

# Department of Biology Graduate Program Handbook

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## DEPARTMENT OF BIOLOGY GRADUATE POLICIES

The Graduate Program in the Department of Biology provides students with specialized training through course work, research, and teaching. The Office of Graduate Studies (OGS) establishes the minimal University guidelines for all graduate degrees. The Biology Department has established additional requirements that all students must satisfy. **It is your responsibility as a graduate student to insure that you have met all departmental and university requirements for your degree.** Please note that graduate students must fulfill the requirements of the catalog that is current during the semester they complete their degree requirements. This is the case for both University and Department of Biology requirements. It is the student's responsibility to keep up with changes in requirements

This book provides you with the Departmental and a summary of University requirements; a complete description can be found in the Graduate Catalog. Please keep this book and a copy of the Graduate Catalog handy and refer to them as you progress through your degree. Additional information can be obtained from the Office of Graduate Studies and the Biology Graduate Advising Office, located in Butler Hall Room 102.

### DEADLINES for GRADUATE DEGREE REQUIREMENTS

The Department of Biology has established the following deadlines. The schedule is identical for all four degrees granted in the Department of Biology.

| <b>BIOLOGY DEPT. DEADLINES</b>                                      |   |
|---|---|
| <b>Ph.D. Degree</b>   |   |
| Choice of Major Professor   | By the end of the 2nd Semester                  |
| Degree Plan Filed with Department                                   | Before registering for the 3rd Semester         |
| Proposal Draft submitted to Advisor                                 | End of 4 <sup>th</sup> Semester                 |
| Proposal Filed with Department                                      | During the 5th Semester (see page 18)           |
| Preliminary Exam  | During the 5th Semester (see page 19)           |
| Final Examination   | Within Four Years of Completing the Prelim Exam |
| <b>M.S. Degree</b>  |   |
| Choice of Major Professor   | By the end of the 2nd Semester                  |
| Degree Plan Filed with Department                                   | Before registering for the 3rd Semester         |
| Proposal Filed with Department                                      | During the 3rd Semester (see page 27)           |
| Final Examination   | Conclusion of Research / Thesis written         |
| Note that the number of semesters does NOT include summer sessions. |   |

*ALL PAPERWORK SHOULD BE SUBMITTED THROUGH THE BIOLOGY GRADUATE ADVISING OFFICE*

All paperwork to be filed with the Office of Graduate Studies (OGS) or other university offices **must** be routed through the Biology Graduate Advising Office. The Graduate Advising Office will review the document, obtain signatures from the Department Head or Graduate Advisor, log in the paperwork, make copies for your departmental file, and file the paperwork with OGS.

*PROGRESS TOWARDS THE DEGREE*

All graduate students must adhere to the requirements set forth by the department in order to remain in good standing. If a student has not met the required Departmental or University deadlines as specified in this handbook or the Graduate Catalog, they will no longer be in good standing with the department and may be blocked from registration the following semester. The block will not be lifted until the requirement is met. Requests for exemptions will be considered by the Graduate Advisor in consultation with the Graduate Programs Committee on a case-by-case basis.

## THE FIRST YEAR

### 1. RESEARCH ROTATIONS

The Biology Department requires all incoming students to complete two seven-week laboratory rotations during their first semester. Rotations acquaint new students with research programs in their areas of interest, provide a perspective on approaches and procedures used in modern biology, as well as useful contacts in other labs. At the conclusion of rotations, a major professor is chosen by the mutual consent of the graduate faculty member and the student. Students have the option to do one or more additional seven-week rotations in the second semester.

### 2. REQUIRED COURSE WORK FOR 1<sup>st</sup>-YEAR STUDENTS

All Department of Biology graduate students are required to enroll in the following graduate courses during their first year.

**a) First-year students are required to enroll in BIOL 697, Method of Teaching Biology Laboratory.** BIOL 697 is a Department of Biology training program for teaching assistants (TAs). This training program is given as a workshop during New Graduate Student Orientation in August. Additionally, Texas A&M University provides a one-day mandatory TA training workshop. All new graduate students will be registered for these TA training programs during orientation and must attend, regardless of whether or what they teach during their first year.

**b) First-year students are required to enroll in BIOL 681, Seminar in Graduate Orientation.** This seminar meets one evening per week from 5:30-7:00 PM and will include discussions of requirements of the program, departmental resources, graduate funding, choosing a major professor, writing skills, oral presentations, and other topics important to new graduate students. Another objective of this seminar is to provide a setting for camaraderie to develop between members of the new class.

**c) First-year students are required to enroll in BIOL 685, Directed Studies (Rotations),** in order to receive credit hours for their participation in faculty-supervised laboratory rotations. Satisfactory/Unsatisfactory grades will be assigned by the Graduate Advisor based on faculty evaluation of a student's performance in each rotation.

**d) All Biology graduate students are required to register for BIOL 681, Seminar in Departmental Colloquium,** at least once. Most students fulfill this requirement during the first year of graduate study.

### 3. ADDITIONAL COURSE REQUIREMENTS

**a) All graduate students are required to register for BIOL 682, Graduate Student Research Seminar,** a course involving presentations of a student's research results. Every scientific career step involves presentation of a research seminar, including the thesis defense. Therefore, the department requires a research seminar series for each of our graduate students. The graduate student research seminar is a one credit hour course that should be listed on the degree plan. For the MS degree, one hour of BIOL 682 should be listed as a required course. For the PhD degree, one hour of BIOL 682 should be listed as a required course, and one hour should be listed under

Prerequisites and other courses. Regardless of whether registered or not, graduate students should attend the weekly Graduate Student Research seminar throughout their graduate careers, unless they have an unavoidable course or teaching conflict.

BIOL 682 will be offered each fall and spring semester. Students enrolled in this course will present a thirty-minute seminar on their specific research project. For Doctoral students one semester presentation will be devoted to their dissertation proposal and should be taken in the second year. The other semester presentation will be a progress report and should be taken in the third or fourth year of study.

**b) Two additional hours of 681 Seminar are required for all M.S. and Ph.D. degrees.** These are usually journal clubs focusing on a specific topic. This is **in addition** to the requirement to enroll in the Seminar in Departmental Colloquium (BIOL 681) and the Seminar in Graduate Student Orientation (BIOL 681). All graduate students are encouraged to participate in and register for a 681 Seminar each semester, however Masters's students may only list a maximum of two credit hours of 681 on their degree plan, Ph.D students are allowed an unlimited number of 681 credit hours.

**c) All graduate students are required to fulfill the course requirements of the Biology Department.** These graduate course requirements are listed on page 14. The purpose of this requirement is to ensure that students are broadly trained within their particular discipline. Courses selected to fulfill these requirements must appear on the degree plan.

#### *4. REQUIRED TEACHING*

The teaching requirement for the Master of Science degree is one semester. The requirement for the Doctor of Philosophy degree is two semesters. Previous teaching experience at the University level may be used to fulfill this requirement, at the discretion of the Graduate Advisor.

#### *5. CHOICE OF MAJOR PROFESSOR*

**All students must identify a major professor by the end of their First year.** The major professor must be a member of the Department of Biology Graduate Faculty. Students must inform the Graduate Advisor of their choice of major professor, and request that the major professor notify the Graduate Advisor of their agreement. A sample memo is included in Appendix I.

#### *6. REQUIREMENTS FOR A CO-CHAired COMMITTEE*

Occasionally, a student can best complete his/her graduate program by working under the direction of two faculty members. Under these circumstances, a student may elect to be co-chaired by two Texas A&M faculty members. In general, students should request a co-chaired committee only if necessary for their graduate training. The co-chairs should both provide ongoing intellectual contributions and be active mentors to the student. In the case of students resident in other academic departments, the Biology co-chair must be willing to act as a conduit to maintain lines of communication between the department, the advisory committee, and the student.

One of the co-chairs **must** be a member of the Department of Biology Graduate Faculty. The other co-chair may be a member of any other department on campus (including Biology). Students

with co-chaired committees must satisfy all Biology requirements for degrees and **must take at least 50% of their 691 research credit hours as Biology hours.**

### **Guidelines for Requesting a Co-Chaired Advisory Committee**

Requests for a co-chaired committee must be reviewed and approved by the Biology Department Graduate Program Committee (GPC) before the Graduate Advisor will approve a student's Degree Plan.

Requests for a co-chaired committee should be submitted to the Biology Graduate Advising Office and must contain the following:

#### **(1) Student Statement of Purpose:**

This letter, from the requesting student, should outline the reasons for requesting the co-chaired committee and the reasons for designating the specific Biology faculty member as their choice of co-chair. The student should outline the role(s) each co-chair will take in guiding the students academic and research progress.

#### **(2) Letters from Faculty Co-Chairs:**

A letter is required from each co-chair outlining his or her contribution to the student's academic endeavors and/or research projects and confirming their approval of the shared duties as co-chairs of the student's advisory committee. The faculty co-chairs may be requested to meet with the GPC to discuss their contributions prior to approval of the request by the GPC.

## *7. ADVISORY COMMITTEE*

An Advisory Committee supervises a student's course work and research, examines a student's progress, and approves all documents required for progress toward a degree. The Advisory Committee will approve the degree plan, read and critique the proposal and thesis or dissertation, and administer the oral exams. The Advisory Committee, chaired by the major professor, is a primary source of direction and intellectual support for a student's research.

In order to provide the student with maximum input on course choices and research direction, the Advisory Committee should be constituted soon after the choice of major professor. Students should meet with their Advisory Committee before the end of their First year.

The University requires that a graduate student's Advisory Committee must include **a total of** at least three (for M.S. students) or four (for Ph.D. students) members of the graduate faculty. In addition to the University requirements, a Biology graduate student's Advisory Committee must include at least one (for M.S. students) or two (for Ph.D. students) tenured or tenure-track Biology graduate faculty. The University requires that one member of the Advisory Committee be from a department other than the student's home department. Joint faculty members are considered Biology faculty, and cannot serve as the out-of-department member of a Biology graduate student's Advisory Committee.

### **8. REQUIRED COMMITTEE MEETINGS**

**All graduate students are required to have at least one committee meeting each academic year.** An Advisory Committee Meeting Report form must be submitted to the Graduate Advising Office no later than the end of summer term of each academic year. Failure to do so may result in a registration block for the Fall semester. The first committee meeting has a unique set of forms to be completed by the Advisory Committee, and subsequent meetings all use the standard Advisory Committee Meeting Report. These can be obtained from the Biology Graduate Advising Office or downloaded from the Biology Graduate Program website, copies are included in the appendix of this manual.

### **9. FILING THE DEGREE PLAN**

**The Degree Plan lists the course work and research hours to be completed by a student during graduate study.** The department or university cannot change the requirements for graduation once the Degree Plan is filed, and the student can only change the Degree Plan by filing a petition with OGS. The student, in consultation with the Major Professor and Advisory Committee, decides upon the courses included on the degree plan that are in addition to the departmentally required courses. The list of required courses starts on page 14, in addition a certain number of seminars, lab rotations and other required courses are listed on pages 6-7. The minimum total number of hours required on a Ph.D. degree plan is 96 hours, however for students entering with a M.S. degree awarded in the U.S. (or its equivalent as determined by the Office of International Admissions) the minimum number of hours is 64. A minimum of 32 semester hours is required for the thesis M.S. degree and 36 semester hours for the non-thesis M.S. degree.

It is important that students review the limitations on the use of undergraduate courses, seminar hours, research hours, and transfer courses (detailed in the Graduate Catalog) prior to submitting a degree plan. Sample degree plans can be found in the appendix.

The degree plan must be filed electronically <https://ogsdps.tamu.edu>. Instructions can be found at the Office of Graduate Studies web site, <http://ogs.tamu.edu/>.



## GENERAL INFORMATION

### Petitions

During the course of a student's career it may be necessary to make requests for changes to the Office of Graduate Studies. These petitions (for changes of committee, program, courses, etc.) must be submitted to the Biology Graduate Advising Office on the appropriate OGS form (forms can be downloaded from the OGS web site) and with sufficient time to accommodate approval decisions. Please note that it can take OGS up to 3 months to process some requests.

### Ombudsperson for Graduate Education

The Ombudsperson for Graduate Education assists graduate students, faculty, staff, and administrators to solve conflicts informally. The ombudsperson serves as a neutral listener, information resource, advisor, intermediary, and mediator. The ombudsperson advocates for the processes of graduate education by being equally open and accessible to all parties.

Ombudsperson contact information:

Ombudsperson for Graduate Education

1113 TAMU

College Station, TX 77842-1113

(979) 845-3631

[ombuds@tamu.edu](mailto:ombuds@tamu.edu)

### Minimum Credit Hour Requirements

All students must remain in continuous enrollment throughout their graduate careers regardless of their source of support. Graduate students must enroll for at least one credit hour during every regular semester (Fall and Spring) while working towards their degrees. Enrollment for a minimum of one credit hour also is required in the Summer semester for all students using university facilities.

**There are higher enrollment requirements for students receiving a graduate assistantship.** All graduate students receiving a graduate teaching or graduate research assistantship must register for a minimum of 9 semester credit hours during the Fall and Spring semester. In the Summer, students receiving a graduate assistantship must register for a minimum of 3 semester credit hours during the summer session in which they are employed or any combination of 6 semester credit hours during the entire Summer if they are employed for the entire summer. For example, 3 hours in SSI and 3 hours in SSII (total 6 hours) or 6 hours in the 10-week summer session.

### Minimum GPR (Scholastic Deficiency)

A student's Graduate GPR is expected to remain at or above 3.000 (on a 4.000 scale) during his or her graduate career. If a graduate student's cumulative GPR falls below 3.000, he or she will be on scholastic probation and notified of this in writing by the Graduate Advisor. A copy of the memo will be sent to the student's advisor. The student will meet with his or her advisor and advisory committee to develop a plan to overcome the scholastic deficiency. The plan should include the course(s) to be taken and the grade(s) the student must receive to return to good standing with the department. A copy of the plan signed by the student and the advisory committee will be given to the Graduate Advising Office for the student's file. If the student has not yet chosen a major

professor, he or she will meet with the Graduate Advisor to develop such a plan, a copy of which will be put in the student's file. The student will be given one semester (excluding summer terms) to raise his or her GPR above 3.000. If after one semester the student remains scholastically deficient, he or she will be informed of this in writing by the Graduate Advisor. The student may request the Graduate Program Committee for a second semester of academic probation. If the request is denied or if after two full semesters the student remains on scholastic probation, he or she may be asked to leave the graduate program and the GPC and Graduate Advisor will submit a request to the Office of Graduate Studies that the student be dismissed from the University for scholastic deficiency.

### **Financial Support**

Graduate students in the Department of Biology can be supported by graduate teaching assistantships (GAT), graduate non-teaching assistantships (GANT), graduate research assistantships (GAR), or fellowships. GAR support is usually provided by individual faculty and is funded by research grants. Fellowship support may be provided by the University, Federal grants, or other sources and is awarded on a competitive basis.

In order to be eligible for support, students must be registered as full-time graduate students. In the Fall and Spring semesters, a minimum of 9 credit hours is required. For summer support, required registration is a minimum of 6 credit hours for the 10-week session or 3 credit hours per five-week summer session.

### **A&M Policy on the on maximum Doctoral (G8) Hours**

A full-time doctoral student will be allowed to pursue his/her program for seven calendar years before a charge of out-of-state tuition is initiated. If a student is pursuing a doctoral degree on a part-time basis, he/she would have up to 99 semester hours before the university would begin to charge out-of-state tuition if they pass the seven year mark.

Students who exceed these time limits will be charged out-of-state tuition to compensate for this lack of state support. In the rare cases where a doctoral student requires more time to complete the degree, he/she can apply to the Department of Biology for funding to cover the out-of-state tuition penalty. These requests will be reviewed by the Graduate Program Committee and Graduate Advisor.

### **Graduate Students at TAMU-Galveston**

Students undertaking research at the Galveston campus toward a Biology Degree are required to adhere to all requirements, deadlines, etc. of the Department of Biology. Residence on the Galveston campus will satisfy the residency requirement for graduate students.

### **Participation in Departmental Committees**

Graduate students are encouraged to participate in departmental Committees. Regular elections are held to select graduate student representatives to the Graduate Programs, Graduate Recruiting and Admissions, and Frontiers committees. These elections are held under the auspices of the Biology Graduate Student Association (BGSA). Students are encouraged to join and become active in the BGSA, as it provides an organized means of communicating student concerns to the faculty and administration. BGSA officer elections are held at the beginning of the Fall semester.

### **Travel, Travel Grants and Mini-Grants for Graduate Students**

The Department of Biology funds graduate student travel grants and mini-grants with Graduate Enhancement funds. **Funds for these programs may not be available every year.** All Biology graduate students may request funds to travel to scientific meetings to make presentations. Travel Mini-grants are limited to a maximum of \$500 per trip. M.S. students may receive one Travel mini-grant; Ph.D. students may receive two. Research Mini-grants of up to \$300 may also be requested by M.S. and Ph.D. students to assist in meeting unexpected research expenses.

Regardless of source of funding, or even if you pay your own costs, every graduate student making a professional trip to attend a meeting or conduct research must complete the "Request for Business Travel" form. These forms are essential to ensure that you will be appropriately covered by university insurance and your trip will be designated as professional business. The form can be found in the Biology office.

## GRADUATE COURSE REQUIREMENTS

Graduate students are required to take a minimum of 4 courses, with at least 2 of the courses coming from the foundation course listing. Exemptions will be considered by the GPC.

### **Foundation courses (taught every year by 2 or more faculty members):**

|          |  |
|----------|--|
| BIOL 613 | Cell Biology   |
| BIOL 6XX | Evolution (Planned course)   |
| BIOL 611 | Developmental Biology  |
| BIOL 6XX | Ecology (Planned course)   |
| BIOL 614 | Microbial Biology (alternates between BIOL 614 Microbial Development and Signaling and BIOL 689 Advanced Microbial Physiology) |
| BIOL 6XX | Comparative Physiology (Planned course)  |

### **Other major courses for specialization (taught every year or every other year)**

|              |  |
|--------------|--|
| BIOL 635     | Plant Molecular Biology                    |
| BIOL 636     | Plant Cell Biology                         |
| BIOL 644     | Comparative and Developmental Neurobiology |
| BIOL 627     | Principles of Neuroscience I               |
| BIOL 628     | Principles of Neuroscience II              |
| BIOL 649     | Comparative Endocrinology                  |
| BIOL 6XX     | Systematics (Planned course)               |
| BIOL 601     | Biological Clocks                          |
| BIOL606      | Bacterial Genetics                         |
| BIOL 615     | Signaling in Development and Behavior      |
| BIOL 651     | Bioinformatics                             |
| BIOL 650     | Genomics                                   |
| BIOL 602     | TEM  |
| BIOL 689     | Light Microscopy                           |
| STAT 651/652 | Statistics in Research I and II            |
| GENE 603     | Genetics                                   |
| BICH 631     | Biochemical Genetics                       |
| BICH 603     | General Biochemistry                       |
| BIOL 689     | Advanced Evolutionary Biology              |

### **Special Topics courses:**

These courses would cover current topics of interest and may or may not become permanent courses. Typically, they would be 1-3 credit literature-based courses and would be announced at the beginning of each semester. If these courses are well subscribed for 3 consecutive academic years then they could be moved up to the major course category and given a BIOL course number.

**Undergraduate background courses:**

If a graduate student enters the program without the background needed for a graduate course in a particular area, it may be appropriate for them to first take an undergraduate course. For example, graduate students who have not taken molecular biology, genetics, biochemistry, or neurobiology, we recommend that they take BICH 431 Molecular Genetics, GENE 302 Genetics (majors course), BICH 440/441 Biochemistry I/II (majors course), ZOOL 434/435.

**Other current requirements:**

BIOL 682 Graduate Student Research Seminar (1cr) MS 1 hr, Ph.D. 2 hr

BIOL 697 Method of Teaching Biology Laboratory (1cr) MS and Ph.D. 1 hr

BIOL 681 Seminar in Graduate Orientation (1cr) MS and Ph.D. 1 hr

BIOL685 Rotations

BIOL 681 Seminar in Departmental Colloquium (1cr) MS and Ph.D 1 hr

2 additional hours of 681 (prefix can be BIOL, BOTN, MICR, ZOOL)

## **Timeline for Graduate Studies Doctor of Philosophy Department of Biology**

### **Year 1:**

- Complete required courses/seminars
- Complete rotations
- Choose advisor
- Develop degree plan with advisor
- Set up advisory committee
- Hold first committee meeting
  - Outline research project
  - Discuss degree plan
  - Obtain committee approval for degree plan
- Submit degree plan to the Office of Graduate Studies (OGS)

### **Year 2:**

- Complete yearly seminars
- Coursework should be completed
- PhD students submit draft of research proposal to their advisor by end of Spring semester

### **Year 3:**

- Complete yearly seminars
- PhD students complete preliminary exam:
  - Submit research proposal to advisory committee (deadline: 3<sup>rd</sup> Monday in September)
  - Submit Preliminary Exam Checklist two weeks before preliminary exam commences (deadline: 3<sup>rd</sup> Monday in October)
  - Complete written and oral exams (deadline: Last working day of November)

### **Year 4 and beyond:**

- Complete seminar course each year
- Hold committee meeting each year
- PhD students complete their final exam
  - Write dissertation
  - Submit completed Permission to Defend Thesis form to the OGS two weeks before defense
  - Distribute thesis to advisory committee two weeks before defense
  - Defend dissertation
  - Obtain committee approval for thesis
- Submit dissertation to the OGS

## **GRADUATE DEGREE REQUIREMENTS**

### **DOCTOR OF PHILOSOPHY**

To earn a Doctor of Philosophy degree a student must meet the requirements of both the University and the Department of Biology. The Department of Biology requirements are outlined below, along with a summary of the University requirements. Please refer to the Graduate Catalog for a complete description of University requirements and policies.

Please note that graduate students must fulfill the requirements of the catalog that is current during the semester they complete their degree requirements. This is the case for both University and Department of Biology requirements. It is the student's responsibility to keep up with changes in requirements.

### **REQUIREMENTS**

#### **A. Residence**

Students who enter the doctoral degree program with a bachelor's degree must spend two academic years in resident study at College Station or Galveston. If a Master's degree has been awarded, one academic year is required. One academic year may include two adjacent regular semesters or one regular semester and one adjacent 10-week summer semester. See the Graduate Catalog for additional information on residence requirements.

#### **B. Identify a Major Professor**

All Biology graduate students must identify a major professor by the end of their 2nd semester (excluding summer terms). Sponsorship by the Chair or Co-chair must be submitted in writing to the Graduate Advisor by the end of the 2nd semester.

The committee chair or one of the co-chairs must be a member of the Department of Biology graduate faculty. Requests for a co-chair from outside the Department of Biology must be approved by the Graduate Program Committee (see requirements on page 7).

#### **C. Establish an Advisory Committee**

The advisory committee, chaired by the major professor, is a primary source of direction and intellectual support for a student's research. The advisory committee should be constituted soon after the choice of major professor in order to provide the student with maximum input on course choices and research direction. The advisory committee will approve the degree plan, read, critique, and approve the proposal and dissertation, and administer the preliminary exam and the final defense.

The University requires that a doctoral student's advisory committee be composed of no fewer than 4 members of the graduate faculty who are representative of the student's field of study and research. The chair or one of the co-chairs of the advisory committee must be from the student's major department, and at least one of the members must be from a department other than the student's department.

The Biology Department has established the following additional requirements for doctoral students. The advisory committee must contain at least 2 tenured or tenure-track members of the

Biology graduate faculty. Faculty having joint appointments in the Department of Biology are considered Biology faculty and **cannot** serve as the out-of-department member of a Biology graduate student's advisory committee.

#### **D. Degree Plan**

The degree plan should be developed in consultation with the student's advisory committee and submitted to the Biology Department Graduate Advising Office **prior to registering for the 3rd semester** (excluding summer terms). This deadline was established to ensure that students consult with their advisory committees about course work before beginning the second year of study.

For Ph.D. students, a minimum of 96 credit hours beyond the baccalaureate degree or 64 credit hours beyond the Master's degree is required. Some Master's degrees awarded in countries other than the U.S. are not equivalent to a Master's degree awarded in the U.S. In these instances, the student will be required to have 96 hours on their degree plan.

The degree plan should include the course work required by the Department of Biology. These requirements are described in the following section. For limitations regarding the use of certain graduate courses and transfer credit see the Graduate Catalog. All doctoral degree plans must carry a reasonable amount of 691 (Research) hours.

The Department of Biology Graduate Program Guide for the student's particular degree must be submitted along with the degree plan (see section E, item 5).

#### **E. Departmental Course Requirements**

- 1) All Ph.D. students are required to take BIOL 681 Seminar in Graduate Student Orientation.
- 2) All Ph.D. students are required to take BIOL 697 Methods in Teaching Biology Laboratory.
- 3) All Ph.D. students are required to complete at least 3 additional hours of 681 (seminar). These must include 1 hour of Departmental Colloquium (BIOL 681).
- 4) All Ph.D. students are required to complete 2 hours of BIOL 682 (Graduate Student Research Seminar). On the degree plan, one hour of BIOL 682 should be entered as a required course, and the second hour should be listed under prerequisites and other courses. All graduate students should attend this seminar each week even when they are not registered for it as a class.
- 5) Graduate students are required to take a minimum of 4 courses, with at least 2 of the courses coming from the foundation course listing. Exemptions will be considered by the GPC. These courses are listed on page 14 at the beginning of this section.
- 6) Students with co-chairs from outside the Dept. of Biology must satisfy all Biology course requirements and must take at least 50% of their 691 research credit hours as Biology hours.

#### **F. Teaching requirement**

All Ph.D. students are required to teach for at least two semesters.

#### **G. Foreign Language**

No foreign language is required.



## H. Research Proposal

The Ph.D. student must prepare a research proposal for approval by his or her Advisory Committee. The Proposal describes the research that a student intends to undertake. The proposal is not a contract to perform the described research and significant research progress need not be completed at the time of proposal submission. The proposal is a mechanism to assist students in clarifying research goals early in their graduate program, to encourage students to become familiar with the primary literature in their field, to provide experience in scientific writing, and to facilitate research interactions between students and members of their Advisory Committee. In the proposal, the student describes the rationale for the research project, the objectives of the research to be performed, and outlines the methodologies to be used.

Students will prepare a proposal describing their planned research. The proposal format will be determined by the student's advisory committee during their first committee meeting. Suggested formats include:

NIH R01 applications (<http://grants.nih.gov/grants/funding/phs398/phs398.html>)

NSF research proposals ([http://www.nsf.gov/pubs/gpg/nsf04\\_23](http://www.nsf.gov/pubs/gpg/nsf04_23))

NIH postdoctoral fellowships (<http://grants1.nih.gov/grants/funding/416/phs416.htm>)

A draft of the research proposal should be submitted to the student's advisor by the end of the 4<sup>th</sup> semester. The proposal must be approved by the student's advisor, then submitted to the entire advisory committee by the 3<sup>rd</sup> Monday in September of their 5<sup>th</sup> semester (excluding Summer). The advisory committee will evaluate the proposal and request any changes by the last business day in September. Students will complete any changes and gain approval by the committee to proceed with the preliminary exam by the 2<sup>nd</sup> Monday in October.

After revisions and approval by the advisory committee, the proposal should be submitted along with the signed official cover sheet to the Biology Graduate Advising Office. The official cover page is available on the OGS website. <http://ogs.tamu.edu/OGS/pdf/prop.pdf>

Students performing research involving human subjects, infectious biohazards, and/or recombinant DNA must attach a copy of the appropriate research compliance approval form to the proposal when proposal is submitted. Proposals that include research with vertebrate animals (including antibody generation in rabbits or mice) must include a copy of an approved Animal Use Protocol cover page. Information on Animal Use Protocols can be found at <http://animal.tamu.edu/approval.html>.

## I. Preliminary Examination

The purpose of the preliminary examination is for the student's advisory committee to determine whether the student has a mastery of the subject matter of all fields in the program, an adequate knowledge of the literature in these fields, and the ability to carry out bibliographical research. The preliminary examination is **required**.

Eligibility requirements for the preliminary exam.

- The student must be registered for at least 1 hour for the semester or 5-week summer term during which any portion of the preliminary exam may fall. If the entire exam falls between semesters, the student must be registered for the term immediately preceding the exam.

- An approved degree plan was on file with OGS at least 90 days prior to the first written examination.
- The student's official GPR at the time of the examination must be at least 3.000.
- All English language proficiency requirements must have been satisfied.
- All committee members must have scheduled or waived the written portion and agree to attend the oral portion of the exam or have found a substitute. Only one substitution is allowed and it cannot be for the committee chair.
- At the end of the semester in which the exam is given, there are no more than 6 hours of course work remaining on the degree plan (except 681, 684, 690, 691, and 692). The head of the student's department has the authority to approve a waiver of this criterion.
- The time span from the first written examination to the oral is no more than three weeks. (In cases of department-wide written examinations, this criterion is not applicable.) The head of the student's department has the authority to approve a waiver of this criterion.

The preliminary examination includes both a written and an oral examination in which the student's Advisory Committee tests a Ph.D. student's mastery of his or her field of specialization. The preliminary examination will be administered, during the 5<sup>th</sup> semester (excluding Summer), by the student's advisory committee. The Ph.D. preliminary examination will consist of the proposal described above, a written and an oral examination. During this exam, students are expected to demonstrate that they: 1) understand fundamental biological concepts; 2) have gained detailed knowledge of scientific literature in their research area and the ability to critically evaluate it; 3) are able to formulate specific, plausible and testable hypotheses; 4) are able to design controlled experiments that distinguish among competing hypotheses; 5) are familiar with techniques within their discipline; 6) understand the theory underlying the proposed techniques; and 7) can communicate effectively both in writing and in the oral presentation. Details of the exam format and requirements are as follows.

Preliminary examinations cannot be taken until all the course requirements of the Biology Department have been completed and less than six hours of formal course work remain to be completed on the degree plan.

- 1) The student and committee chair will complete the Preliminary Exam Checklist. The committee chair will bring the Preliminary Exam Checklist to the Biology Graduate Advising Office, which will then submit the form to the Office of Graduate Studies. **This MUST be submitted and the Exam scheduled 2 weeks prior to taking the Preliminary Exam.**
- 2) Written exams will be taken during the week starting with the last Monday in October. Each student will arrange a time to take the written exam from each advisory committee member. Exams will be evaluated and returned to the committee chair, who will then forward the exams to the student. Students will have the opportunity to discuss any deficiencies in their exams with advisory committee members during the first full week of November.
- 3) Oral exams will be taken during the second full week of November. Students are responsible for scheduling a mutually agreeable two hour block of time for the committee to give the oral exam. Students are expected to prepare a 20-40 minute presentation on their proposal and will be

examined on their proposal and general knowledge of biology. The committee will meet at the end of the exam and evaluate student performance. The student passes the preliminary exam if there is no more than one dissenting vote among advisory committee members.

- 4) In the event of a failure, the advisory committee has the option to allow a retake of the preliminary exam. The written and oral portions of the exam, administered as described above, must be completed within a three week timeframe prior to Spring break. In the event of a second failure, no further retakes will be allowed. The student's status in the Biology graduate program will then be determined by the student and the advisory committee.

The results of the examinations should be reported on the Report of the Preliminary Exam form. The chair will bring the completed Report form to the Biology Graduate Advising Office, which will submit the form to the Office of Graduate Studies. Failure to submit the form to OGS within 10 working days of the exam will result in the preliminary exam being recorded as a failure. Copies of the official forms can be downloaded from the Office of Graduate Studies web site: <http://ogs.tamu.edu/OGS/currentExams.htm>

**After passing the preliminary examination, all degree requirements must be completed within four calendar years. Otherwise, the student will be required to repeat the preliminary exam.**

#### **J. Admission to Candidacy**

For admission to candidacy for a doctoral degree, the student must have: (1) completed all formal course work on the degree plan with the exception of any remaining 681, 684, 690, and 691, (2) a 3.0 graduate GPR and a Degree Plan GPR of at least 3.0 with no grade lower than C in any course on the degree plan, (3) passed the written and oral portions of the preliminary exam, (4) submitted an approved dissertation proposal, and (5) met the residence requirements. The final examination will not be authorized for any doctoral student who has not been admitted to candidacy.

#### **K. Continuous Registration**

Once all course work on the degree plan other than 691 (Research) is completed, a doctoral student must be in continuous registration until all further requirements for the degree have been completed. See the Graduate Catalog for additional information on the continuous registration requirement.

**L. Pre-Defense Publication of Dissertation Material.** Students should be aware of the agreement that is signed when a journal (hard copy or electronic) accepts an article for publication. At that time, the student assigns rights to the journal as publisher. The student must obtain written permission from the copyright holder to include the material in the thesis, dissertation, or record of study. Some journals and publishers have previously granted TAMU such rights, these can be found on the thesis office website.

## **M. Dissertation**

The ability to perform independent research must be demonstrated by the dissertation, which must be the original work of the candidate. The dissertation describes the research performed by a student during graduate study and the unique contribution the student has made to advance the frontiers of knowledge. The student, in consultation with his or her Advisory Committee, determines the content of the dissertation. The dissertation must be approved by the student's Advisory Committee. The dissertation should be submitted to the members of a student's Advisory Committee **at least two weeks prior to the Final Examination.**

The dissertation must be original work, grammatically correct in a format consistent with that used in scholarly journals in the candidate's field. The Office of Graduate Studies controls the format of the dissertation. Students must follow it exactly, or risk having it rejected by the Thesis Clerk. Instructions and the Thesis Manual is available on-line at <http://thesis.tamu.edu/>.

The student must submit an original copy of the dissertation in a form approved by the student's Advisory Committee to the Graduate Advising Office in order to obtain the Department Head's approval and signature **a minimum of two weeks prior** to the Office Graduate Studies deadline for submitting the dissertation to the Thesis Office. If the Department Head deems the dissertation unsatisfactory, it will be given to the Graduate Program Committee for review. The Graduate Program Committee will make a recommendation of action to the Department Head, student, and the members of the student's Advisory Committee.

Students are required to submit an electronic thesis/dissertation (ETD) as a pdf file to the Thesis Office instead of using the traditional blue-line paper. Paper copies of these ETDs will not be sent to the library or to the departments. All electronically submitted manuscripts can be accessed from the Internet via <http://etd.tamu.edu> or through the library website, <http://library.tamu.edu>. Information on how to submit an electronic thesis/dissertation is available on the Thesis Office website: <http://thesis.tamu.edu>.

**In addition, the Biology Dept. requires students to submit a copy of their dissertation printed on acid-free cotton bond paper to the Graduate Advising Office.** Acid-free cotton bond paper can be obtained from the Biology Graduate Advising Office. The Biology Dept. will have this document bound for the departmental archives.

Deadlines for submission of manuscripts to the Office of Graduate Studies are published each semester in the Office of Graduate Studies calendar. A copy of this calendar can be found at: <http://ogs.tamu.edu/OGS/currentCalendars.htm>.

## **N. Time Limit**

All graduate work must be completed within 10 consecutive calendar years. If within this time period a student does not complete all requirements for the degree sought, he or she cannot receive graduate credit for any course work that is more than 10 calendar years old at the time of the final examination.

## **O. Application for Degree**

Graduate students who expect to complete their work at the end of a given semester must apply for graduation by submitting the electronic application for degree to the Office of the Registrar and by paying the required graduation fee at the Fiscal Department no later than the Friday of the second week of the fall or spring semester or the Friday of the first week of the first summer term. The electronic application for degree can be accessed via the website [degreeapp.tamu.edu](http://degreeapp.tamu.edu). Graduate

students in interdisciplinary programs should attend the ceremony of their home academic department.

The Biology Graduate Advising Office should be notified when you apply to graduate so your file can be reviewed with time to identify and address any problems.

#### **P. Final Examination/Dissertation Defense**

In order to graduate at the end of a given semester the final exam for a doctoral degree must be passed by deadlines announced in the Office of Graduate Studies calendar. Students must be registered for at least one hour for the semester during the semester or summer term in which the final examination is held.

To be eligible to take the final examination, a student must be advanced to candidacy. The preliminary examination results and research proposal must have been submitted to the Office of Graduate Studies at least 14 weeks prior to the date of the defense. However the Final Examination must be held within three years of advancement to candidacy.

Request for permission to hold and announce the final oral examination must be submitted to the Office of Graduate Studies at least 10 working days before the requested exam date. This request must be approved by the student's advisory committee, the Biology Dept. Graduate Advisor (or Department Head), and OGS. . This announcement must be made on the official form, which can be downloaded from the OGS website. A sample form can be seen in Appendix II.

The student's advisory committee will conduct the final examination/dissertation defense. The final examination is not to be administered until the candidate's dissertation in substantially final form is provided to the Advisory Committee, and all concerned have had adequate time to review the document. The Biology Department requires **that the dissertation in substantially final form be submitted to the members of a student's Advisory Committee at least two weeks prior to the Final Examination. In order to allow sufficient time for revisions and for Department Head approval, the Final Exam should be scheduled no later than 4 weeks prior to the OGS deadline for submission of the Dissertation.**

All Ph.D. students receiving degrees through the Department of Biology will be required to present a Departmental Seminar covering their dissertation research, to be held immediately prior to the final examination. This seminar must be announced two weeks prior to the scheduled date and time (indicating that the student is a doctoral candidate), be advertised as a departmental seminar, and be open to all interested parties. Presentation of this seminar is to be followed by an open question period. Following the open question period, the student's Advisory Committee will conduct the Final Examination.

Whereas the final examination may cover the broad field of the candidate's training, it is presumed that the major portion of the time will be devoted to the dissertation and closely allied topics. Persons other than members of the graduate faculty may, with mutual consent of the candidate and the major professor, be invited to attend a final examination for an advanced degree. Upon completion of the questioning of the candidate, all visitors must excuse themselves from the proceedings when the Advisory Committee begins its deliberation on the results of the examination.

A positive vote by all members of the graduate committee with at most one dissension is required to pass a student on his or her exam.

## **Timeline for Graduate Studies Master of Science Department of Biology**

### **Year 1:**

- Complete required courses/seminars
- Complete rotations
- Choose advisor
- Develop degree plan with advisor
- Set up advisory committee
- Hold first committee meeting
  - Outline research project
  - Discuss degree plan
  - Obtain committee approval for degree plan
- Submit degree plan to the Office of Graduate Studies (OGS)
- MS students submit draft of research proposal to their advisor by the end of the Summer

### **Year 2:**

- Complete yearly seminars
- Coursework should be completed
- MS students submit research proposal to advisory committee by the end of the Fall semester

### **Year 3:**

- Complete yearly seminars
- MS students complete their final exam
  - Write thesis
  - Submit completed Permission to Defend Thesis form to the OGS two weeks before defense
  - Distribute thesis to advisory committee two weeks before defense
  - Defend thesis
  - Obtain committee approval for thesis
- Submit thesis to the OGS

## GRADUATE DEGREE REQUIREMENTS

### MASTER OF SCIENCE Thesis Option

To earn a Master of Science (thesis option) degree a student must meet the requirements of *both* the University *and* the Department of Biology. The Department of Biology requirements are outlined below, along with a summary of the University requirements. Please refer to the Graduate Catalog for a complete description of University requirements and policies.

Please note that graduate students must fulfill the requirements of the catalog that is current during the semester they complete their degree requirements. This is the case for both University and Department of Biology requirements. It is the student's responsibility to keep up with changes in requirements.

## REQUIREMENTS

### A. Residence

In partial fulfillment of the residence requirement for the degree of Master of Science, the student must complete 9 residence credit hours during one regular semester or one 10-week summer semester. Upon recommendation of the student's advisory committee and with approval of the Office of Graduate Studies, a student may be granted exemption from this requirement. However, such a petition must be approved prior to the student's registration for the final 9 credit hours of required course work.

### B. Identify a Major Professor

All Biology graduate students are required to identify a major professor by the end of the second full semester (excluding summer terms). M.S. candidates are encouraged to identify a major professor by the end of the first full semester. Sponsorship by the Chair or Co-chair must be submitted in writing to the Graduate Advisor by the end of the second semester.

The committee chair or one of the co-chairs must be a member of the Department of Biology graduate faculty. Requests for a co-chair from outside the Department of Biology must be approved by the Biology Department Graduate Program Committee (see requirements on page 7).

### C. Establish an Advisory Committee

The advisory committee, chaired by the major professor, is a primary source of direction and intellectual support for a student's research. The advisory committee should be constituted soon after the choice of major professor in order to provide the student with maximum input on course choices and research direction. The advisory committee will approve the degree plan, read and critique the proposal and thesis, and administer the final exam.

The University requires that a M.S. student's advisory committee be composed of no fewer than 3 members of the graduate faculty who are representative of the student's field of study and research. The chair or one of the co-chairs of the advisory committee must be from the student's

major department, and at least one of the members must be from a department other than the student's department.

The Biology Department has established the following additional requirements. The advisory committee must contain at least one tenured or tenure-track member of the Biology graduate faculty. Faculty having joint appointments in the Department of Biology are considered Biology faculty and **cannot** serve as the out-of-department member of a Biology graduate student's advisory committee.

#### **D. Degree Plan**

The degree plan should be developed in consultation with the student's advisory committee and submitted to the Department of Biology Graduate Advisor **prior to registering for the 3rd semester** (excluding summer terms). This deadline was established to ensure that students consult with their advisory committees about course work before beginning the second year of study.

For M.S. Thesis students, the degree plan must contain a minimum 32 semester hours of approved courses and research hours. The Department of Biology course requirements are described in the following section. There are limitations regarding the use of certain graduate courses including 681, 685, 689, 690, 691, 694, and 695 courses, certain transfer course work, extension courses, advanced undergraduate courses, and certain courses offered by the College of Medicine. The student is referred to the Graduate Catalog for the details of these limitations.

The Department of Biology Graduate Program Guide for the student's particular degree must be submitted along with the degree plan (see section E, item 5).

#### **E. Departmental Course Requirements**

- 1) All M.S. students are required to register for BIOL 681 Seminar in Graduate Student Orientation.
- 2) All M.S. students are required to complete BIOL 697 Methods in Teaching.
- 3) All M.S. students are required to complete 3 additional hours of 681 (seminar). These must include 1 hour of Departmental Colloquium (BIOL 681). Please note that the Office of Graduate Studies allows only 2 hours of 681 to be used on the degree program.
- 4) All M.S. students must register for one hour of BIOL 682 Graduate Student Research Seminar. All graduate students should attend this seminar each week even when they are not registered for it as a class.
- 5) 5) Graduate students are required to take a minimum of 4 courses, with at least 2 of the courses coming from the foundation course listing. Exemptions will be considered by the GPC. These courses are listed on page 14 at the beginning of this section.
- 6) M.S. students with a co-chair from outside the Dept. of Biology must satisfy all Biology course requirements and must take at least 50% of their 691 research credit hours as Biology hours.

#### **F. Teaching Requirement**

All M.S. students are required to teach for at least one semester.

#### **G. Foreign Language**

No foreign language is required.



## H. Research Proposal

The M.S. student must prepare a research proposal for approval by his or her Advisory Committee. The Proposal describes the research that a student intends to undertake. The proposal is not a contract to perform the described research and significant research progress need not be completed at the time of proposal submission. The proposal is a mechanism to assist students in clarifying research goals early in their graduate program, to encourage students to become familiar with the primary literature in their field, to provide experience in scientific writing, and to facilitate research interactions between students and members of their Advisory Committee. In the proposal, the student describes the rationale for the research project, the objectives of the research to be performed, and outlines the methodologies to be used.

Students will prepare a proposal describing their planned research. The proposal format will be determined by the student's advisory committee during their first committee meeting. Suggested formats include:

NIH R01 applications (<http://grants.nih.gov/grants/funding/phs398/phs398.html>)

NSF research proposals ([http://www.nsf.gov/pubs/gpg/nsf04\\_23](http://www.nsf.gov/pubs/gpg/nsf04_23))

NIH postdoctoral fellowships (<http://grants1.nih.gov/grants/funding/416/phs416.htm>)

The proposal must first be approved the student's advisor, then submitted to the advisory committee by the end of their 3<sup>rd</sup> semester (excluding summer). After revisions and approval by the advisory committee, the proposal should be submitted along with the signed official cover sheet to the Biology Graduate Advising Office. The official cover page is available on the OGS website. <http://ogs.tamu.edu/OGS/pdf/prop.pdf>

Students performing research involving human subjects, infectious biohazards, and/or recombinant DNA must attach a copy of the appropriate research compliance approval form to the proposal when proposal is submitted. Proposals that include research with vertebrate animals (including antibody generation in rabbits or mice) must include a copy of an approved Animal Use Protocol cover page. Information on Animal Use Protocols can be found at <http://animal.tamu.edu/approval.html>.

## I. Pre-Defense Publication of Thesis Material.

Students should be aware of the agreement that is signed when a journal (hard copy or electronic) accepts an article for publication. At that time, the student assigns rights to the journal as publisher. The student must obtain written permission from the copyright holder to include the material in the thesis, dissertation, or record of study. Some journals and publishers have previously granted TAMU such rights, these can be found on the thesis office website.

## J. Thesis

The thesis describes the research performed by a student during graduate study and the unique contribution the student has made to advance the frontiers of knowledge. The student, in consultation with the Advisory Committee, determines the content of the thesis. The thesis must be approved by the student's Advisory Committee. The thesis should be submitted to the members of a student's Advisory Committee **at least two weeks prior to the Final Examination.**

The thesis must be original work, grammatically correct in a format consistent with that used in scholarly journals in the candidate's field. The Office of Graduate Studies controls the format of the

thesis. Students must follow it exactly, or risk having it rejected by the Thesis Clerk. Instructions and the Thesis Manual is available on-line at <http://thesis.tamu.edu/>.

After approval by the Advisory Committee an original of the thesis must be submitted to the Department of Biology Graduate Advising Office in order to obtain the Department Head's approval and signature **a minimum of two weeks prior** to the Office Graduate Studies deadline for submitting the thesis to the Thesis Office. If the Department Head deems the thesis unsatisfactory, it will be given to the Graduate Program Committee for review. The Graduate Program Committee will make a recommendation of action to the Department Head, student, and the members of the student's Advisory Committee.

Students are required to submit an electronic thesis/dissertation (ETD) as a pdf file to the Thesis Office instead of using the traditional blue-line paper. Paper copies of these ETDs will not be sent to the library or to the departments. All electronically submitted manuscripts can be accessed from the Internet via <http://etd.tamu.edu> or through the library website, <http://library.tamu.edu>. Information on how to submit an electronic thesis/dissertation is available on the Thesis Office website: <http://thesis.tamu.edu>.

**In addition, the Biology Dept. requires students to submit a copy of their thesis printed on acid-free cotton bond paper to the Graduate Advising Office.** The Biology Dept. will have this document bound for the departmental archives. Acid-free cotton bond paper is available in the Graduate Advising Office.

Deadlines for submission of manuscripts to the Office of Graduate Studies are published each semester in the Office of Graduate Studies calendar. A copy of this calendar can be found at: <http://ogs.tamu.edu/OGS/currentCalendars.htm>.

#### **K. Time Limit**

All requirements must be completed within seven consecutive calendar years. If a student does not complete all requirements for the degree sought by seven years, no course work will be applicable to the degree program that is more than seven calendar years old at the time of the final examination.

#### **L. Application for Degree**

Formal application for the degree must be filed in the Office of Graduate Studies not later than 90 days prior to the end of the semester (or 30 days in the summer term). Students must be registered in the semester in which the degree is conferred. If graduating at the end of the summer semester, the student must register during the first 5-week term of the summer session. There is a diploma fee that must be paid at the time formal application is submitted. The Biology Dept. Graduate Advising Office should be notified when the application for degree is filed so that the student's file can be reviewed with time to address any problems.

### **M. Final Examination for M.S. students**

*The student should read the Graduate Catalog for a complete description of the University requirements.*

1. The student must pass their final exam by deadline dates announced in the Office of Graduate Studies Calendar.
2. The student must be registered in the semester that the exam is taken.
3. The student's GPR must be at least 3.000 for courses on the degree plan and for all courses completed at Texas A&M that are eligible to be applied to a graduate degree. There must be no un-absolved grades of D, F, or U in courses listed for credit on the degree plan. See the Graduate Catalog for information on how to absolve a deficient grade.
4. The student must have completed all course work on the degree plan with the exception of those hours for which the student is registered.
5. All English Language Proficiency requirements must be satisfied before the final examination is scheduled.
6. An approved research proposal must be on file with the Office of Graduate Studies by the published deadlines.
7. A request for permission to hold and announce the final examination must be submitted to the Office of Graduate Studies at least 10 working days in advance of the scheduled date for final examination.
8. The final examination covers the thesis and all course work on the degree plan. At the discretion of the Advisory Committee, the final examination may be written, oral, or both.
9. The final examination may not be administered until such time that the thesis is available to all members of the advisory committee in substantially final form and all members have had adequate time to review the document.
10. The final examination must be administered on campus (unless approved by the OGS).
11. There will be only one opportunity to retake the final examination. This must be accomplished within a time period that does not extend beyond the next regular semester (summer terms excluded).

## GRADUATE DEGREE REQUIREMENTS

### MASTER OF SCIENCE

#### Non-Thesis Option

To earn a Master of Science (non-thesis option) degree a student must meet the requirements of *both* the University *and* the Department of Biology. The Department of Biology requirements are outlined below, along with a summary of the University requirements. Please refer to the Graduate Catalog for a complete description of University requirements and policies.

Please note that graduate students must fulfill the requirements of the catalog that is current during the semester they complete their degree requirements. This is the case for both University and Department of Biology requirements. It is the student's responsibility to keep up with changes in requirements.

### REQUIREMENTS

**All requirements for the non-thesis option Master of Science degree other than those specified below are the same as those for the thesis option degree.**

#### Required course work

A minimum of 36 semester hours is required. The degree plan must be approved by the student's advisory committee and department head and is subject to the Limitations on the Use of Transfer, Extension and Certain Other Courses as described in the Graduate Catalog.

Students pursuing a non-thesis M.S. degree are not allowed to enroll in 691 (Research) for any reason and no 691 hours may be used for credit on the degree plan. A maximum of 4 credit hours of 684 (Professional Internship), 8 credit hours of 685 (Directed Studies), and up to 3 credit hours of 690 (Theory of Research) or 695 (Frontiers in Research) may be used toward the non-thesis option M.S. degree. In addition, any combination of 684, 685, 690, and 695 may not exceed 25% of the total credit hour requirement shown on the student's degree plan.

Department of Biology course requirements for the non-thesis option Master of Science degree are same as those for the thesis option degree with the following exceptions: BIOL 682 Graduate Research Seminar is not required, there should be no more than 6 hours of non-science course work on the degree plan.

#### Thesis

A thesis is not required. However, the Department of Biology requires non-thesis option students to prepare and submit a library research paper as described in the following section.

#### Library Research Paper

Students pursuing the non-thesis option Master of Science Degree in the Department of Biology are required to prepare and submit a library research paper. The purpose of this paper is to demonstrate that the student can do library research and read, understand, and integrate information from the primary literature. In scope the paper is similar to the literature review that constitutes the

first chapter of a thesis or dissertation. Typically, the paper is expected to be approximately twenty pages of double-spaced type, not including references and figures or tables.

The student's Advisory Committee must approve this effort. An approved copy of this paper will be deposited with the Chair of the student's advisory committee and a second soft-bound copy will be deposited in the departmental file of non-thesis papers located in the Department of Biology Graduate Advising Office.

### **Final Exam**

A final comprehensive examination is required for students seeking a non-thesis M.S. degree in the Department of Biology. **No exemptions are allowed.** The requirements as to level of courses and examinations are the same as for the thesis option M.S. degree.

The final examination may **not** be held prior to the mid-point of the semester or summer term in which a student will complete all remaining courses on the degree plan.