Environmental Safety web site: / https://www.clemson.edu/research/oes/.

Appropriate training must be completed prior to beginning laboratory or fieldwork.

Research Safety provides biohazard waste and sharps collection containers, plus disposal. For assistance with disposal of biohazard wastes, contact the Environmental Compliance Officer at 656-1770 or 656-7309. Notify Rebecca Ackerman (arebecc@clemson.edu, 656-6189, 318 Long Hall. the departmental chemical hygiene and safety contact person, for any questions or issues related to chemical hygiene in Biological Sciences.

You should also speak with your advisor regarding laboratory safety and core facilities.

G. Travel Forms

Visit this website for instructions BEFORE you travel:click here Forms requesting *permission to travel* or to report *expenses for in-state, out-of-state, and foreign travel* are at here (http://www.clemson.edu/procurement/travel/) or are available in box (here). Make sure to check with Ms. Andrea Thornal (656-2330, **thornal@clemson.edu**) for rules and regulations for booking travel or registering for conferences. Foreign travel requires extra time to be approved.

IV. Graduate School Forms Summary

This section briefly outlines the forms that are required by the graduate program for both Ph.D. and M.S. students. Each form can be found on the Graduate School website and these should be used as some forms are now online or accessible through iRoar. See http://www.clemson.edu/graduate/students/forms.html. Completed original forms are submitted to the Graduate Enrolled Services Office (104-D Sikes Hall) electronically and copies are kept by the Biological Sciences Department. You will need to send a copy to the Graduate Student Services Coordinator, biolgrad@clemson.edu, email with any questions.

It is the student's responsibility to check the Graduate School website to ensure the most recent update of the form is used for submission.

Plan of Study (**Appendix 1)**. The Plan of Study (formerly submitted as the GS2 form) is to be determined in consultation with your faculty advisor and graduate committee. It details the coursework to be completed as part of the graduate program. All courses listed in the Plan of Study must be passed with a grade of "B" or higher prior to completion of the graduate degree, even if those courses are not part of the general degree requirements. The procedure for selecting the advisory committee and Plan of Study can be found in **Section VI**.

Proposal Defense Verification Form fillable form here (https://www.clemson.edu/graduate/files/pdfs/GS-ResearchApproval.pdf). Please submit and send a copy to biolgrad@clemson.edu after your proposal defense.

Results of the Comprehensive Ph.D. Exam Form (GS5D; Ph.D. Only). This form is to be completed by the graduate committee upon completion of the Ph.D. comprehensive exam.

Application for Graduation and Diploma Form (GS4). This form must be filled out and turned in several months prior to graduation (check on-line for deadlines relative to your graduation date). This form officially informs the Graduate School of your intention to graduate and must be re-submitted if your graduation date is postponed.

M.S. Final Exam and Thesis Approval Form (GS7M). This form is completed following the final M.S. thesis defense. It is a record that your thesis has been reviewed and signed by your advisor. It is turned in when your thesis is turned in for review by the Graduate School.

Ph.D. Dissertation Defense and Dissertation Approval Form (GS7D). This form is completed following your dissertation defense and acceptance of your Ph.D. dissertation by your committee. Once it is signed by your advisor, you will turn it in for review by the Graduate School.

Clemson University Name Change Request (Name Change Request). This form is turned in to officially change your legal name in the school records (such as in the case of marriage or divorce).

V. Procedure for Selecting a Committee and Filing the Plan of Study

The selection of a graduate advisory committee and filing of the plan of study are now conducted online through iRoar. Please go to the Graduate School's website for detailed instructions: (http://www.clemson.edu/graduate/students/plan-of-study/index.html).

Committee Composition (see the Graduate School's policy for the most up-to-date instructions)

The majority of the advisory committee, including the major advisor, must be composed of Clemson University faculty who hold full-time, tenured or tenure-track positions (*i.e.*, 2 for a committee of 3 faculty members; 3 for a committee of 4 or 5 members). Either the major advisor or at least half of the committee must hold rank in the program offering the degree. If a minor is declared, this area must be represented on the committee. Faculty emeriti may serve as advisory committee members but may not serve as chair of the advisory committee. Part-time visiting and other nontenure-track faculty employed by Clemson University may serve on the advisory committee if approved by the graduate faculty (TPR committee) in the department but may not serve as chair. Persons not employed by the University may serve on the advisory committee; if they serve as one of the statutory members of the committee, they must be approved by the Department graduate faculty (TPR committee) and given graduate faculty status. See GSC Committee selection section below for more details. All duly appointed committee members have full voting status on the outcomes of all examinations given by the committee. It is possible

for co-chairs to direct the activities of the advisory committee. Check with the appropriate Graduate Program Coordinator if you have any questions.

Change in Committee Composition: The student or a committee member may request a change in committee membership by selecting a new committee through the iRoar portal. However, such change must meet approval of all concerned. In the event of a conflict of opinion, the appropriate Graduate Program Coordinator will arbitrate the request. Any revision in committee membership will require submission of a new committee and approval by all committee members and appropriate administrators. A new GS2 Plan of Study must also be approved after changes in committee membership.

GS2 Committee Selection

To appoint a graduate advisory committee, the student will follow the directions on the Graduate School's webpage about the GS2 and select the button "GS2 Committee Selection". A drop-down list of faculty will appear for different departments. All faculty eligible to serve on graduate student committees are found on this graduate faculty list. If the faculty is not on the list but is at Clemson University, contact your GPC to request approval to add them as a committee member. Once approved, they will be added to the graduate faculty list. External faculty (outside the university) will appear if all steps for their appointment have been completed as described below. In order for an external member to be awarded graduate faculty status through the Department, your advisor should fill out a template requesting Graduate Faculty Status found in the BioSci faculty resource folder here and send it, as well as the external faculty's CV to the chairs of the TPR committee and the department. Their application will be reviewed by the IRC and then the TPR committee, who will vote on it during the next scheduled faculty meeting. Once the external faculty member is approved by the TPR committee, the department chair can approve the workflow request that you initiate in iRoar. See here for directions on adding an external committee member in iRoar. Once the committee is selected, e-mails will be sent one-by-one in a hierarchical order for approval. An email is first sent to your advisor, then each committee member (alphabetically by last name), then the appropriate Graduate Program Coordinator, the Chair of the Department, the Dean of the College, and finally the Dean of the Graduate School. Faculty will need to use the Duo system to enter the site to approve the Committee Selection and Plan of Study. Contact the appropriate Graduate Program Coordinator if any help is needed with this process.

GS2 Plan of Study

The purpose of the GS2 Plan of Study is to document the plan for coursework upon which the student and committee have agreed.

Deadlines: A student should plan on filling out *two* Plans of Study during their degree. The first one is due by the middle of a student's second semester for M.S. students and by the end of the third semester for Ph.D. students. After this date, registration for the next semester may be blocked by the Registrar until the Plan of Study has been filed. An updated Plan with the courses that have been taken is generally then filed before graduation. **Note the deadlines** for filing the

final GS2 before graduation – these are generally an entire semester before the defense, here: http://www.clemson.edu/graduate/students/deadlines.html

Form: As with the Committee Selection, the "form" is available through the iRoar portal. Please follow the directions found on the Graduate School's webpage.

Courses: Students should list courses (formal or research) to total 30 or 60 credits depending on the degree and past degrees. This coursework is decided between the student and their advisory committee.

The total is determined based on the following:

- **M.S. students need 30 credits**: 24 of which are formal course credits (at least 12 of them at the 8000 level) and 6 research credits (BIOL, ENTX, or MICR 8910). Four (4) of the 12 course credits should come from BIOL 8120 (or ETOX 8610 for ENTOX students) (Seminar), and 4 credits should come from BIOL/MICR 8070 (the Reading Group course), except for ENTOX students.

- **Ph.D. students coming in with a M.S. degree in hand need 30 credits**: at least 18 of which must be research (BIOL, ETOX, or MICR 9910) and at least 12 of which must be coursework (this requirement for coursework credits may change in 2018-19). Six (6) course credits should come from BIOL 8120 (or ETOX 8610 for ENTOX students) and 6 course credits should come from BIOL/MICR 8070 except for ENTOX students unless the M.S. degree was granted from Clemson and the student already has completed 4 credits of BIOL 8120 and BIOL/MICRO 8070. In that case, only as many credits of BIOL 8120 and BIOL/MICRO 8070 needed to complete 6 credits of each course for the entire time at Clemson (inclusive of the M.S. degree) are needed.

- **Ph.D. students coming in with only a B.S./B.A. degree need 60 credits**: at least 18 of which must be research (BIOL, ETOX or MICR 9910); at least 12 of which should be formal course credits (e.g., courses, BIOL 8120, BIOL 8130, BIOL 8070, MICR 8070); and at least half of which are at the 8000-level or above. Six (6) course credits should come from BIOL 8120 or ETOX 8610 for ENTOX students (Seminar) and 6 course credits should come from BIOL/MICR 8070 (the Reading Group course), except for ENTOX students. No more than 60 credits need to be included in the Plan of Study.

Do not list courses completed in excess of those required by the advisory committee. A student can take as many credits as they like (within reason), but only the courses required by the advisory committee, our graduate programs (i.e., the Biological Sciences Seminar and Reading Group courses), and research credits should be listed on the Plan of Study.

Contact the appropriate Graduate Program Coordinator if you have any questions.

Approval: As with the committee selection, e-mails will be sent one-by-one in a hierarchical order for approval. An email is first sent to your advisor, then each committee member

(alphabetically by last name), then the appropriate Graduate Program Coordinator, the Chair of the Department, the Dean of the College, and finally the Dean of the Graduate School.

VI. Procedure for Organizing Your Proposal Defense

Reserve a Seminar Room

Contact Ms. Teri Elliott (656-2416; telltt@clemson.edu) well in advance of the date you want to defend your proposal. Be sure to let her know you are scheduling a ***proposal*** **defense** and not a final defense. Let her know your defense date, time, and room preference(s). She can also help you choose a room. Some common rooms for public proposal defenses include the Jordan Room, Long 229, LSF 026, 142, and 242; BRC 100; and Poole E-142. Teri can reserve the Jordan Room and the Long Hall rooms directly. She can fill out the forms to request LSF rooms click here or BRC rooms click here . She can also request P&A E-142, which has videoconferencing abilities, through Tracy Reynolds (tracyr@clemson.edu). If Teri is unavailable, email BiolSci@clemson.edu and someone will assist you.

A proposal defense is required for all M.S. and Ph.D. students, but a public proposal defense is only required for Ph.D. students. A public proposal defense is optional for M.S. students.

Written Proposal

Provide your committee with your proposal ***at least*** **14 days** before your defense.

Announce Your Public Proposal Defense

At least 10 days before a public proposal defense,

- You should email an announcement of your proposal defense with the flyer attached (see below) to your advisor, committee members, and the Graduate Student Services Coordinator, biolgrad@clemson.edu.
- The contents of the announcement should be **in the body of the email**. The contents include your name (the name of the person defending); what you are defending (proposal, M.S., Ph.D.); the title of your talk; the date, time, and location of the talk; and your advisor's name.
- You should include this information on a flyer in a separate attachment with the email as well. The flyer should contain the following information:
    - A brief description of your research or a GOOD diagram (something that would, by itself, explain your proposed research to any interested persons) that can be used in place of a description of your research.
    - All the relevant information for people who might wish to attend such as your name, date, time, location, name of your advisor, etc.
    - An image related to your research (photo, graph, computer generated image, etc.) may also be provided.
- You should post your flyer on the Seminar Board near the main Biological Sciences Office and on various boards in Long and Jordan Halls and the LSF, if appropriate.

Use the Proposal Defense Verification Form

- Thesis Proposal Preparation and Defense (Filing Proposal Defense Verification Form, fillable form: https://www.clemson.edu/graduate/files/pdfs/GS-ResearchApproval.pdf). Fill out appropriate info and send to committee members to get all signatures.
- Send a copy to the Graduate Student Services Coordinator, biolgrad@clemson.edu, so it can be placed in your file.

If you need assistance with teleconferencing: See Joe Bradford, (ITHELP@clemson.edu), one of the IT specialists for the College of Science, for assistance.

Please see below (Section VII, Remote Dissertation/Thesis Support) for instructions for setting up virtual meetings.

VII. Procedure for Organizing Your Thesis or Dissertation Defense

The following outlines the steps in scheduling your defense, advertising your defense, filing the appropriate form with the Graduate School once you have successfully completed your defense, and filing the appropriate assessment form with the Department. See here for all deadlines *well in advance* of the semester you plan to defend. Note that you must be enrolled for at least one credit during the semester you plan to defend (usually BIOL or MICR 8910/9910, but can be anything) and that you have to apply for graduation (GS4) at the beginning of the semester in which you plan to defend.

If you can complete all your requirements, including an accepted manuscript, by the last day of registration for classes for the coming semester, you will be cleared to graduate at the end of that semester without having to enroll in credit hours or pay tuition. Check with Enrolled Services (weartha@clemson.edu) for the exact deadline for each semester, and please notify them that you plan to delay your graduation.

For guidelines for formatting your dissertation or thesis, see here.

Note that Ph.D. candidates must pass the oral examination, i.e. the dissertation defense, at least three weeks prior to the commencement ceremony.

Reserve a Seminar Room

Contact Ms. Teri Elliott (656-2328; telltt@clemson.edu) well in advance of the date you want to defend your proposal. Be sure to let her know you are scheduling a ***final*** **defense**. She can also help you choose a room. Some common rooms for public proposal defenses include the Jordan Room; 229 and 228 Long Hall; LSF 026, 142, and 242; BRC 100; and Poole E-142. Teri can reserve the Jordan Room and the Long Hall rooms directly. She can fill out the forms to request LSF or BRC rooms. She can also request P&A E-142, which has videoconferencing abilities, through Tracy Reynolds (tracyr@clemson.edu). If Teri is unavailable, email BiolSci@clemson.edu and someone will assist you.

Remote Dissertation/Thesis Support

If you need to set up a virtual meeting, your advisor should set up the Zoom meeting, create a waiting room, invite people in, and record the defense in the cloud. The waiting room, passwords

and invites prevent Zoom bombing. If you use remote connections (Zoom) for your defense, this link provides some best practices for use. Clemson University also provides excellent support for Zoom.

Graduate School policy permits defenses to be delivered virtually if the defense is a synchronous event for the committee members. As this method is being employed more extensively than originally anticipated, the resources shared here are intended to support this process for all involved.

Jodi Cox, our Director of Graduate Training and Mentoring, forwarded the link below. I have secured permission from the student author (Ashton Merck) to share with you. She held her virtual dissertation defense at Duke University last week and shared many excellent suggestions for both the defending student as well as the faculty committee.

This article from Inside Higher Ed below shares more information about virtual defenses including a reference to the resource above.

Thesis or dissertation

Provide all members of your committee with your full thesis/dissertation ***at least* 14 days** before your defense. **Email the appropriate Graduate Program Coordinator stating that the document has been provided to the committee at this time.**

Announce Your Defense

At least 10 days before your defense, you need to fill out this form to alert the Graduate School of your defense: http://www.clemson.edu/graduate/calendar/defense-form.html.

At least 10 days before your defense, you must also send an email to your advisor, committee members, and the Graduate Student Services Coordinator, biolgrad@clemson.edu) announcing your defense. The department will forward it to the faculty and graduate students. **The contents of the announcement should be formatted as an attached document (flyer) AND also included in the body of the email**.

The announcement flyer/email should contain the following information:

- All the relevant information for people who might wish to attend: the name of the person defending, date, time, location (zoom link if needed), name of advisor, etc.
- A brief description of your research or a GOOD diagram (something that would, by itself, explain your proposed research to any interested persons) that can be used in place of a description of your research.
- An image related to your research (photo, graph, computer generated image, etc.) may also be provided.

You should also post your flyer on the Seminar Board near the main Biological Sciences Office and on various boards in Long Hall, Jordan Hall, and the Life Sciences Facility (if appropriate).

Use GS7M (M.S.) or GS7D (Ph.D.) Form

Go here for up-to-date forms.

- Open the appropriate GS7M or GS7D form.
- Type in your information at the top and your committee members names in the appropriate spaces at the bottom. Save to your computer (it can be opened and edited in Adobe Acrobat).
- Get signatures of all committee members via email.
- Email copy of the GS7 to the Graduate Student Services Coordinator, biolgrad@clemson.edu.
- Submit signed GS7 via the submit button.

Send a copy of the rubrics for departmental assessment to your advisor/committee PRIOR to the defense (Appendix 10/11/12) depending on MS/PhD and BioSci/Entox/Micro). The rubrics can be found in box (address). The advisory committee will fill out the appropriate rubric form after the defense and send it to the Graduate Student Services Coordinator, biolgrad@clemson.edu.

VIII. Guide for Formatting Bound Copies of Theses/Dissertations

The Graduate School requires that all Master's theses and Doctoral dissertations be submitted in electronic format. Guidelines for electronic format of theses/dissertations can be found on the Graduate School webpage. The official copy of your thesis/dissertation must be submitted to the Graduate School in this electronic format and approved before your degree will be awarded.

- In addition to the electronic copy of your thesis/dissertation document required by the Graduate School, you have the option to purchase bound copies through a vendor. A signature page from your advisory committee (not available in the electronic copy) can be included in the bound copy, and there is an option to print your figures in color.
- One option that some of our students have used: www.ETDadmin.com
- The Graduate School recommends Proquest.

Appendix 1. Plan of Study (GS2)

The Plan of Study is now completed online and involves selecting a committee first. Instructions can be found here.

A list of courses that a typical graduate student would take is on the next page.

Also see *Section VI* of this Graduate Student Guide for instructions specific to our graduate degree programs.

Typical MS student	Credits	Notes	
Reading Group (BIOL/MICR 8070 or BCHM 8900)	4		Total course credits ≥ 24 (at least 12 at 8000+ level)
Seminar (BIOL 8120)	4		
GTA Colloquium (BIOL 8130)	1		
Other course (6000+)	3		
Other course (6000+)	3		
Other course (6000+)	3		
Other course (6000+)	3		
Other course (6000+)	3		
BIOL/MICR 8910	6	Minimum of 6 research credits	
Total Credits for MS	**30**	**Minimum total of 30 credits**	

Typical PhD student with MS from elsewhere	Credits	Notes	
Reading Group (BIOL/MICR 8070 or BCHM 8900)	6		Total course credits ≥ 12 because of Reading Group and Seminar requirements
Seminar (BIOL 8120)	6		
GTA Colloquium (BIOL 8130)	1		
Other course (6000+)	3		
Other course (6000+)	3		
BIOL/MICR 9910	18	Minimum of 18 research credits	
Total Credits for PhD with MS	**30**	**Minimum total of 30 credits**	

Typical PhD student with MS from Clemson	Credits	Notes	
Reading Group (BIOL/MICR 8070 or BCHM 8900)	2	Have already taken 4 during MS	Total course credits ≥ 12
Seminar (BIOL 8120)	2	Have already taken 4 during MS	
Other course (6000+)	3		
Other course (6000+)	3		
Other course (6000+)	3		
BIOL/MICR 9910	20	Minimum of 18 research credits	
Total Credits for PhD with MS from Clemson	**30**	**Minimum total of 30 credits**	

Typical PhD student without MS	Credits	Notes	
Reading Group (BIOL/MICR 8070 or BCHM 8900)	6		Total course credits ≥ 12 because of Reading Group and Seminar requirements
Seminar (BIOL 8120)	6		
GTA Colloquium (BIOL 8130)	1		
Other course (6000+)	3		
Other course (6000+)	3		
Other course (6000+)	3		
BIOL/MICR 9910	28	Minimum of 18 research credits	
Total Credits for PhD without MS	**60**	**Minimum total of 60 credits**	

Appendix 2. Proposal Defense Verification Form – example; do not use!

Current Graduate School forms reside at **https://www.clemson.edu/graduate/students/forms.html**

The purpose of this form is to confirm approval for a graduate student to commence research activity for the proposal identified below. If the proposal is commensurate with a doctoral program's comprehensive exam requirement, this form should be submitted to Enrolled Student Services along with **Form GS5D — Results of the Doctoral Comprehensive Exam and Candidacy**. A copy should be retained by the department.

Department:_Degree: _____

This is to verify that _____*Student name and XID#*

has successfully defended the £ **THESIS** £ **DISSERTATION** proposal with the following working title:

_____

_____

on the date: _____

The written proposal has been accepted by the following Advisory Committee chair/co-chairs and members:

Printed name	Signature
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

If the committee requires or recommends additional changes before research commences, details are listed below or in an attachment (include due date if warranted).

_____

_____

_____

_____

_____ _____

Student signature *Advisory Committee Chair signature*

Appendix 3. Ph.D. Comprehensive Exam Formats

Format 1. "Research Proposal Format" This exercise is intended to assure that the doctoral student who has successfully completed the majority of the coursework requirements has the ability to identify specific questions that remain unanswered in a research area and to develop a written research proposal that describes experimental approaches to answer these questions. **Note: the comprehensive exam research proposal should be on a topic that is not a part of the student's dissertation research or an ongoing research project of the student's mentor.** The proposal can, however, be an extension of the student's dissertation research and thus, be in the student's same field of research as the dissertation project. For example, a student might write a proposal outlining a postdoctoral project that would be a follow-up study to the student's dissertation research.

Choosing a Topic: The student and the advisor will discuss two or three topics of interest for a research proposal to be written in federal grant style. After discussion and agreement, the student will have 2 weeks to research the topics before presentation to the student's advisory committee. A 1.5–2 page description containing background and specific aims for each topic should be delivered to the members of the committee several days prior to an advisory committee meeting. At this meeting the student will give a short, informal presentation on each topic. The committee will decide which topic should be addressed in the research proposal and the student will have 4 weeks from the date of this meeting to write the proposal.

Format of Proposal: The proposal will be written in federal grant style. Sections will include, background and significance, specific aims, experimental design and methods. Students will not solicit help from any faculty or other graduate students when writing this proposal.

Comprehensive Exam: Following submission of the research proposal to the advisory committee by the student, the committee will schedule the comprehensive examination at which the student will present, in 30 minutes or less, an overview of the research proposal and will then defend the proposal and answer questions from the advisory committee. The student will be expected to demonstrate a thorough knowledge of background information and to be capable of applying basic information from his/her coursework and reading of the literature to answer questions related to the research proposal. In addition, the student will be expected to demonstrate a general knowledge of biology, physics, chemistry, biochemistry, mathematics, and, in particular, the area of "bioscience" in which he/she is being trained. At the end of the exam, the committee can recommend Pass/Rewrite/Remediation/Fail.

Pass: student should file GS5D with the Graduate School; once approved by the Graduate School the student will be considered a **Ph.D. Candidate**. The student will then have five years from this date to complete and successfully defend the dissertation research.

Rewrite: committee will decide extent of the rewrite and time allotted

Remediation: nature determined by committee (i.e. additional course work, another comprehensive exam)

Fail: if the advisory committee deems that the material and the student's preparation is of sufficiently poor quality to be considered a "fail", then several options may be recommended by the committee. These recommendations include but are not limited to: choice of another topic and probationary period or recommendation for dismissal from program. All the

recommendations in this category will be presented to the Graduate Program Coordinator and the Graduate Advisory Committee, who will be responsible for determining the final status of the student. A second failure of any part of the exam terminates the student from the Ph.D. program.

Format 2. "Written and Oral Examination" This format is the more traditional style where a student answers a series of written essay exam questions provided by each member of the advisory committee. Following completion of the written portion of the comprehensive exam, the student will then meet with the advisory committee for the oral portion of the comprehensive exam.

Written exam. The written examination should be constructed to evaluate: 1) the student's knowledge and appreciation of empirical and theoretical information from the specialty area and related subject areas, 2) the student's ability to analyze and evaluate such information, and 3) the student's ability to recognize and construct important and useful relationships of information from within and outside their areas of concern. For the purpose of preparation, students should obtain a list of possible examination topics from each committee member prior to the examination. The length of the written exam and the rules for taking the exam (time limits, open versus closed book, etc.) are determined by each member of the advisory committee for their portion of the exam. Each committee member grades his/her own examination and reports the grade for each question, "Pass", "Marginal", or "Fail", to the major advisor. Upon receiving all results, the major advisor determines the outcome. If more than one of the written exams is marked "Fail" overall, then the written portion of the exam is failed and must be re-done before the oral portion of the comprehensive exam can proceed.

Oral exam. The student schedules the oral exam no more than 3 weeks after receiving notification from his/her advisor that all written exams are passed. The oral exam should evaluate the ability of the student to think and speak in situations that require relatively rapid, well-organized, and articulate responses. The examination also provides an opportunity for the committee to further evaluate the student's knowledge and analytical abilities. At the end of the oral exam, the committee can recommend Pass/Rewrite/Remediation/Fail.

Pass: student should file the GS5D with the Graduate School; once approved by the Graduate School, the student will be considered a **Ph.D. Candidate**. The student will then have five years from this date to complete and successfully defend the dissertation research.

Rewrite: committee will decide extent of the rewrite and time allotted for rewriting answers to written exam questions.

Remediation: nature determined by committee (i.e. additional course work, another comprehensive exam)

Fail: if the advisory committee deems that the material and the student's preparation is of sufficiently poor quality so as to be considered a "fail", then several options may be recommended by the committee. These recommendations include but are not limited to: choice of another attempt at written and oral examinations or recommendation for dismissal from program. All of the recommendations in this category will be presented to the Graduate Program Coordinator and the Graduate Advisory Committee, who will be responsible for determining the final status of the student. A second failure of any part of the exam terminates the student from the Ph.D. program.

Appendix 4. Rubrics for Assessing SLOs – Biological Sciences – PhD Comprehensive Exam

Name: _____
Academic Year (e.g. 2018-19): _____

Committee chair: Return this form to Graduate Student Services Coordinator in 144 Long Hall.

SLO 1: Knowledge of principles and theories in biology as demonstrated in the comprehensive exams:

	Exceeds expectations	**Meets expectations**	**Below expectations**	**Unacceptable**
Demonstrates extensive knowledge of general principles and theories in biology				
Demonstrates extensive knowledge of particular subdiscipline of study				

Appendix 5. Rubrics for Assessing SLOs – Environmental Toxicology – PhD Comprehensive Exam

Name: _____
Academic Year (e.g. 2018-19): _____

Committee chair: Return this form to Graduate Student Services Coordinator in 144 Long Hall.

SLO 1: Knowledge of <u>principles and theories</u> in Environmental Toxicology as demonstrated in the comprehensive exams:

	Exceeds expectations	Meets expectations	Below expectations	Unacceptable	N/A
Demonstrates adequate knowledge of biochemical and cellular processes					
Demonstrates adequate knowledge of physiological effects and dose-response relationships					
Demonstrates adequate knowledge of ecotoxicology					
Demonstrates adequate knowledge of environmental chemistry: fate and routes					
Demonstrates adequate knowledge of particular subdiscipline of study					

Appendix 6. Rubrics for Assessing SLOs – Microbiology – PhD Comprehensive Exam

Name: _____
Academic Year (e.g. 2018-19): _____
Committee chair: Return this form to Graduate Student Services Coordinator in 144 Long Hall.

SLO 1: Knowledge of principles and theories in microbiology as demonstrated in the comprehensive exams:

	Exceeds expectations	**Meets expectations**	**Below expectations**	**Unacceptable**
Demonstrates extensive knowledge of general principles and theories in biology				
Demonstrates extensive knowledge of particular subdiscipline of study				

Appendix 7. Rubrics for Assessing SLOs – Bio Sciences – MS Thesis presentation and defense

Name: _____
Academic Year (e.g. 2018-19): _____
Committee chair: Return this form to Graduate Student Services Coordinator in 144 Long Hall.

SLO 1: Knowledge of principles and theories in biology as demonstrated in the thesis defense:

	Exceeds expectations	Meets expectations	Below expectations	Unacceptable
Demonstrates adequate knowledge of general principles and theories in biology				
Demonstrates adequate knowledge of particular subdiscipline of study				

SLO 2: Application of scientific methods in biology as evidenced in the written thesis:

	Exceeds expectations	Meets expectations	Below expectations	Unacceptable
States the research problem clearly, providing motivation for undertaking the research				
Demonstrates sound knowledge of literature in the area, and of prior work on the specific research problem				
Shows a good understanding of how to use methods/tools effectively				
Defends use of particular methods/tools clearly and logically				

SLO 3: Effective oral communication of research in biology as evidenced by the thesis presentation:

	Exceeds expectations	Meets expectations	Below expectations	Unacceptable
Presents sufficient background information to justify the project				
Clearly presents the hypotheses tested				
Clearly presents the experimental design and statistical/analytical tools used				
Uses slides effectively to convey content				
Provides an overall clearly conceived and designed MS thesis				

SLO 4: Effective written communication of research in biology as evidenced by the written thesis:

	Exceeds expectations	Meets expectations	Below expectations	Unacceptable
States the research problem clearly, providing motivation for the research				
Synthesizes peer-reviewed literature appropriate for research topic				
Clearly describes appropriate scientific and statistical methods/tools				
Presents results clearly and succinctly				
Uses appropriate graphics				
Comes to conclusions that are supported by the results				

Appendix 8. Rubrics for Assessing SLOs – Environmental Toxicology– MS Thesis presentation and defense

Name:_____ Academic Year (e.g. 2018-19):_____

Committee chair: Return this form to Graduate Student Services Coordinator in 144 Long Hall.

SLO 1: Knowledge of principles and theories in Entox as demonstrated in the thesis defense:

	Exceeds expectations	Meets expectations	Below expectations	Unacceptable	N/A
Demonstrates adequate knowledge of biochemical and cellular processes					
Demonstrates adequate knowledge of physiological effects and dose-response relationships					
Demonstrates adequate knowledge of ecotoxicology					
Demonstrates adequate knowledge of environmental chemistry: fate and routes					
Demonstrates adequate knowledge of particular subdiscipline of study					

SLO 2: Application of scientific methods in Entox as evidenced in the written thesis:

	Exceeds expectations	Meets expectations	Below expectations	Unacceptable
States the research problem clearly, providing motivation for undertaking the research				
Demonstrates sound knowledge of literature in the area, and of prior work on the specific research problem				
Shows a good understanding of how to use methods/tools effectively				
Defends use of particular methods/tools clearly and logically				

SLO 3: Effective oral communication of research in Entox as evidenced by the thesis presentation:

	Exceeds expectations	Meets expectations	Below expectations	Unacceptable
Presents sufficient background information to justify the project				
Clearly presents the hypotheses tested				
Clearly presents the experimental design and statistical/analytical tools used				
Uses slides effectively to convey content				
Provides an overall clearly conceived and designed MS thesis				

SLO 4: Effective written communication of research in biology as evidenced by the written thesis:

	Exceeds expectations	Meets expectations	Below expectations	Unacceptable
States the research problem clearly, providing motivation for the research				
Synthesizes peer-reviewed literature appropriate for research topic				
Clearly describes appropriate scientific and statistical methods/tools				
Presents results clearly and succinctly				
Uses appropriate graphics				
Comes to conclusions that are supported by results				

Appendix 9. Rubrics for Assessing SLOs – Microbiology – MS - Thesis presentation and defense

Name: _____
Academic Year (e.g. 2018-19): _____
Committee chair: Return this form to Graduate Student Services Coordinator in 144 Long Hall.

SLO 1: Knowledge of principles and theories in microbiology as demonstrated in the thesis defense:

	Exceeds expectations	Meets expectations	Below expectations	Unacceptable
Demonstrates adequate knowledge of general principles and theories in microbiology.				
Demonstrates adequate knowledge of particular subdiscipline of study				

SLO 2: Application of scientific methods in microbiology as evidenced by the written thesis:

	Exceeds expectations	Meets expectations	Below expectations	Unacceptable
States the research problem clearly, providing motivation for undertaking the research				
Demonstrates sound knowledge of literature in the area, and of prior work on the specific research problem				
Shows a good understanding of how to use methods/tools effectively				
Defends use of particular methods/tools clearly and logically				

SLO 3: Effective oral communication of research in microbiology as evidenced by the thesis presentation:

	Exceeds expectations	Meets expectations	Below expectations	Unacceptable
Provides sufficient background information to justify the project				
Clearly presents the hypotheses tested				
Clearly presents the experimental design and statistical/analytical tools used				
Uses slides effectively to convey content				
Provides an overall clearly conceived and designed MS thesis				

SLO 4: Effective written communication of research in microbiology as evidenced by the written thesis:

	Exceeds expectations	Meets expectations	Below expectations	Unacceptable
States the research problem clearly, providing motivation for the research				
Synthesizes peer-reviewed literature appropriate for research topic				
Clearly describes appropriate scientific and statistical methods/tools				
Presents results clearly and succinctly				
Uses appropriate graphics				
Comes to conclusions that are supported by the results				

Appendix 10. Rubrics for Assessing SLOs – Biological Sciences – PhD Dissertation and Defense

Name: _____
Academic Year (e.g. 2018-19): _____
Committee chair: Return this form to Graduate Student Services Coordinator in 144 Long Hall.

SLO 2: Application of scientific methods in biology as evidenced by the written dissertation:

	Exceeds expectations	Meets expectations	Below expectations	Unacceptable
States the research problem clearly, providing motivation for undertaking the research				
Demonstrates sound knowledge of literature in the area, and of prior work on the specific research problem				
Shows a good understanding of how to use methods/tools effectively				
Defends use of particular methods/tools clearly and logically				
Shows ability to propose future research questions				

SLO 3: Effective oral communication of research in biology as evidenced by the dissertation defense:

	Exceeds expectations	Meets expectations	Below expectations	Unacceptable
Presents sufficient background information to justify the project				
Clearly presents the hypotheses tested				
Clearly presents the experimental design and statistical/analytical tools used				
Uses slides effectively to convey content				
Provides an overall clearly conceived and designed PhD dissertation				

SLO 4: Effective written communication of research in biology as evidenced by the written dissertation:

	Exceeds expectations	Meets expectations	Below expectations	Unacceptable
States the research problem clearly, providing motivation for the research				
Synthesizes peer-reviewed literature appropriate for research topic				
Clearly describes appropriate scientific and statistical methods/tools				
Presents results clearly and succinctly				
Uses appropriate graphics				
Comes to conclusions that are supported by the results				

Appendix 11. Rubrics for Assessing SLOs – Environmental Toxicology – PhD Dissertation and Defense

Name: _____

Academic Year (e.g. 2018-19): _____

Committee chair: Return this form to Graduate Student Services Coordinator in 144 Long Hall.

SLO 2: Application of <u>scientific methods</u> in Environmental Toxicology as evidenced by the written dissertation:

	Exceeds expectations	Meets expectations	Below expectations	Unacceptable
States the research problem clearly, providing motivation for undertaking the research				
Demonstrates sound knowledge of literature in the area, and of prior work on the specific research problem				
Shows a good understanding of how to use methods/tools effectively				
Defends use of particular methods/tools clearly and logically				
Shows ability to propose future research questions				

SLO 3: Effective <u>oral communication</u> of research in Environmental Toxicology as evidenced by the dissertation defense:

	Exceeds expectations	Meets expectations	Below expectations	Unacceptable
Presents sufficient background information to justify the project				
Clearly presents the hypotheses tested				
Clearly presents the experimental design and statistical/analytical tools used				
Uses slides effectively to convey content				
Provides an overall clearly conceived and designed PhD dissertation				

SLO 4: Effective <u>written communication</u> of research in Environmental Toxicology as evidenced by the written dissertation:

	Exceeds expectations	Meets expectations	Below expectations	Unacceptable
States the research problem clearly, providing motivation for the research				
Synthesizes peer-reviewed literature appropriate for research topic				
Clearly describes appropriate scientific and statistical methods/tools				
Presents results clearly and succinctly				
Uses appropriate graphics				
Comes to conclusions that are supported by the results				

Appendix 12. Rubrics for Assessing SLOs – Microbiology – PhD Dissertation and Defense

Name: _____
Academic Year (e.g. 2018-19):_____
Committee chair: Return this form to Graduate Student Services Coordinator in 144 Long Hall.

SLO 2: Application of scientific methods in microbiology as evidenced by the written dissertation:

	Exceeds expectations	Meets expectations	Below expectations	Unacceptable
States the research problem clearly, providing motivation for undertaking the research				
Demonstrates sound knowledge of literature in the area, and of prior work on the specific research problem				
Shows a good understanding of how to use methods/tools effectively				
Defends use of particular methods/tools clearly and logically				
Shows ability to propose future research questions				

SLO 3: Effective oral communication of research in microbiology as evidenced by the dissertation defense:

	Exceeds expectations	Meets expectations	Below expectations	Unacceptable
Presents sufficient background information to justify the project				
Clearly presents the hypotheses tested				
Clearly presents the experimental design and statistical/analytical tools used				
Uses slides effectively to convey content				
Provides an overall clearly conceived and designed PhD dissertation				

SLO 4: Effective written communication of research in microbiology as evidenced by the written dissertation:

	Exceeds expectations	Meets expectations	Below expectations	Unacceptable
States the research problem clearly, providing motivation for the research				
Synthesizes peer-reviewed literature appropriate for research topic				
Clearly describes appropriate scientific and statistical methods/tools				
Presents results clearly and succinctly				
Uses appropriate graphics				
Comes to conclusions that are supported by the results				

Appendix 13. Guide for New Students

Disclaimer: All the expenses mentioned in this document should be considered as guidelines; the actual costs or prices may differ.

1) Most GTA and some GRA assistantships are 9-month appointments, and the annual salary is paid in bimonthly (twice a month) equal installments between the end of August and mid-May each year.
   a. Students need to set aside money during these 9-months to be able to pay for housing, food, etc. during the 3 months over the summer that they are not paid. To determine how much you should set aside per paycheck next year to make it through next summer, calculate [(annual salary/18) - (annual salary/24)]. For students receiving $22,000 per year, this equates to $306 per paycheck.
   b. Over the summer, graduate students do not need to sign up for course/research credits. However, without being registered, students will have to purchase a Fike membership at the Service Center for $15 per summer session ($30 for the entire summer) if they wish to use the campus recreation facilities.
   c. Over the summer, students will also not have access to the Redfern Health Center. Students can pay a $15 co-pay for each office visit or a $50 fee for each summer session. If you anticipate that a visit will be your only visit or that you would at most be there for a total of 3 visits ($45), then the $15 co-pay would be the least expensive option for you. If you anticipate that you're going to be returning and will have a total of 4 or more visits ($60+), then the $50 fee would be the best option. Contact Dawn Perry (dawnp@clemson.edu or 656-3561) at Redfern Health Center to pay the summer fee.

2) **Fees:** Each semester, there are various fees that each student must pay that include access to the health center, gymnasium (Fike), and software. For Fall 2020 and Spring 2021, the amount was $1137 for students on an assistantship; check here to calculate the most up to date amount. Health insurance is not included in these fees and must be purchased separately (see below). Paying for fees with a credit card (US or international) will incur an additional cost.

   International students can also bring money in a Forex Card (which is issued by several banks for international travel, and acts as a debit card), international credit card issued by a bank in their home country, or traveler's checks. After a bank account is opened (see below) and these checks are deposited, the bank will provide a checkbook, from which you can write a check to the University for the fees.

3) **Opening a bank account:** Opening a bank account is easy. It is advisable to open an account in banks that have a national and international presence such as Bank of America, Wachovia, BB&T − all of which have branches in Clemson. It is advantageous to open bank accounts in such banks because, if you travel around the country, you can find their branches and ATMs. Also, if you need to send or receive money from your home, it is easier to deal with banks that have international banking experience. You can open an account with relative ease. The banks will need to see your passport, I-20, and student ID. Students should inform the bank manager/officer that their checking account will be a salaried account.

4) **Housing:** A wide choice of housing exists for students as Clemson is a university town. Most of the international students don't buy a car within their first semester at Clemson due

to costs and not having a U.S driving permit. It is convenient to stay near campus either within walking distance or near bus routes. The City of Clemson offers a free bus service (CAT bus) to everyone. Buses run on designated routes from early morning to nearly dawn. There are many apartment complexes that are couple of steps from the nearest bus stop.

Apartment costs vary depending on locality and number of bedrooms. But as a general range you can find a single bedroom apartment or a studio apartment from $500-800 per month. Utilities such as water and electric bills are paid separately. Apartments from two to four bedrooms with living room, kitchen and a washer and dryer with 1.5 to 2 bathrooms can cost from $350-800/per person, depending on if it is in walking distance to campus. Most of the apartments can be furnished with beds and sofas, and microwaves. You will need to set up the kitchen and buy things like blenders, utensils, etc. You can find roommates once you arrive here, or before, and share the apartment costs. The property managing companies that maintain the apartments take a full month of rent as deposit. The deposit is also shared between the roommates. The utility companies (water and electric) also take deposits for the connections, which are also shared by the roommates. Many property management companies allow students to sign a lease only if they have a Social Security Number. Otherwise, an extra deposit may have to be paid. It is advisable to find an established student who is looking for a new roommate.

The Biological Sciences Graduate Student Association (BSGSA) has created a housing guide: https://sites.google.com/site/clemsonbsgsahousingguide/. In addition, many of the international student organizations, such the Clemson Indian student association (CISA) (https://www.facebook.com/groups/qacisa/), have online groups where you can find roommates before coming to Clemson.

There are four major property managing companies from whom you can rent apartments. Contact information for them is as follows.
- Burton Properties (Heritage Pointe, Heritage at Riverwood, Heritage Hills) http://www.clemsonapartments.com/
- Advantage Property Management Company, downtown Clemson. http://apmclemson.com/
- Carolina Real Estate, College Avenue. http://www.carolina-realestate.com/

5) **Cell phone:** Clemson University has contracts with various cell phone companies and students can get a cell phone without paying any deposits. The cell phone service costs around $40-80 per month. The phones are provided free or at a discount if a one-year contract is signed. Students can purchase an international calling card online when they have activated their cell phone. These calling cards help to make cheap phone calls. One example is http://www.indiald.com/.

6) **Cable and internet:** You can get satellite cable from either Dish TV (http://www.dishnetwork.com) or DirecTV (http://www.directv.com). The cost ranges from $60-90 a month. You aren't required to pay for installations or equipment purchase. Alternatively, you can get cable, which may cost a bit more. You can get a cable internet plan from Northland Cable (http://www.northlandcabletv.com/) or AT&T U-verse (www.att.com/U-verse).

7) **Grocery shopping:** The Clemson Area Transit (CAT; http://www.catbus.com/) buses go to

a couple of major supermarkets such as Ingles and Walmart. So, grocery shopping is easy even if you don't have a car. The groceries at the supermarkets aren't expensive, so it is cheaper and healthier to cook your own meals when you are on a budget. If you decide to cook on your own, your grocery budget shouldn't exceed more than $150-200 a month. For international /Asian/Indian groceries for basmati rice, spices, etc., students travel to Greenville (nearest) or Atlanta. Students can travel with other students who have a car or even give a list to someone who is going to the store. An on-campus group called Friends of Internationals organizes a trip to the Asian market in Atlanta once every semester. https://www.facebook.com/groups/FriendsOfInternationals.Clemson/

8) **Getting a driver's license:** If you drive a car in your home country and if you are planning to buy a car here, get a driver's license from your home country and also an international driving permit from your home country. If you have a driver's license from your home country, you will not be required to get a beginner's permit here. You can directly take the driver's license test, and if you pass both the computer and driving exams, you will get a license.

9) **Health insurance:** All students are required to get health insurance. It is highly suggested to buy health insurance through Clemson. For international students, when you are traveling from your home country to the USA, it is advisable to get short-term travel insurance so you will be covered until the time your health insurance coverage starts at Clemson University. The Graduate School subsidizes the cost of health insurance. See http://www.clemson.edu/cfo/student-financials/tuition-fees/index.html and http://www.clemson.edu/campus-life/campus-services/redfern/insurance/faq.html.

10) **Enterprise CarShare**: Don't have a car? No problem. You can rent a car by the hour, on campus. Follow the link to get signed up for this car-sharing program. The vehicles available include hybrids and low emission vehicles. https://www.enterprise.com/en/car-rental/locations/us/sc/clemson-university-26cu.html

11) **What to bring**: CISA has a list of what to bring that may be helpful to Indian and other international students. http://cu-cisa.org/ Books are expensive in the US, so it may useful to bring textbooks and other reference materials from your home country. The library has basic books such as basic molecular biology or biochemistry textbooks, but it does not have multiple copies of each book.

Appendix 14. Resources for Graduate Students with Special Needs

For graduate student teaching issues:
Access and Equity (ADA)
http://www.clemson.edu/campus-life/campus-services/access/american-disabilities/
110 Holtzendorff Hall

Priscilla Harrison, ADA Coordinator
864-656-3553
priscih@clemson.edu

What to do:
Meet with someone from Access and Equity to disclose disability and discuss possible accommodations.

For graduate student research and coursework:
Student Accessibility Services (SAS)
http://www.clemson.edu/academics/studentaccess/student-resources.html
Suite 239 Academic Success Center Building
864-656-6848

Margaret Camp, Director
mmcamp@clemson.edu

What to do:
Meet with someone from Student Accessibility Services to disclose disability and discuss possible accommodations.
Provide documentation of disability (contact SAS for guidelines)

For graduate students who struggle with executive functioning:
Academic Success Center
http://www.clemson.edu/asc/
864-656-6452

What to do:
Set up meeting with Academic Coach, if necessary. An academic coach can help with difficulties with executive functioning: social skills, self-direction, self-awareness, etc.

Appendix 15. Contact Information for Departmental and University Staff and Their Duties Related to Graduate Students

For up-to-date information, go here: https://clemson.app.box.com/file/819777318944 **Carla Brewer** (138 Long Hall; cjdunca@clemson.edu, 656-0854): Registration Coordinator (Overrides for signing up for courses)

Teri Elliott (132 Long Hall; telltt@clemson.edu, 656-2328): Main Office Administrative Assistant (Scheduling use of the departmental vehicles, issuing departmental visitor parking permits, scheduling conference rooms, issuing keys, issuing paper and supplies, assisting with the photocopiers)

Ginger Foulk (236 Long Hall; foulk@clemson.edu , 656-4224): Project Coordinator (Manages website, social media, seminar speaker travel/logistics, marketing, event planning, outreach events)

Melissa Fuentes (138 Long Hall; fuente2@clemson.edu): Vertebrate Collection Curator

Graduate Student Services Coordinator, TBD: Student Services Program Coordinator for Graduate Studies (**All graduate-student related questions**, including payroll)

Mike Moore (235 Long; mmoore@clemson.edu, 656-6273): Project/Building Manager (manages all building/lab renovations/projects/constructions, general maintenance and repair, ethanol stockroom, radiation badges, service contract issues)

Nancy Brown (132B Long Hall; nbrown4@clemson.edu 656-3057): Administrative Coordinator (manages calendar and schedules meetings with Chair; HR Liaison, payroll for faculty/staff/graduate students/undergraduate student workers)

Rhonda Powell (G-24 Life Sciences Facility, rhondar@clemson.edu, 656-1264): Clemson Light Imaging Facility

Andrea Thornal (139A Long Hall; thornal@clemson.edu, 656-2330): College of Science Financial Analyst (verifies funds before travel, IDOs, expenditure/revenue reports)

Jade Jones (140 Long Hall; ejj2@clemson.edu, 656-); College of Science Accounts Payable and Receivable Accountant (receives and processes p-card receipts, processes BuyWays orders, travel reimbursements, invoicing)

Any general questions about the Biological Sciences program, contact: BiolGrad@clemson.edu.

Any general questions about the Environmental Toxicology program, contact: EntoxGrad@clemson.edu.

Any general questions about the Microbiology program, contact: MicroGrad@clemson.edu.

Any general questions about the Department, contact: BiolSci@clemson.edu.

Appendix 16. Graduate Student Mandatory Safety Training

DEPARTMENT OF BIOLOGICAL SCIENCES

NEW GRADUATE STUDENT ORIENTATION & NEW GRADUATE TEACHING ASISTANTSHIP

(GTA) TRAINING WORKSHOP

INFORMATION ON SAFETY TRAINING REQUIRMENTS

All new Biological Sciences graduate students must complete **MANDATORY** safety training in which the following online trainings **MUST BE COMPLETED** by new graduate students **BEFORE teaching.**

All the required online training courses listed can be found at Clemson University's Human Resources Tiger Training website (https://www.clemson.edu/human-resources/talent-and-org-dev/tigertraining.html) and Clemson University's Office of Research Safety's training website (https://www.clemson.edu/research/safety/BioRAFT/Training%20Materials.html), and therefore require log in with Clemson University credentials.

Fire Extinguisher Training (online):

https://www.clemson.edu/human-resources/talent-and-org-dev/tigertraining.html

Under **Accessing Tiger Training,** click on the link at Go to Tiger Training.

Biosafety and Biohazardous Waste (online):

https://www.clemson.edu/research/safety/BioRAFT/Training%20Materials.html

Use the direct link under **Biological Safety**

- **Hazardous Communication Training (online):**

https://www.clemson.edu/research/safety/BioRAFT/Training%20Materials.html

Use the direct link under **Chemical**

Hazardous Waste Management Training – How to Dispose of Chemical Wastes (Labs) (online):

https://www.clemson.edu/research/safety/BioRAFT/Training%20Materials.html

Use the direct link under **Chemical**

Lab Safety and Chemical Hygiene Training (online):

https://www.clemson.edu/research/safety/BioRAFT/Training%20Materials.html

Use the direct link under **Chemical**

- Complete all five online trainings mentioned above. Certificates of completion will be generated for each training course upon completion and upon obtaining an acceptable score on an online quiz. Certificates must be emailed to Rebecca Ackerman at arebecc@clemson.edu **in order to be cleared to teach.**
  -

Disclaimer: Any additional safety training requirements for the graduate student pertaining to research will be the responsibility of the PI. This GTA training is specifically for the graduate student who will have a teaching assistantship. Therefore, material presented will be for training to prep, work, and teach in the Biological Sciences teaching labs. Some of the safety training will pertain to research but not all of it; therefore, graduate students will receive additional training from the PI in relation to research. GTA safety training personal are not responsible for research safety training.

Things to remember:

1. No food or drink in the classroom.

2. You and your students must wear close toed shoes, lab coat, safety glasses, with hair secured back, and gloves when working in a wet lab using chemicals, biologicals, or other hazards. For you and your students' safety, please make sure everyone is covered appropriately when working with hazardous substances.

3. As a TA, you are setting an example for your students and representing Clemson University.

4. On the first day of lab class, train your students using the General Instructions for Safety.

5. You will also have Student Safety Signature Sheets for each section to fill out. When those are completed, you may place them in my mailbox, located in 133 Long Hall. Place the completed sheets in the slot below my name. (Ackerman)

6. A Safety Kit is in each lab classroom. If someone needs a band aid, we can give them one. If a student needs more than a band aid, they must go to Redfern Health Center, and you as the TA will fill out an incident form. If a student needs more, please call 911. Fill out the incident form.

7. Please make sure your hazardous chemical containers are closed tightly when you are finished and ready to leave.

8. Know the hazards of your chemicals or biologicals that you are working with prior to each lab. Know where your SDS are located and how to access them.

GENERAL INSTRUCTIONS AND SAFETY RULES FOR THE BIOLOGICAL SCIENCES LABORATORY

GENERAL INSTRUCTIONS

1. Read reagent bottles carefully. There is a great difference between potassium chloride and potassium chlorate, between mercurous chloride and mercuric chloride, between manganese and magnesium. NEVER put anything in a reagent bottle, including any unused reagent.
2. Always carefully check all glassware for cracks prior to use.
3. Test tubes or any piece of equipment which has a potential for expelling a gas or liquid should be pointed away from your bench partner or fellow worker.
4. Talking is permitted if control and restraint are practiced.
5. Drains should be thoroughly flushed after spilling out non-hazardous reagents. Check with your TA to see what can be flushed down the drain. Hazardous waste containers will be provided to dispose of liquid hazardous waste.
6. **GOOD HOUSEKEEPING**- The continuous practice of good housekeeping is essential to the prevention of accidents, fire and personal injuries. Each laboratory student is responsible for:
    a. Keeping benches, tables, hoods, floors, aisles and desks clear of all materials not being used.
    b. Keeping clear space around safety showers, fire extinguishers, eye wash station, electrical controls and an adequate passageway to exits.
    c. Keeping floors free of spilled ice, dropped stirring rods, stoppers, pencils, and other tripping hazards.
    d. Cleaning up spills and disposing of the materials used to absorb the spills.
    e. **For Non-Hazardous Materials**:
    (aa) Removing and disposing of broken glass (special container provided – DO NOT use trash cans).
    (bb) Used glass pasteur pipets, glass capillary tubes, microscope slides and coverslips are disposed in broken glassware container.
    (**cc**) Dirty test tubes are placed in container labeled "dirty test tubes" provided.
    (**dd**) Dirty glass volumetric pipets are placed in pipet soakers if provided or in container labeled "dirty test tubes".
    (**ee**) Used dirty pipet tips for pipetmen are placed in trashcans located in TL. In some TL's plastic beakers labeled "pipet tip waste" will be provided on student work benches for disposal of tips.
    f. **For Hazardous Materials: TA should help remind student of proper disposal.**
    (aa) Removing & disposing of broken glass ask TA for special container to dispose glass in.
    (bb) Used pasteur pipets, glass capillary tubes, microscope slides and coverslips are disposed in a special labeled hazardous container found in the hood.
    (cc) Used test tubes and glass volumetric pipets are placed in special labeled hazardous bucket or tray located in the hood.
    dd) Used dirty pipet tips for pipetmen or eppendorf tubes are placed in special labeled hazardous container found in the hood or biohazardous box located in the teaching lab.

g. Keeping chemical containers clean and properly labeled.
h. Placing clothing in its proper place. Do NOT drape over equipment or work benches.
i. When working with preserved specimens, place ONLY animal waste, and gloves used to touch animals in the hazardous waste boxes located in the TL. Liquid waste is put in liquid waste container. Check with instructor or TA before discarding liquid waste. The hazardous waste boxes **are not to be used as a regular trash can.** Paper trash **not** used on hazard material, etc. is to be placed in a trash can.

SAFETY RULES

1. **Wet labs**: Wear long pants, no open toed shoes or sandals. Safety glasses and lab coat are required when interacting with **hazardous materials** in the teaching lab. You will have to purchase your own safety glasses as well as a lab coat if necessary.
   The safety glasses will protect both against impact and splashes to the eyes. If you should get a chemical in your eye, wash immediately with flowing water for 15-20 mins. at the eye wash station. The wearing of contact lenses, even under safety glasses, is discouraged because it restricts the washing out of chemicals in the eye.
   Confine long hair.

   ALL TEACHING LABS:

2. During the first lab, check to see where eye wash station/safety shower, and fire extinguishers are located. SDS sheets are available for chemicals used in the teaching labs upon request. If this information is not given by your TA ask for it if you can't locate the above, mentioned items. Signs are posted in the Teaching Labs instructing where SDS information is located.

3. In case of fire, alert your TA (or instructor if present) at once.

4. You must go to the infirmary (Redfern) for treatment of cuts, burns, or inhalation of fumes. Your instructor/TA will arrange transportation if needed. Always notify your TA if any of the above happens. Incident report needs to be filled out.

5. Do not taste anything in the laboratory. This applies to food as well as chemicals.
   Some of the teaching lab courses do have food to eat in the lab experiment. Your instructor or TA will direct you when it is appropriate to eat food or drink.
   Do NOT eat or drink from laboratory glassware.
   No food or beverages are allowed in the teaching laboratories unless part of the experiment.
   No smoking allowed in labs or on any Clemson campus property!
   Do not use mouth suction in filling pipets with chemical reagents. Use a suction bulb or pipet aid on the pipet, pipettor or dropper bottles provided.

6. Do not force rubber stoppers onto glass tubing. Lubricate the tubing with water or glycerol and protect your hands with a towel when inserting tubing onto stoppers; keep your hands close together.

7. Perform no unauthorized experiments.

8. Never work in the laboratory alone – must have TA or instructor present.

9. Use safety shields or screens whenever there is a potential danger from an explosion or implosion of apparatus.

The safety of the individual student is of prime importance to all concerned in the Biological Sciences teaching laboratories. The observation of the safety plan should take priority and have precedence over all work performed.

Make sure you sign the safety signature sheet provided by TA to verify you have read these general instructions and safety rules and agree to abide by them.

Safety Sheet Instructions to the Teaching Assistant

When you are finished reading this sheet, make sure it is placed in view for the TA for the next section using this classroom! DO NOT THROW AWAY!

New: Each TA sign your name (legibly) in **top left corner** of the signature sheet and please print your name legibly in the top right corner of the signature sheet.

Please take care of the safety sheets the FIRST time your lab meets this semester.

The TA's are responsible for making sure all the students in their lab section of a particular lab have read the general instructions & safety sheet and have signed the signature sheet.

A signature sheet will be provided for each lab and section via the professor of record. An electronic copy of these documents will be emailed to each professor for his/her convenience. They will print and place them in their labs. Each teaching lab room will have safety sheets provided on the front bench. These sheets will stay on the front bench until:

1. all sections of a lab have met or
2. all labs have met in that particular room

Instructions:

1. At the beginning of each lab the TA is to pass out the safety sheets and let the students read the instructions.
2. Collect the safety sheets after everyone has read them and place them on the front bench for the next section or another lab.
3. Have each student print his/her name CLEALY, sign, and put their student CID number on the signature sheet.

TA is to <u>turn in</u> his/her completed signature sheet(s) for each of your lab section(s) into Rebecca Ackerman's mailbox in 133 Long Hall.

TA: _____ TA Legible Printed Name: _____

Signature↑

I have read the general laboratory instructions and the safety rules and I will observe them in my Biological Sciences laboratories.

Semester: FALL 2021 Date signed: _____

Lab Course: BIOL _____ **BLDG:**_____ **Room:** _____**Section** _____

	Student Name: (Please PRINT)	Student Signature (ink)	CID (XID) Number
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