

The Department of Biology Graduate Advising Handbook



College of Arts and Sciences
The University of Memphis

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Note: This handbook is available on-line at: www.memphis.edu/biology/

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INTRODUCTION

Welcome to the Department of Biology at The University of Memphis. This booklet will answer many of your questions about our graduate program in Biology and contains all the forms and timetables required for completion of your program. Keep it in a safe place and check the timetables periodically. Students should read the Graduate Bulletin prepared by the Graduate School for additional entrance and graduation requirements for each degree.

Full-time faculty members in the department have diverse interests covering most of the major fields of biology and taxa of organisms. Programs are offered that lead to Master's (Thesis and non-Thesis) and Doctorate degrees. Details about admission and degree requirements are presented in the paragraphs that follow in this handbook.

Many Graduate School forms must be completed before, during, and at the end of your program in the Department of Biology. **A copy of each form submitted to the graduate school must be submitted to the Graduate Coordinator and placed in your file (also it is suggested that you keep a copy for your personal files and give a copy to your major advisor).** Online addresses for these forms are included at the end of this booklet. Graduate School forms are also available on The University of Memphis web page (www.people.memphis.edu/~gradsch/forms1.html).

All students must meet with the Coordinator of Graduate Studies during or before April of every year to assess progress made toward their degree goals. It is the responsibility of each student to schedule this meeting. The form for the meeting is included at the end of this booklet.

NOTICE: Each student is responsible for reading and following the requirements set forth herein and in the Graduate School Bulletin. Departmental policies for all deadlines and examinations must be satisfied.

GENERAL REQUIREMENTS FOR ADMISSION TO GRADUATE STUDY IN THE DEPARTMENT OF BIOLOGY

Persons wishing to work toward a graduate degree (Master of Science [MS] with Thesis or non-Thesis or Doctor of Philosophy [PhD]) in Biology must apply for admission to the Graduate School and the Department of Biology of The University of Memphis.

It is essential that applicants for any degree apply to both the Graduate School (http://www.memphis.edu/gradcatalog/acad_reg/index.php) **and** the Department of Biology (<http://www.memphis.edu/biology/graduate.htm>). Acceptance by the Graduate School does not necessarily indicate acceptance by the Department. The application procedure for the Graduate School can be found at: (<http://academics.memphis.edu/gradschool/>).

All applicants must submit the following directly to the Department of Biology:

1. **Application** to The University of Memphis Graduate School and to the Department of Biology.
2. **Official transcripts** of all previous academic coursework must be sent directly to The University of Memphis Graduate Admissions from the issuing institution. An overall minimum grade point average of 2.75 (on a 4.0 scale) at the undergraduate level is usually competitive. Applicants whose highest degree is from a foreign institution must have their **credentials evaluated** by any credentialing agency listed on the National Association of Credential Evaluation services website (www.naces.org) on a course-to-course evaluation basis.
 - a. Applicants must have satisfactorily completed ("C" or better) three upper division courses within the following six areas: Ecology, Genetics, Cell Biology, Microbiology, Physiology, and Evolution.
 - b. Students must have satisfactorily completed ("C" or better) five courses within the following nine areas: General Chemistry I, General Chemistry II, Organic Chemistry I, Organic Chemistry II, Biochemistry, Physics I, Physics II, Calculus, and Statistics. Other courses in the sciences may substitute for these requirements.
3. **Scores for the Graduate Record Examination** must be submitted directly to The University of Memphis Graduate Admissions by the testing agency. A minimum of 500 each on the verbal and quantitative portions of the GRE is generally competitive.
4. **A statement of professional goals** and reasons for applying to this program must be sent to The Department of Biology.
5. **A written letter** from a prospective advisor within the Department of Biology that states that he/she will accept the applicant and how the student will be funded while in the program must be submitted to the Department of Biology. Applicants for the Master's degree are expected to have made prior contact with potential research advisors in the department's graduate program. This is a critical first step; no applicants will be accepted to the Department without an advisor. Faculty research interests are listed on the departmental website; applicants are encouraged to interact directly with those faculty members who have research interests matching theirs.
6. **Two letters of recommendation** from persons capable of assessing the applicant's suitability for graduate work in biology must be submitted to the Department of Biology.
7. International students for whom English is not their native language must submit proof that they have taken the **Test of English as a Foreign Language (TOEFL)**; acceptable minimums are 550 for paper-based and 120 for computer-based exams. Applicants for Graduate Teaching Assistantships in the Department of Biology must pass the Test of Spoken English (TSE) with a score of 50 or higher. Alternatively, the applicant must obtain a score of 26 or higher on the spoken English component of the TOEFL iBT. Exams for English proficiency are available from the Educational Testing Service at <http://www.ets.org>.

A personal visit to the department is strongly encouraged; however, it is not required before admission. **Applications will not be considered by the Department of Biology until a complete file containing the above materials has been compiled.**

The Department of Biology prefers that students begin in the fall; however, they may be accepted for the spring or summer terms. Students wishing to be considered for a Graduate Teaching Assistantship (GTA) for support should apply by 1 February; however, because some important funding sources have a February deadline, we recommend that students apply as early as possible. Applicants who will not be supported through a departmental GTA should apply no later than 15 June for consideration for fall admission. Applicants in the spring semester admission should apply by 15 October. Late applications are considered, but admission is at the discretion of the Graduate Studies Committee. Generally, GTAs will not be available to students applying for spring and summer admission, although they may apply for a GTA in subsequent terms. Applicants, who fail to apply by the above stated deadline, may take courses as an **undeclared major** and up to **nine credits** may be applied to their graduate degree, **if** they are accepted when their completed applications are reviewed by the Graduate Studies Committee.

Note: the Department of Biology deadlines are considerably earlier than those of the Graduate School. It is essential that applicants apply in a timely manner to both the Department of Biology and the Graduate School to assure that your materials reach the Department of Biology by the above dates. **Acceptance by the Graduate School does not guarantee acceptance into the Department of Biology's graduate program.**

MASTER OF SCIENCE DEGREE REQUIREMENTS FOR MS DEGREE IN BIOLOGY

ADMISSION

The MS program is normally open only to students who hold a Bachelor of Arts (BA) or Bachelor of Science (BS) degree in Biology or a related field from a recognized institution. Note that seniors who are in the final term of their undergraduate program, with a very good record to date, will also be considered. There are two options for the Master's degree in the Department of Biology: (1) The Master's degree requiring a thesis is designed for those students who plan to continue work toward a doctorate (have interests in research and teaching) or students who wish to seek upper-level or advanced positions in the workplace; and (2) The **non-Thesis** Master's degree is for students who expect the Master's to be a terminal degree in biology.

Applicants must submit scores for the Graduate Record Examination (GRE). A minimum of 500 each on the Verbal and Quantitative portions of the GRE is generally considered competitive for admission. An overall minimum grade point average of 2.75 (on a 4.0 scale) at the undergraduate level is usually competitive. A personal visit to the department is encouraged; however, it is not required before admission. It is critical that applicants submit all of the materials listed (see points 1 – 6, page 2) in the General Requirements for Admission section to the Coordinator of Graduate Studies of the Department of Biology. Applications that do not include all of the requested materials will not be considered. Admission to the MS program of the Department of Biology will be determined by the departmental Graduate Studies Committee. **Meeting entrance requirements for admission does not guarantee acceptance into the program.**

Students must have satisfactorily completed (“C” or **better**) three upper division courses within the following six areas: **Ecology, Genetics, Cell Biology, Microbiology, Physiology, and Evolution.** Applicants must have satisfactorily completed (“C” or better) five courses within the following nine areas: **General Chemistry I, General Chemistry II, Organic Chemistry I, Organic Chemistry II, Biochemistry, Physics I, Physics II, Calculus, and Statistics.** Other courses in the sciences may substitute for these requirements.

Applicants must also apply for admission to the Graduate School (see the Graduate School website <http://academics.memphis.edu/gradschool/>) for details. **Meeting Graduate School requirements for admission does not guarantee acceptance into the Department’s graduate program.**

ADVISORY COMMITTEE

During the first year in the program, the student and their advisor (major professor) will form an Advisory Committee of at least three voting members (for a minimum of three). A majority of the Committee must be members of the graduate faculty from the Department of Biology of The University of Memphis. At least three voting members of the student's Committee must be physically involved in the following meetings: Planning of coursework, Prospectus proposal (not applicable for non-Thesis MS), and Final Comprehensive Examinations (written and oral). Students should meet with their Advisory Committee each semester and are required to meet with it at least once a year.

PROGRAM REQUIREMENTS

MASTER'S DEGREE (THESIS)

A minimum of 30 semester hours beyond the baccalaureate degree is required. A minimum of 18 semester hours must be taken in residence. Seventy percent of the total of 30 semester hours (i.e., a minimum of 21 hrs.) must be at the 7000 level or above; a minimum of 12 hours in the major is required. The student's Advisory Committee may require additional courses. A grade point average of 3.0 must be maintained. A student whose grade point average drops below 3.0 will have one semester to raise his or her GPA to 3.0 or better. Continuation of a student who fails to reach a 3.0 overall GPA during two semesters, while in the graduate program, is at the discretion of the Graduate Studies Committee (in consultation with the student's Advisory Committee). A student must make at least a "B" or "S" (Satisfactory) on any graduate course required by the Department of Biology or the student's Advisory Committee. A student is allowed to repeat graduate courses only one time and no more than two courses may be repeated. Approval to repeat a course must be obtained from the Graduate Studies Committee in consultation with the student's Advisory Committee.

Courses Required by the Department of Biology for all MS (thesis) students:

Biology 7000 (Orientation to Graduate Studies), **Biology 7004** (College Biology Teaching), **Biology 7200** (Seminar in Biology – presentation of research proposal and research progress updates), **Biology 7600** (Seminar in Biology – thesis presentation), and **Biology 7996** (Thesis) are required. **Biology 7000** is required during the first year in residence. **Biology 7600** is an oral presentation of the student's research and is usually presented during the last semester in the program. Up to six credit hours of Biology 7092 (Research), three credit hours of Biology 7200 (Seminar in Biology), and six credit hours of Biology 7996 (Thesis) may be used to meet degree requirements.

Attendance at department seminars is mandatory.

A **research prospectus** (see pages 17-18 for format), presented to the full graduate faculty orally and a written version signed by the members of the Advisory Committee, must be completed by the end of the second semester in residence and submitted to the Graduate Studies Committee. **The prospectus should be approved prior to data collection.** A signed prospectus must be kept on file in the Department of Biology Graduate Studies office. The prospectus may be amended with the approval of the Advisory Committee no later than one semester before the thesis is to be completed.

CANDIDACY

Students seeking the Master's degree must submit a petition to the Coordinator of Graduate Studies, Chairperson of the Department of Biology, and subsequently to the Graduate School requesting approval of candidacy. **Approval of candidacy at the departmental level will be based on the following:**

- A. Satisfactory completion of 12 semester hours of graduate work.
- B. Formation of an Advisory Committee and convening an initial meeting.
- C. Completion of any prerequisite undergraduate requirements.
- D. Completion of the Comprehensive Examination (after successful completion of all required courses, students pursuing a MS degree are required to take a **Written** and **Oral Comprehensive Examination**; the examination will be scheduled in consultation with the student's Advisory Committee; a minimum of one half day per evaluating committee member should be scheduled for the exam to be completed over a 10-day period).

Additionally, before an applicant will be officially admitted to candidacy for the master's degree, he/she must have satisfied the following requirements of the Graduate School:

- A. The **Application for Admission to Candidacy** for the Master's Degree and an **Intent to Graduate Card** must be filed by the deadline published in the Graduate Bulletin, posted on academic unit bulletin boards on campus, and available online. No exceptions will be made if both the intent card and candidacy forms are not submitted by the stated deadlines.
- B. An approved **Thesis Proposal Form** must be filed with all necessary human or animal subjects approvals before any research is undertaken (see *Regulatory Issues*, Graduate School Bulletin).
- C. The student must have at least a **3.0 average** on all coursework listed on the candidacy form as well as any other graduate work undertaken at The University of Memphis within the specified time limit. Grades of "D" or "F" are not accepted for any graduate degree credit, but these grades will be computed in the GPA. No more than seven (7) hours of "C+," "C," or "C-" will be counted toward degree requirements.
- D. **Grades earned in the final semester may not be used to correct GPA deficiencies.** The student must have at least a 3.0 average in all graduate work at the time the Intent to Graduate Card is filed.
- E. The program must include a minimum of 70% of the total required hours as 7000-level courses.
- F. All requirements of the Graduate School, the College of Arts and Sciences, and Department of Biology must be met.
- G. If a student wishes to substitute a course for a required course, the **substitution form** must be approved by the student's advisor and the Coordinator of Graduate Studies for the Department of Biology on the Course Substitution Form. The form must accompany the candidacy form.
- H. The student's graduate work up to this point must be acceptable in quality and quantity to the Major Advisor, Coordinator of Graduate Studies of the Department of Biology, Director of Graduate Studies of the College of Arts and Sciences, and the Assistant Vice Provost for Graduate Studies.

It is the responsibility of each graduate student to notify the Graduate Analyst at mstout@memphis.edu of any changes in name and address. Students who are graduating will receive a letter explaining graduation ceremony requirements about one month prior to graduation.

A **final oral presentation (seminar)** of the student's research thesis (Biology 7600) will be announced and will be open to the public. A written abstract and summary of the presentation will be distributed to all faculty members at least **seven days** prior to the oral presentation.

After the final-oral seminar, the student's Advisory Committee will conduct a **Final Oral Examination**. This examination should be conducted as soon after the public presentation as possible. The examination will focus on questions related to the student's area of research and specialization. The student's Advisory Committee will evaluate the student's performance on the examination as follows:

Full Pass

All Committee members voting pass.

Conditional Pass

An agreement by the Committee that the student has neither failed nor satisfactorily passed the examination. Remedial conditions must be stipulated by the Committee and may include either further course work or a retaking of a portion or portions of the exam. In the former case, the courses and final grade required must be designated in writing. In the latter case, a time for re-examination (no less than 30 days) will be determined by the student and the Committee. In either case, a failure to complete the agreed upon requirements will signify that the entire examination has been failed and must be retaken as noted under "Full Fail".

Full Fail

Two or more of the Committee voting fail. The student may retake the entire examination only once. A time for re-examination (no less than 30 days from the date of the first examination) will be determined by the student and the Committee.

THESIS

A **thesis** is required of all candidates for this Master's degree. Once a student has enrolled for thesis credit, he/she must register for at least one credit in each subsequent fall and spring semester until graduation. Six (6) hours of thesis credit (Biology 7996) must be scheduled during the graduate program. The student's Advisory Committee must approve the topic, prospectus, and the written thesis. The thesis should be prepared and presented to the Advisory Committee in the following manner:

- A. Write and revise under the direction of the major professor in consultation with the Advisory Committee. Usually this requires several drafts. The finished draft will be submitted to the major professor for detailed criticism.
- B. Revise, incorporating suggestions made by the major professor, and obtain major professor's approval.
- C. Submit the revised draft of the thesis to the Advisory Committee for critical review. This draft must be submitted at least **six weeks** before the deadline for submission of theses to the Graduate School. The Advisory Committee will have **two weeks** to edit and comment on the draft. The student and their advisor are responsible for eliciting a response from each Committee member.
- D. Revise the thesis incorporating suggestions made by the Advisory Committee. This will entail submission of rewritten drafts until each Committee member is satisfied with the thesis. Committee members must be given at least two weeks to read the final thesis.
- E. Obtain approval of the Advisory Committee on the corrected draft.
- F. Prepare final copies of thesis in accordance with Graduate School and Departmental regulations regarding form, size of type, method of reproduction, and number of copies required. See the University of Memphis booklet on Graduate School Policies Concerning Thesis and Dissertation and details of form and style used by major journals in the student's research area (also available at The University of Memphis web page: <http://academics.memphis.edu/gradschool/>). The specific style will be determined in consultation with the major professor and Committee members. The candidate is responsible for proof-reading and correcting all copies to be submitted to the Graduate School. The original is to be submitted to the Graduate School. One copy is required for the library, and another copy is submitted to the Department of Biology. These three copies are all bound.

Final copies of the thesis must be distributed to the Advisory Committee **one week** before the final thesis defense. All copies of the signed thesis must be in the Graduate Office **two weeks** before graduation. In addition to the three required copies, a bound copy will be given to the major professor and an unbound copy to each member of the student's Advisory Committee (if requested by the individuals involved). Other copies are at the student's discretion.

Students are strongly encouraged to present papers and posters at professional meetings and to publish papers in peer reviewed scientific journals during tenure for the Master's degree.

A graduate degree is not awarded solely because the student completes a prescribed number of courses. Graduate degrees are awarded, based on the judgment of the Advisory Committee and the Graduate Faculty, to students who have shown a level of professional competency and creativity deserving of the graduate degree. Upon successful completion of all degree requirements, the Advisory Committee and College Director of Graduate Studies will recommend the awarding of the Master's degree by the Graduate School.

PROGRAM REQUIREMENTS

MASTER'S DEGREE (NON-THESIS)

A minimum of 36 semester hours of graduate course work is required. The total number of semester hours required for graduation will be determined by the student's Advisory Committee based on academic background. No more than three semester hours can be satisfied by Biology 7092 (Research). Seventy percent of the total hours taken must be at the 7000 level or above with a minimum of **12 hours** in the major. A grade point average of 3.0 must be maintained. A student whose grade point average drops below 3.0 will have one semester to raise his or her GPA to 3.0 or better. Continuation of a student who fails to reach a 3.0 overall GPA during two semesters while in the graduate program is at the discretion of the Graduate Studies Committee (in consultation with the student's Advisory Committee). A student must make at least a "B" OR "S" (Satisfactory) on any graduate course required by the Department of Biology or the student's Advisory Committee. A student may repeat a graduate course only one time. Only two courses may be repeated. Approval to repeat a course must be obtained from the Graduate Studies Committee in consultation with the student's Advisory Committee.

Courses Required by the Department of Biology for all MS (non-Thesis) students:

Biology 7000 (Ordination to Graduate Studies), **Biology 7004** (College Teaching), and **Biology 7200** (Seminar in Biology). **Biology 7000** must be completed during the first year of residence.

Students will not present in Biology 7200 during some semesters; attendance at departmental seminars is mandatory each semester.

CANDIDACY

Students seeking the Master's degree must submit a petition to the Coordinator of Graduate Studies, Chairman of the Department of Biology, and, subsequently, to the Graduate School requesting approval of candidacy. **Approval of candidacy at the departmental level will be based on the following:**

- A. Satisfactory completion of 12 semester hours of graduate work.
- B. Formation of an Advisory Committee and convening an initial meeting.
- C. Completion of any prerequisite undergraduate requirements.
- D. After successful completion of all required courses, students pursuing a non-Thesis master's degree are required to take a **Written and Oral Comprehensive Examination**. The examination will be scheduled in consultation with the student's Advisory Committee. A minimum of one half day per evaluating-committee member should be scheduled for the exam (to be completed over a 10-day period.).

Additionally, before an applicant will be officially admitted to candidacy for the non-Thesis master's degree, he/she must have satisfied the following requirements:

- A. The **Application for Admission to Candidacy** for the Master's Degree and an **Intent to Graduate Card** must be filed by the deadline published in the Graduate

Bulletin, posted on academic unit bulletin boards on campus and available online. No exceptions will be made if both the intent card and candidacy forms are not submitted by the stated deadlines.

- B. The student must have at least a **3.0 average** on all coursework listed on the candidacy form as well as any other graduate work undertaken at The University of Memphis within the specified time limit. Grades of "D" or "F" are not accepted for any graduate degree credit, but these grades will be computed in the GPA. No more than seven (7) hours of "C+," "C," or "C-" will be counted toward degree requirements
- C. **Grades earned in the final semester may not be used to correct GPA deficiencies.** The student must have at least a 3.0 average in all graduate work at the time the Intent to Graduate Card is filed.
- D. The program must include a minimum of 70% of the total hours as 7000-level courses.
- E. All requirements of the Graduate School, the College of Arts and Sciences, and Department of Biology must be met.
- F. If a student wishes to substitute a course for a required course, **the substitution form** must be approved by the student's advisor or the program coordinator on the Course Substitution Form. The form must accompany the candidacy form.
- G. The student's graduate work up to this point must be acceptable in quality and quantity to the student's advisor and Coordinator of Graduate Studies.

A graduate degree is not awarded solely because the student completes a prescribed number of courses. Graduate degrees are awarded, based on the judgment of the Advisory Committee to students who have shown a level of professional competency and creativity deserving of the graduate degree.

CHANGE IN MS DEGREE PROGRAM

Students wishing to make the transition from the MS to PhD program prior to completing the MS degree must:

- A. **Submit a statement** to the Graduate Studies Committee (GSC) that details the student's reason for wishing to make the change. The statement should set forth the student's accomplishments that merit making such a change.
- B. The student must **submit a short** (1 - 3 pages) proposal that offers some detail of the proposed research project. This short proposal must briefly set forth the background underlying the project, the hypothesis or question being addressed, predictions that the hypothesis generates and the proposed methods to test these predictions, and the possible outcomes of the research.
- C. The student's major professor must **submit a letter supporting the student's proposed change** and agreeing to continue to serve as the Major Advisor.
- D. The student must solicit, and subsequently submit, at least **two written statements** from other members of the graduate faculty in support of the proposed change.
- E. Materials must be received by the GSC by 15 March for consideration for the following academic term. **No mid-year changes will be considered.**
- F. The student must have at least a **3.5 grade point average** (GPA) for graduate course work that has been completed at The University of Memphis.
- G. The student's general **Graduate Record Exams (GRE) scores and undergraduate GPA** must meet the criteria established for a student to gain direct admission to the PhD program with a BA or BS degree (see page 11).

Petitions to change programs will be considered at the same time as new applications for the following year. Even though a student meets the above requirements, this does not guarantee that a student will be allowed to change programs.

Changing programs from Thesis to non-Thesis and the reverse is strongly discouraged. This will only be allowed after the student has met his/her initial obligation (e.g., collection of data, completion of reports, presentation at meetings, or other) to the major professor and the Department of Biology, as well as to any funding agency that might be involved in the student's program. Such changes require a petition from the student to the Graduate Studies Committee (GSC). Following a review of the request and consultation with the major professor and, in appropriate cases, the funding agency, the GSC will act on the petition. The student may be called for a personal interview with the GSC. Early graduation rarely results from switching graduate programs.

It should be noted that the Department of Biology does not normally provide financial support for non-Thesis students. Therefore, students with teaching or research assistantships will likely lose this support if they change from the Thesis to non-Thesis program.

CHANGE IN ADVISORY COMMITTEE

A graduate student may change the composition of the Advisory Committee responsible for direction of his/her graduate program (including the major professor); however, any change in the Advisory Committee composition must be approved by the Graduate Studies Committee. Normally, this change will present few problems if the change is made early in the student's career. To change membership of the Advisory Committee, the student will complete the proper Graduate School form (<http://academics.memphis.edu/gradschool/forms1.html>) and petition the GSC for approval of the change. If changes are made after the student has finished most of the course work, presented the 7200 or 7600 seminar, or taken the comprehensive examinations, changing the composition of the Committee may lead to a delay in graduation. Requests for change in Advisory Committee membership late in a student's program are strongly discouraged.

Guidelines that apply to committee changes are:

- A. The new Advisory Committee may recommend additional course work.
- B. The student will be required to take the Final Examination from the Committee as constituted at the time of graduation. Therefore, if the student has taken the comprehensive examination and subsequently changes the membership of the Committee, the student may be required to take the examination from the new members.
- C. If the thesis research has been previously presented in a Biology 7600 seminar and has been scored satisfactorily; the student may be required to present an additional seminar to the faculty. This presentation will include any additional research required by the new membership of the Advisory Committee.

PROGRAM REQUIREMENT

DOCTOR OF PHILOSOPHY

ADMISSION

Applicants with a Bachelor's degree but not a Master's degree: A combined score of at least 1100 on the Verbal and the Quantitative portions of the GRE is generally considered competitive for admission (the minimum score preferred on either portion is usually 500). An overall minimum grade point average of 3.00 (on a 4.0 scale) for students with a BS or MS degree is generally competitive. A personal visit to the department is encouraged; however, it is not required before admission. It is critical that applicants submit all of the materials listed (see points 1 – 6; page 2) in the General Requirements for Admission section to the Coordinator of Graduate Studies of the Department of Biology. Admission to the PhD program of the Department of Biology will be determined by the departmental Graduate Studies Committee. **Meeting entrance requirements for admission does not guarantee acceptance into the program.**

Applicants with a Master's degree: Applicants must submit transcripts from the institution from which they received their graduate degree and the materials listed in the General Requirements for Admission section (see points 1 – 6; page 2) to the Coordinator of Graduate Studies in the Department of Biology. Applications that do not include all of the requested materials will not be considered. Admission to the PhD program of the Department of Biology will be determined by the departmental Graduate Studies Committee. Admission is not dependent upon GRE scores for students holding a MS degree from an accredited institution. **Meeting entrance requirements for admission does not guarantee acceptance into the program.**

All applicants must have satisfactorily completed ("**C**" or better) four upper division courses within the following six areas: **Ecology, Genetics, Cell Biology, Microbiology, Physiology, and Evolution.** Other courses in the sciences may be substituted for these requirements.

All applicants must have satisfactorily completed (C or better) seven courses within the following nine areas: **General Chemistry, General Chemistry II, Organic Chemistry I, Organic Chemistry II, Biochemistry, Physics I, Physics II, Calculus, and Statistics.** Other courses in the sciences may substitute for these requirements.

Applicants must also apply for admission to the Graduate School (see the Graduate School website <http://academics.memphis.edu/gradschool/> for details of the application procedure).

ADVISORY COMMITTEE

During the first year in the program, the student and their advisor will form an Advisory Committee of at least four additional voting members (for a minimum of five). A majority of the Committee must be members of the graduate faculty from the Department of Biology of The University of Memphis (Note: At least four voting members must be physically present at each of the following meetings: Planning of coursework, Prospectus proposal, and Final Examinations [written and oral]). At least one of these members must be from outside the student's major area of study. Members may be from outside the Department if they have adjunct standing at The University of Memphis.

SWITCHING FROM PhD TO MASTER'S DEGREE

If a student admitted into the PhD program fails to complete the requirements for the PhD, the student may be granted a Master's degree upon successful completion of the requirements for that degree (see M.S. requirements). Granting of the Master's in lieu of the PhD must be approved by the student's Advisory Committee and the Graduate Studies Committee.

REQUIREMENTS FOR THE PhD PROGRAM

A minimum of 72 credit hours beyond the baccalaureate degree is required. A student entering the PhD program with a M.S. degree may be awarded 30 semester hours toward the 72 hours required. A minimum of 30 graduate semester hours must be taken in residence. The student should have a major area of specialization with a sufficient diversity in course work to insure a breadth in training. Course requirements are determined by the Advisory Committee in conjunction with the student before the end of the second semester in residence. A grade point average of 3.0 must be maintained. Continuation of a student who fails to reach a 3.0 overall GPA during two semesters in the graduate program is at the discretion of the Graduate Studies Committee (in consultation with the student's Advisory Committee). A student must make at least a "B" or "S" (Satisfactory) on any graduate course **required** by the Department of Biology or the student's Advisory Committee. A student is not allowed to repeat a graduate course more than one time. Only two courses may be repeated. Approval to repeat a course must be obtained from the Graduate Studies Committee in consultation with the student's Advisory Committee.

Courses Required by the Department of Biology for all PhD students:

Biology 8000 (Orientation to Graduate Study), **Biology 8004** (College Biology Teaching), **Biology 8092** (Research), **Biology 8103** (Dissertation Proposal), **Biology 8200** (Seminar in Biology), **Biology 8600** (Seminar in Biology – public dissertation defense), and **Biology 9000** (Doctoral Research and Dissertation) are required. Biology 8000 is required during the first year of residence. The oral seminar component of Biology 8103 should be presented to the Department by the sixth semester in residence; the written component of BIOL 8103, the Dissertation Proposal, should be approved by the student's Advisory Committee during the same semester. Biology 8600, an oral presentation of the doctoral research, is part of the final examination in defense of the dissertation and is usually presented during the last semester in residence (see Final Examination). Up to nine credit hours of Biology 8092 (Research), five credit hours of Biology 8200 (Seminar in Biology), and 18 credit hours of Biology 9000 can be counted toward the degree requirements.

Attendance at department seminars is mandatory.

Foreign language proficiency - Students are required to demonstrate competence in a foreign language and/or research tool. Specific requirement(s) is (are) determined by the student's Advisory Committee.

ADVANCEMENT TO PhD CANDIDACY

The process of becoming a PhD Candidate is a two step process that should be completed by the end of the third year.

- 1) Research Prospectus (Proposal;** see page 17 for format): The prospectus should be completed and signed by the members of the Advisory Committee as early in the student's program as possible and should, generally, be approved prior to data collection. The written **Prospectus (BIOL 8103)** should be submitted in a format that is appropriate for the student's sub-discipline (e. g., an NIH, NSF, EPA, or USDA grant or an appropriate state or federal agency grant or contract). The student will subsequently orally present the proposed research to the Department of Biology. The signed

prospectus must be kept on file in the Departmental of Biology office. The prospectus may be amended with the approval of the Advisory Committee no later than one semester before the dissertation is to be completed.

- 2) Specialized Knowledge Examination:** All students are required to take and pass a **Written and Oral Comprehensive Examination** administered by the student's Advisory Committee, usually, before the end of their sixth semester in residence. The scope of this examination is broad and includes a review of general biological principles. A maximum of one day per evaluating Committee Member will be available for the written examination. The entire written examination must be completed within one 10-day calendar period. Committee members will grade their own questions, but members are encouraged to read all sections of the examination. The oral examination will be conducted by the student's Advisory Committee within two weeks of completion of the written examination (unless a request for extension is submitted by the student or major professor and approved by the Coordinator of Graduate Studies). Guests may be invited to participate in the oral examination at the discretion of the Advisory Committee. The Committee will evaluate the performance on the **entire examination** as follows:

Full Pass

All Committee members voting pass.

Conditional Pass

The Committee agrees that the student has neither failed nor satisfactorily passed the exam. Conditions for rectifying this may include further course work, retaking of a portion or portions of the exam, or both. If the former, courses and final grade required must be designated in writing. If the latter, a time for re-examination (no less than 30 days) will be determined by the student and the Committee. In either case, failure to complete the requirements at the first attempt will signify that the entire examination has been failed and must be retaken as noted under Full Fail.

Full Fail

Two or more of the Committee voting fail. The student must retake the entire examination (written and oral). A time for re-examination (no less than 30 days) will be determined by the student and the student's Advisory Committee.

Following completion of the prior two steps, students must submit a petition through the Coordinator of Graduate Studies and Chairman of the Department of Biology to the Graduate School for the approval of candidacy. Approval of candidacy by the Coordinator of Graduate Studies and Departmental Chairman will be based on satisfactory completion of the Research Prospectus and Specialized Knowledge Examinations (written and oral comprehensive exam).

Additionally, before an applicant will be officially admitted to candidacy for a doctoral degree and allowed to register for dissertation hours, the student must have satisfied the following requirements of the Graduate School:

- A. The **Application for Admission to Doctoral Candidacy** must be submitted to the Graduate School as soon as possible after the student has **passed the comprehensive examination**.
- B. An approved **Dissertation Proposal Form** must be filed with the Graduate School. Any necessary human or animal subjects approvals must be included before any research is undertaken (see *Regulatory Issues*, Graduate School Bulletin).
- C. The student must have at least a **3.0 average** on all coursework listed on the candidacy form as well as any other graduate work undertaken at The University of Memphis within the specified time limit (10 years). Grades of "D" or "F" are not

accepted for any graduate credit but these grades will be computed in the GPA. No more than seven (7) hours of "C+," "C," or "C-" will be counted toward degree requirements.

- D. **No more than fifteen (15) hours of 6000-level courses may be applied to a doctoral degree.**
- E. **Grades earned on courses taken during the student's final semester may not be used to correct GPA deficiencies.** The student must have at least a 3.0 average in all graduate work at the time the Candidacy Form is filed.
- F. All coursework offered for the doctoral degree must have been completed within **10 years.**
- G. If a student wishes to substitute a course for a required course, the substitution form must be approved by the student's advisor and the Coordinator of Graduate Studies. The form must accompany the candidacy form.

DISSERTATION

A **dissertation** will be required of all candidates for the doctoral degree. Eighteen (18) hours of dissertation credit (Biology 9000) must be scheduled during the graduate program. Once a student has enrolled for dissertation credit, he/she must register up for at least one credit in each subsequent fall and winter semester until graduation. The student's Committee must approve the topic, prospectus, and the final dissertation. The dissertation must show a mastery of the techniques of scientific research, and it must be a distinct and new contribution to the body of scientific knowledge. At least a portion of the dissertation or other research must be accepted for publication in a nationally or internationally peer reviewed journal that is acceptable to the Advisory Committee (see Publications section – page 16). Students are encouraged to present papers at professional meetings and to publish in scientific journals. The dissertation should be prepared and presented to the Advisory Committee in the following manner:

- A. Write and revise under the direction of the major professor in consultation with the Advisory Committee. The completed draft will be submitted to the major professor for detailed criticism.
- B. Revise, considering suggestions made by the major professor, and obtain major professor's approval.
- C. Submit revised draft of the dissertation to the Advisory Committee for critical review. This draft must be submitted to the Committee at least **six weeks** prior to the deadline for submission of dissertations to the Graduate School. Committee members must be given at least **two weeks** to read the dissertation.
- D. Rewrite as necessary incorporating suggestions made by the Advisory Committee members. This will entail submission of rewritten drafts until each Committee member is satisfied with the dissertation.
- E. Obtain approval of the corrected draft by all Committee members.
- F. Prepare final copies of the dissertation in accordance with Graduate School and Departmental regulations as to form, size of type, method of reproduction, and number of copies required. See The University of Memphis booklet on Graduate School Policies Concerning Thesis and Dissertation (also available on The University of Memphis Graduate School web page: www.people.memphis.edu/~gradsch/forms1.html) and details of form and style used by major journals in the student's research area. The specific style will be determined in consultation with the Major Professor and Committee members. Candidates are responsible for proof-reading and correcting all copies to be submitted to the Graduate School. The original is to be submitted to the Graduate School. One copy is required for the library, and another copy is submitted to the Department of Biology. The final copies of the dissertation must be distributed to the Advisory Committee **one week** before the final thesis defense. All copies of the signed thesis must be in the Graduate Office **two weeks** before graduation. In addition to the three required copies, a bound copy

will be given to the major professor and an unbound copy to each member of the graduate Committee (if requested by the individuals involved). Other copies are at the student's discretion.

DISSERTATION DEFENSE AND FINAL ORAL EXAMINATION

The Final Examination (BIOL 8600) will be an oral defense of the dissertation. The examination will be announced and open to the public, but the Advisory Committee will decide the results of the examination. This committee will consist, insofar as possible, of the same persons involved in the specialized knowledge examination. Following adjournment of the public dissertation defense, a Final Examination will be conducted by the student's Advisory Committee. No more than one dissenting vote is permissible to pass the examination. The Final Examination may be retaken only once and not in the same semester. Upon successful completion of the examination and all degree requirements, the committee will recommend awarding the PhD.

PUBLICATIONS

Prior to graduation, students are required to have published or have fully accepted at least one publication in a refereed national or international journal that has been approved by their Advisory Committee. The publication must be based on work conducted during the doctoral program. In addition, students are strongly encouraged to publish other components of their research in appropriate journals and to present papers and posters at scientific meetings during their program of study.

Upon successful completion of the examination and all other degree requirements, the Advisory Committee will recommend the awarding of the Doctor of Philosophy degree by the Graduate School. **A graduate degree is not awarded solely because the student completes a prescribed number of courses. Graduate degrees are awarded on the judgment of the Advisory Committee to students who have demonstrated a level of professional competency and creativity deserving of the Doctoral Degree.**

CHANGE IN ADVISORY COMMITTEE

A graduate student may change the composition of their Advisory Committee (including the major professor); **however, any change in committee composition must be approved by the Graduate Studies Committee (GSC).** If the change is made early in the student's career, it will present few problems. However, if committee changes are made after the student has finished most of the course work, presented the 8103 and 8600 seminars, or advanced to PhD candidacy, changing the composition of the Committee may lead to a delay in graduation. Therefore, requests for Committee changes in the Advisory Committee late in a student's program are strongly discouraged. Regardless, to change membership of the Advisory Committee, the student must complete the proper Graduate School forms and petition the GSC for approval of the change.

Guidelines that apply are:

- A. If the Biology 8103 Seminar has been given, the student's new Advisory Committee will determine whether it will be repeated.
- B. The student's new Committee will determine any additional course work.
- C. The student may be required to take the Specialized Knowledge Examination from the new Advisory Committee. Therefore, if the student has taken the examination and then changes the membership of the Committee, the student may be required to retake the examination from the new Committee members.

- D. If the research for the dissertation has been presented previously to the faculty in a Biology 8600 seminar and has been judged satisfactory, the student may be required to present an additional seminar to the faculty that will include any additional research required by the new members of the Committee.

APPENDICES

RESEARCH PROSPECTUS (PROPOSAL) OUTLINE

A research prospectus will be written in the form of a grant proposal that is appropriate to the student's area of research. The format will be decided by the student and their Committee and will likely include information in points 2 – 4 below. A copy of the prospectus, to be kept on file in the Department of Biology Graduate Studies office, will include all of the information in points 1 – 9.

1) TITLE PAGE:

Research Title
Name
Degree Sought
Date
Names of faculty on Advisory Committee

2) OBJECTIVES OF RESEARCH:

Background information on questions
Importance of research to field of study
Hypotheses tested (Questions posed)
Specific explanations of interpretations of possible results

3) RESEARCH PROCEDURES:

Detailed presentation of Materials and Methods
Budget sheet listing materials required to complete research

4) POSSIBLE OUTCOMES (OR EXPECTED RESULTS)

Text and graphical data to show what results are expected (or likely) and how they will support or reject working hypotheses
A statement on how the study will be interpreted and what conclusions will be drawn if hypotheses are or are not supported

5) RESEARCH SUPPORT TO BE SOUGHT:

Granting Agencies (both government and private)
Departmental/University support

6) RESEARCH CHRONOLOGY:

Anticipated date of starting and finishing each portion of the research project
Anticipated date of first draft of thesis/dissertation
Anticipated date of submission of research for publication
Name(s) of journal(s) to which papers will be submitted
Anticipated date of graduation

7) ACCEPTANCE PAGE:

The student's Advisory Committee members' signatures below have knowledge of the student's proposed research area, know that the materials needed for the work are available and adequate for the proposed research, and are in general agreement that the area of research chosen will yield an original and significant contribution to scientific knowledge.

8) SIGNATURES OF COMMITTEE MEMBERS:

9) NAMES OF COLLABORATORS:

OUTLINE FOR THESIS/DISSERTATION ABSTRACT

TITLE PAGE:

Research Title
Name
Degree Sought
Date
Names of faculty on Advisory Committee

ABSTRACT

Introduction
Objectives
Hypotheses tested
Methods
Results
Significance

LITERATURE CITED/IMPORTANT REFERENCES (optional but recommended)

PUBLICATIONS

PRESENTATIONS

CLASSES TAKEN IN BIOLOGY/RELATED FIELDS DURING GRADUATE SCHOOL

GRANTS/AWARDS/HONORS

CHECKLIST FOR MASTER OF SCIENCE IN BIOLOGY

- Advisory Committee Formed (Graduate School [GS] form)
- Biology 7000 - Orientation to Graduate Studies
- Biology 7004 - College Biology teaching
- Biology 7200 - Seminar on dissertation research (research proposed and progress updates)
- Research Prospectus on file in Department of Biology (MS-Thesis students only)
- Admission to Candidacy (GS)
- Course work completed
- Written Examination
- Results of Written Examination (GS)
- 6 Hours of Thesis (BIOL 7092: Not required of non-Thesis students)
- Biology 7600 - Seminar in Biology: Public defense of thesis (Not required of non-Thesis students)
- Intent to Graduate card (GS)
- Final Oral Examination (GS)

The student is responsible for submitting the appropriate forms at the proper times and scheduling the required advisory meetings (with the approval of the major professor). Any omission or delay in satisfying requirements or submission of required materials may cause a delay in completion of the program and/or a delay in graduation. Failure to comply with program guidelines and policies may result in loss of funding and removal from the program.

CHECKLIST FOR DOCTOR OF PHILOSOPHY IN BIOLOGY

- Advisory Committee Formed (Graduate School (GS))
- Biology 8000 - Orientation to Graduate Studies
- Biology 8004 - College Biology teaching
- Biology 8200 - Seminar on dissertation research (research proposed and progress updates)
- Biology 8103 – Written submission and oral presentation of research prospectus
- Research Prospectus on file in Department of Biology
- Course work completed
- Foreign language or research tool completed
- Admission to Candidacy (GS)
- 18 Hours of dissertation
- Biology 8600 - Seminar in Biology: Public defense of dissertation (Not required of non-Thesis students)
- Intent to Graduate Card (GS)
- Evidence of a publication in an acceptable journal
- Defense of Dissertation (GS)
- Final Oral Examination

The student is responsible for submitting the appropriate forms at the proper times and scheduling the required advisory meetings (with the approval of the major professor). Any omission or delay in satisfying requirements or submission of required materials may cause a delay in completion of the program and/or a delay in graduation. Failure to comply with program guidelines and policies may result in loss of funding and removal from the program.

GRADUATE STUDIES PROGRAM INTERNET LINKS

University of Memphis Graduate School Website

<http://www.memphis.edu/gradschool/>

Department of Biology Website

<http://www.memphis.edu/biology/>

Department of Biology Graduate Faculty

http://www.memphis.edu/gradschool/graduate_faculty/departmental_listings/biol.php

University of Memphis Graduate School Admissions Form

http://www.memphis.edu/gradcatalog/acad_reg/index.php

Readmission Application

https://spectrumssb2.memphis.edu/pls/PROD/bwskalog.P_DisplLoginNon

Department of Biology Graduate Application Form

University of Memphis Graduate School Catalog Archive

<http://www.memphis.edu/gradcatalog/archive/index.php>

Change of Status

<http://www.memphis.edu/gradschool/applications/statusapp2.php>

Thesis/Dissertation Faculty Committee Form

<http://www.memphis.edu/gradschool/committee.php>

Thesis/Dissertation Proposal Defense Form

<http://www.memphis.edu/gradschool/form/tdproposal.php>

Master's Degree Candidacy Form

<http://www.memphis.edu/gradschool/grad/howmdc.php>

Doctoral Degree Candidacy Form

<http://www.memphis.edu/gradschool/grad/howddc.php>

Thesis/Dissertation Defense Results Form

<http://www.memphis.edu/gradschool/form/defense.php>

Intent to Graduate Card

<https://saweb.memphis.edu/commencement/intenttograduate/>

Cap and Gown Order Form

<http://www.memphis.edu/gradschool/form/regalia.php>