

**DEPARTMENT OF BIOLOGY**

**GRADUATE STUDIES GUIDE**

**HOWARD UNIVERSITY**

**[www.biology.howard.edu](http://www.biology.howard.edu)**

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## **GRADUATE PROGRAM**

### **Overview**

The Department of Biology offers graduate programs leading to the Master of Science and Doctor of Philosophy degrees in two major areas of concentration: 1) Cell and Molecular Biology (CMB) and 2) Ecological, Environmental and Systematic Biology (EESB). **CMB** offers specialization in cell biology, molecular biology, genetics, neurobiology, physiology, developmental biology, microbiology and bioinformatics, while **EESB** offers specialization in ecology, evolutionary biology, environmental biology, conservation biology, and organismal biology. Incoming graduate students may elect any area of their choice leading to either M.S. or Ph.D. degree; however, the Ph.D. program is the major focus of the departmental graduate program. The department also participates in the M.D./Ph.D. degree program jointly offered by the Graduate School and Howard University College of Medicine.

### **Section 1. Admission Requirements**

The departmental committee with oversight of the graduate programs, the Graduate Studies Committee, will evaluate applications to the Department of Biology. Applicants should apply for admission to the Graduate Program in Biology through application to the Graduate School of Arts and Sciences at Howard University. Students are expected to have an undergraduate background in the biological sciences or a related field. Training appropriate for admission to the Biology Graduate Program is a minimum of two years of college level biology, including a course in genetics; two years of chemistry, including Organic Chemistry; one year of mathematics, through pre-calculus; and one year of physics. Students deemed qualified but not having appropriate training may be admitted provisionally. Applicants are required to submit scores for the Graduate Record Examination (GRE). The performance of each student will be evaluated annually. Note that the criteria for admission are identical for both the Ph.D. and Master's students.

#### **Decisions on applications will be based on the following considerations:**

1. The applicant's official transcripts.
2. Three letters of recommendation, preferably from members of the academic community familiar with the applicant's academic performance.
3. Admission to the Ph.D. Program requires prior agreement of a Graduate Faculty member to act as the student's advisor in the Department. Therefore, applicants are strongly advised to contact those faculty members with whom their research interests are matching. Contact information and research interests of the Graduate Faculty are available at the departmental website ([www.biology.howard.edu](http://www.biology.howard.edu)).

Admission and residency in the graduate program in Biology are guided by the General Admission Requirements, Rules and Regulations for the Pursuit of Academic Degrees in the

Graduate School. Students are strongly encouraged to consult and familiarize themselves with these rules and regulations.

### **International Applicants**

In addition to the requirements listed above, international applicants must submit the following:

- Official transcripts, final certificates and/or mark/grade sheets must be sent directly from the college or university to the Office of Graduate Recruitment and Admissions, and must show proof of degree(s) earned, courses taken and marks/grades received. Also, ALL transcripts **must** be evaluated by World Education Services ([www.wes.org](http://www.wes.org)) or AACRAO ([www.aacrao.org](http://www.aacrao.org)) and be forwarded to Graduate Recruitment and Admissions. If the documents are not in English, an official translated copy must accompany them.
- All documents must bear the same name that appears on the admissions application unless an official document so submitted indicating a change of name.
- Test of English as a Foreign Language (TOEFL) from all applicants from countries in which English is not the official language. TOEFL Scores (Minimum computer-based score of 213 is required and only official score reports are accepted within 2 years of the test date ([www.toefl.org](http://www.toefl.org)). TOEFL scores must be sent directly from ETS (HU code: 5297).
- Statement of Financial Resources Form (<http://www.gs.howard.edu/admissions/default.html>) A completed form that verifies proof of financial support (sufficient funds to cover expenses for one full year) and supporting financial documentation indicating sources of funds while attending Howard University (such as a certified bank statement dated within three months of registration). Verification of six months history with bank.

**Provisional admission:** In exceptional cases (good grades in science subjects, research experience attested to by publication etc.), applicants deemed qualified but who have not fulfilled all admission requirements may be admitted on a provisional basis. All provisional students will be required to remedy identified weaknesses or deficiencies through appropriate course work planned in consultation with the Director of Graduate Studies, a temporary adviser and/or the Graduate Studies Committee. The performance of each student will be evaluated annually. A provisional student must earn a minimum GPA of 3.0 during the first year of full-time study. Transfer to regular status will be made by vote of the Graduate Studies Committee. The student will receive written notice of transfer to regular status.

### **Change of Program:**

**MS to Ph.D.** — Students admitted to the MS program in the Biology department are expected to complete the degree before applying to the Ph.D. program. However, in exceptional cases, the student's major advisor may recommend a program change from MS to Ph.D. for a student who demonstrates excellent performance in their academic work. The student must have completed a minimum of two semesters in residence and earned a GPA of 3.5 or above. Note that mentor's recommendation does not automatically qualify an applicant for a program change; the applicant has to apply officially through the graduate school as described above.

**Transfer from Another Department within Howard University** — Graduate students from other departments at Howard University seeking transfer to the Biology Department must complete a full application and go through the admission process as a new candidate. In addition, the applicant must submit an official release document from the original department.

### **Section 2. Research Advisor**

Prior to joining Howard University, all graduate applicants are expected to contact a prospective mentor(s) based on their research interest. The prospective mentor has to agree to accept the student in his/her laboratory when the student arrives at Howard. If the prospective mentor's laboratory is full, the graduate admissions committee may recommend the student to join another laboratory based on the student's interest. Students are encouraged to discuss their research topic with their prospective mentors, and begin developing the necessary background in specific research area. While some of these initial projects may become the thesis or dissertation topic, students are not required to remain with their initial topic or mentor.

The responsibilities of the thesis advisor is to help the students in formulating a viable and interesting research project, train them in right direction, meet with the students regularly, monitor their progress, and encourage the students to publish their work in peer reviewed journals. It is not obligatory for a thesis advisor to provide summer support but all advisors are strongly encouraged to gather external funds so that students are supported during the summer to maintain the continuity of research and training. Advising and mentoring is only a mutual agreement and not a contract. So, in the event a student wants to work with a different advisor during the course of their MS or Ph. D. work, it is within their rights to do so. However, the Director of Graduate Studies and the Chairman of Biology Department must be consulted if such change is necessary. While biology graduate students may work with an external mentor and these mentors may serve on the Ph. D. committee, but they may not serve as the major advisor for a student.

### **Section 3. Admission to candidacy**

Research is an integral part of graduate education. All M.S. and Ph. D. students are expected to be involved in research programs early in their graduate careers. Students are encouraged to begin research early in their academic career, to conduct research as they take courses, and to pursue a full-time research program during the summer months, although only limited teaching assistantships are available during summer. Masters students are required to submit for candidacy by the third semester; doctoral students by the end of the fourth semester (2nd year). Application for candidacy includes submission of a thesis research proposal for approval by the guidance committee in addition to providing the following documents:

1. An approved research proposal signed by all members of the guidance committee, the director of graduate studies, and departmental chair.
2. A candidacy application form  
(<http://www.gs.howard.edu/admissions/default.html>)
3. Documentation related to completion of qualifying examinations (see section on qualifying examination).
4. Students need to pass the written and oral qualifying examinations given by the candidates guidance committee.
5. Completion of RCR workshop and English examination
6. Completion of online CITI certification
7. Other requirements that graduate school might need in future.

### **Section 4. Evaluation of Progress and Timeline**

Students in consultation with their major advisors are required to submit a progress report each year to the Director of Graduate Studies. An approved departmental form will be circulated by the Director of Graduate Studies to the students at the end of each semester. HU graduate school regulation mandates that the Ph.D. degree should be completed within 7 years and MS degree should be completed within 5 years. Failure to complete these degrees within the specified period may result in dismissal. Also, credit for courses taken more than five years and less than seven years ago for the MS degree, or more than seven years and less than 10 years ago for the Ph.D. degree, must be restored by an examination approved by the departmental Graduate Studies Committee. For further details, students are referred to the rules and regulations of the Graduate School (<http://www.gs.howard.edu>). If for any reason this time period has to be extended, the student must petition to the Graduate School through his/her major advisor, the Director of Graduate Studies and the departmental Graduate Studies Committee. The Biology Department holds a policy to offer Graduate Teaching Assistantships (GTA) to doctoral students for up to a maximum of 5 years and on rare occasions; one additional year may be granted upon justification from the advisor. Beyond 6 years, no Ph. D candidate can receive teaching assistantship from the Biology Department. Those in the MS program can get a maximum of 3 years of financial support. The department has limited GTA positions, and is not obligated to provide assistantships to all of its students; however, priority is given to Ph. D. students.

## Section 5. Course Requirements

Requirements for Ph. D. degree in Biology

Core Courses-	12-15 credit -hours
Graduate Seminar Courses-	2 credit hours
Elective Courses	28-30 credit hours
Ph. D Dissertation	12-credit -hours
Research	13-17 credit hours
TOTAL	72 credit hours

Candidates admitted to Ph. D with a Master's Degree are allowed to transfer up to 24 credit hours of elective course credits from the previous graduate work.

Research and Dissertation students will receive either a P (pass) or S (Satisfactory) grade once the maximum allowable credit hours are fulfilled.

Requirements for M.S. degree in Biology

Core Courses	8-11 credit -hours
Graduate Seminar Courses	2 credit hours
Elective Courses	11-14 credit hours
Thesis Research	6 credit-hours max
TOTAL	30 credit hours

Research and Dissertation students will receive either a P (pass) or S (Satisfactory) grade once the maximum allowable credit hours are fulfilled.

## Section 6. Required Core Courses for the Ph. D. degree in Biology

1. All candidates for Ph.D. degree are required to take any three of the following four core courses prior to applying for candidacy:
  - (a) *Biochemistry*, 3-4 credit-hours, which can be satisfied by any of the following options:
    - i. *Biochemistry*, 222-101, 4 credit hours or
    - ii. *Biochemistry*, 205-251 and 205-252, 3-credit hours each
  - (b) *Molecular Biology of the Cell*, 280-532, 4 credit hours
  - (c) *Ecological and Environmental Biology*, 280-533, 4 credit hours
  - (d) *Evolutionary and Systematic Biology*, 280-534, 4 credit-hours

2. Graduate Seminar: Two semesters courses of *Graduate Seminar* are required including:
  - (a) *Graduate Seminar*, 280-500, 1 credit hour
  - (b) *Graduate Seminar*, 280-501, 1 credit hour
3. Electives: Addition elective courses as recommended by the student's Guidance Committee.

### **Section 7. Required Core Courses for the M.S. degree in Biology**

1. The required core courses for the M.S. degree are one course in each of two pairs of courses:
  - (1) *Biochemistry*, 4-7 credit-hours (for the Biochemistry options, see note 1a)  
or  
*Molecular Biology of the Cell*, 280-532, 4 credit hours,
  - and
  - (2) *Ecological and Environmental Biology*, 280-533, 4 credit hours,  
or  
*Evolutionary and Systematic Biology*, 280-534, 4 credit hours.
2. Graduate Seminar: Two semesters courses of *Graduate Seminar* are required including:
  - (a) *Graduate Seminar*, 280-500, 1 credit hour
  - (b) *Graduate Seminar*, 280-501, 1 credit hour

In addition, seminars and meetings play an important role in the dissemination of knowledge, particularly of material prior to publication and in the defense of their research proposals. Graduate students are required to attend the departmental seminars. They are also encouraged to attend seminars in other departments on campus, as well as those at other institutions throughout the metropolitan area. Students should consider attending meetings of scientific societies, particularly those related to their research interest.

### **III. Requirements for completion of Ph. D. degree in biology**

The degree of Doctor of Philosophy will be awarded upon the student's demonstration of mastery of certain fields of knowledge, ability to conduct independent research, and ability to organize research into an acceptable dissertation that represents a significant contribution to the student's field of study. The specific requirements in addition to those listed in the GSAS document, *Rules and Regulation for the Pursuit of Academic Degrees* are:

1. A minimum of seventy-two (72) semester hours of graduate work, inclusive of the dissertation, thirty-six (36) of which must be earned within the Biology Department;
2. An approved Program of Study including all such courses and requirements specified by the Graduate Faculty;

3. Successful completion of Qualifying Examinations (see below);
4. Submission of an approved Dissertation Proposal;
5. Completion of any other requirements of the Graduate School (at present, successful completion of the Graduate Expository Writing Examination is required) and RCR workshop;
6. Admission to candidacy, requiring;
  - a) A minimum of four semesters of research; and
  - b) A minimum GPA of 3.0 or higher with no more than two C's in the transcript.
7. Successful defense of the Dissertation.

#### **IV. Requirements for completion of the M. S. degree in Biology**

The degree of Master of Science will be awarded upon the student's demonstration of mastery of certain fields of knowledge and the completion of a formal thesis. The specific requirements in addition to those listed in the *Graduate School Rules and Regulations for the Pursuit of Academic degrees* are:

1. A minimum of thirty (30) semester hours of graduate work, inclusive of the thesis, fifteen (15) of which must be earned within the Biology Department.
2. An approved Program of Study including all such courses and requirements specified by the Graduate Faculty;
3. Successful completion of Qualifying Examinations (see below)'
4. Completion of any other requirements of the Graduate School (at present, successful completion of the Graduate Expository Writing Examination is required); and RCR workshop.
5. A minimum GPA of 3.0 with no more than 2 C's in the transcript
6. Successful defense of Thesis.

#### **V. Requirements for Qualifying Examinations**

The Qualifying Examinations are comprised of two parts, oral and written, and are comprehensive in nature. The Biology Department does not conduct one qualifying examination for all graduate students. The student's own Guidance Committee is in the best position to determine the specific content of these examinations. Accordingly, Graduate

Qualifying Examinations (M.S. and Ph.D. levels) will be administered by the Guidance Committee members with the major advisor serving as the coordinator. The examination should stress the student's ability to integrate and analyze information. Otherwise, the members of the Guidance Committee shall decide the exact format and content of each examination. The examination will be scheduled at the convenience of the student and his/her Committee. This examination should be taken in the first two years in residence for the Ph.D. and the first year in residence for the M.S. If a student fails any part of the examination, he/she must take that part of the examination again. A student who fails his/her Qualifying Examination twice will be dropped from the program.

## **VI. PROGRAM ADMINISTRATION**

### **A. Graduate Studies Committee**

The Graduate Studies Committee shall consist of all members of the Graduate Faculty of the Department and a student representative. The student representative shall have voting privileges and may be involved in all Committee matters except where access to student records is required. The Chairman of the Committee is the Director of Graduate Studies and is appointed by the Chairman of the Biology Department and approved by the Dean of the Graduate School.

A graduate student may consult the Committee at any time on matters concerning his/her graduate program or on problems involving student-professor relationships. First the student should petition the Director of Graduate Studies and the Department Chair who will present his/her case to the Committee.

The Committee shall be responsible for recommending candidates for admission, providing information to the Student Evaluation Committee regarding recommendations for Departmental Graduate Assistantships, providing programs of study, overseeing student progress towards the degree, and recommending students for candidacy.

### **B. Guidance Committee**

The responsibilities of the Guidance Committee are to set up individual programs of study, guide and assist in research where appropriate, approve dissertation proposals and serve as thesis and dissertation examiners.

The Guidance Committee shall consist of four members: The student's Major Adviser and three other faculty members. One member may be selected from "outside" the department. This committee member will be expected to interact both with the student and other members of the Guidance Committee. This individual may be drawn from another department, the consortium, another university, or an off-campus institute. This individual may not serve as the Outside Examiner during the thesis or dissertation defense. A resume of the "outside" member should be available and he/she should meet the qualifications to be a graduate faculty member at Howard.

A student may be permitted to conduct M.S./Ph.D. dissertation research under the guidance of a Research Advisor. This research advisor must meet the qualifications of graduate

faculty, have an active and funded research program, and collaborate with the academic (major) advisor. Both advisors, student and guidance committee are expected to meet frequently to assess progress of the student.

### **C. Examination Committee**

The Examination Committee shall consist of the four member Guidance Committee plus an additional member drawn from “outside” the university. This individual should not have interacted with the Guidance Committee or the student in any substantive capacity. S/he may be drawn from the consortium, another university, or an off-campus institute, must submit a curriculum vita, must meet the qualifications to be a graduate faculty member at Howard, and must receive approval from the Graduate School to serve on the Examination Committee.