

## I. Admission Requirements

### A. Courses

1. General Biology with laboratory (1 term required, 2 recommended)
2. Genetics
3. A course in Plant Biology (e.g. Botany, Physiology, or Ecology)
4. General Chemistry with laboratory (2 terms required)
5. Organic Chemistry (1 term required, 2 recommended)
6. Calculus (1 term required, 2 recommended)
7. Physics (1 term required, 2 recommended)

- B. Lack of an admission requirement may be made up without credit early in a graduate student's curriculum. In certain cases, course requirements can be modified or waived. The Graduate Record Examination (Verbal, Quantitative and Analytic) is required for admission. A Graduate Record Examination Advanced Test in an appropriate subject such as Biology, Biochemistry, or Cell & Molecular Biology, is strongly recommended.

## II. Degrees Offered

1. Master of Science (M.S.)
  - a. M.S. with thesis.
  - b. M.S. without thesis (usually terminal in this program)
2. Master of Philosophy (M. Phil.)
3. Doctor of Philosophy (Ph.D.)

## III. Degree Requirements

### A. Minimum Number of Credits

1. Courses (400 level or higher)
  - a. M.S. with thesis - 26 (including up to 3 credits of lab rotation)
  - b. M.S. without thesis - 31
  - c. Ph.D. - 32 (including up to 6 credits of lab rotation)
2. Research
  - a. M.S. with thesis - 6
  - b. M.S. without thesis - topic research and presentation of one paper - 1
  - c. Ph.D. - 34
3. The total minimum number of credits for the Ph.D. is 72. The maximum number of credits of C or C + is 6. The rest of the credits must be B or better.
4. The minimum cumulative average for graduation is 3.0 (B) for all courses taken at Rutgers University after admission into the Plant Biology program as a matriculated student. A student may elect to include grades in 400 and 500 level courses taken at Rutgers while a non-matriculated student in his/her official cumulative average.
5. A student who receives a term average below 3.0 or whose cumulative average falls below 3.0 will be placed on academic probation for the next term. A student who is on academic probation for two consecutive semesters can be expelled from the Plant Biology Graduate Program.

### B. Undergraduate Courses

1. Only 400 level courses are allowed
2. 12 credits maximum for either M.S. or Ph.D.

### C. Transfer Credits

1. 8 course credits maximum for M.S. (Maximum 8 non-matriculated)
2. 21 course credits maximum for Ph.D. (Maximum 12 non-matriculated)
3. Courses taken in fulfillment of undergraduate requirements may not be transferred

Transfer of credits toward completion of the M.S. degree is done following the first committee meeting; transfer of credits toward the Ph.D. degree is done following passage of the oral qualifying examination.

#### D. Subject Matter

1. Four curriculum tracks are offered:
  - a. Horticulture and Plant Technology
  - b. Molecular and Cellular Biology
  - c. Organismic and Population Biology
  - d. Plant Pathology
  
2. Core curriculum for all students in the program includes a course from each of the four tracks. Currently, required courses are: Plant Physiology (16:765:502); Plant Molecular Biology (16:765:513); Angiosperm Diversity (16:765:512); Principles of Plant Pathology (16:765:531) and Introduction to Plant Biology (16:765:501). Program faculty affiliated with each track will develop an appropriate track curriculum. Other course requirements for a given student will be determined by the student's advisor and advisory committee, in consultation with the coordinator of the student's chosen curricular track.

The track coordinator should serve as a resource for helping students and committees select proper courses. As such, the track coordinator should be aware of courses scheduled to be taught through this program and through related programs.

(Students should consult their track coordinator before registering for classes. All current students are required to register for the coming semester by the early registration deadline printed in the appropriate Schedule of Classes.)

#### E. Other Requirements

1. Residence: M.S., none. Ph.D., one year minimum.
2. Teaching: At least one term recommended for the Ph.D.
3. Language: None required, at least one recommended.
4. Other: Graduate committees may add requirements as appropriate.

#### F. Graduate Committees

1. M.S.: 3 members minimum, at least 2 from this program, no outside member required.
2. Ph.D.: 4 members minimum, at least 3 from this program, 1 must be from outside this program.

#### G. Qualifying Examination

1. The **written** qualifying examination is comprehensive and focuses on the basics of Plant Biology with emphasis on the core courses described in section III D2. It will be administered by the Qualifying Exam Committee at the end of the second year of a student's entry into the Ph.D. program. Students enrolling in the program during a given Fall semester will take the written qualifying exam as a group. If a student fails a section of the written exam but passes other sections, he or she may, at the discretion of the Examination Committee and Program Director, be permitted to retake the failed section of the exam.
  
2. The **oral** qualifying examination must be taken after the written qualifying examination has been passed in its entirety. The oral exam is comprehensive and focuses on the academic track area and all courses to be transferred for credit towards the course requirement. The oral qualifying exam will include a description of the student's proposed dissertation research, which normally constitutes the first part of the exam meeting, and critical examination and discussion of the research proposal.

#### IV. Graduate Committee Meetings

- A. The student must bring copies of the following items for each committee member to all meetings of the graduate committee:
  1. A brief curriculum vitae summarizing education, experience, publications, etc.
  2. A list of science and math courses taken, listing institutions and grades received.

It is the student's responsibility to identify an appropriate advisory committee. This should be done in consultation with the student's thesis or dissertation advisor and/or track coordinator as early as possible in the degree program.

M.S. - 3 committee members required (minimum). 2 must be members of the Plant Biology faculty.

Ph.D. - 4 committee members required (minimum). 3 must be members of the Plant Biology faculty. 1 **non**-Plant Biology faculty member required.

#### B. M.S. with Thesis

1. Meeting 1: It is recommended that this be held no later than the end of the student's second semester of matriculation. It must be held within 13 months of matriculation. Its purpose is to determine the student's program for the degree, including approval of any courses for which transfer of credit is sought, and to discuss the proposed research problem. The student should have prepared and distributed to the committee members before the meeting a rather detailed proposal covering background for the projected research, with pertinent bibliography and details of the experimental procedures to be employed.
2. Meeting 2: Final oral examination.
  - a. Presentation of the research will be in seminar form, approximately 40-45 minutes long, advertised on bulletin boards and by e-mail a week in advance by the student, and open to the public. Arrangements for the seminar and examination rooms should be done through the program office at least a month in advance of the proposed defense.
  - b. Discussion of research will proceed in greater depth after the audience has been dismissed and only the committee remains.
  - c. Questions on any topic concerning Plant Biology. Exam time will be divided about evenly between the research and general subject matter.
  - d. This exam cannot take place before the thesis has been written, and read by all members of the committee. It must be taken before the particular deadline date set by the Graduate School for the awarding of a May, October, or January degree.

A master's thesis in this program generally includes a body of research that is publishable as a paper in a refereed scientific journal. Such a paper in itself generally does not constitute a thesis. The thesis usually provides more detail in terms of methodology, a more extensive literature review and introduction, a broader discussion of results, and conclusions that may point to future research.

#### C. M.S. without thesis

1. Meeting 1: Must be held by the end of the student's second semester of matriculation, or as soon as possible after a student has chosen this degree option. Its purpose is to determine the student's program for the degree, including approval of any courses being transferred for credit, and to discuss the subject of the paper to be written. Student should have prepared a brief outline of the general topic to be covered and distributed it to the committee members in advance of the meeting.
2. Meeting 2: Final oral examination (Paper "Defense").
  - a. Brief presentation of paper topic, 30 min. maximum. Discussion of paper. Questions on any topic concerning Plant Biology. Exam time will emphasize the general subject matter.
  - b. This exam cannot take place before the paper has been written, read and approved by all members of the committee. It must be taken before the particular deadline date set by the Graduate School for the awarding of a May, October or January degree.

The non-thesis master's paper generally represents a thorough review of a subject area of particular interest to a student. It may include results of research performed by the student, but deemed insufficient for submission as a master's thesis.

#### D. Ph.D.

1. Meeting 1: It is recommended that this be held no later than the end of the student's second semester of matriculation. It must be held within 13 months of matriculation. Its purpose is to determine the student's program for the degree, including discussion and preliminary approval of any courses for which transfer of credit is sought, and discussion of the proposed research problem.
2. Meeting 2: Oral qualifying examination. Must be taken after a student has completed most of the course requirements, and after the written qualifying examination. It must be taken by the end of the third year, and should be at least one year before the degree is to be awarded. This meeting includes, but is not limited to defense of the dissertation proposal. Academic and research requirements for the degree should be defined at this meeting.
3. Meeting 3: Finalizing dissertation requirements. Although a formal meeting is not required, it is suggested that a student meet with committee members before the writing process begins to ensure that all research expectations of individual committee members have been met, and dissertation format approved. This can often be done most easily in the context of a 30-45 minute meeting.
4. Meeting 4: Final oral examination (Dissertation Defense).
  - a. Presentation of the research will be in seminar form, 40-50 min. long, advertised on bulletin boards and by e-mail a week in advance and open to the public. Arrangements for the seminar and examination rooms should be done through the program office at least a month in advance of the proposed defense.
  - b. Discussion of research: the formal presentation will be open to questions from anyone in attendance. After the audience has been dismissed and only the committee remains, questions on the research and on topics related to the research may be continued.
  - c. This exam cannot take place before the dissertation has been written, read and approved by all members of the committee. It must be taken before the particular deadline date set by the Graduate School for the awarding of a May, October or January degree. The usual procedure is to have the dissertation read and edited at least once by the primary advisor, respond to those editorial comments, and distribute the dissertation to the rest of the committee.

#### E. M.S. and Ph.D.

1. Continuation to the Ph.D. following completion of the M.S. is not automatic. Admission to the Ph.D. program must be approved by the Admissions Committee of the Plant Biology Program. The exam committee should be informed before the exam commences so that the committee can help judge whether the student should be admitted to the Ph.D. program. Following the exam, the committee chair should write a short letter of evaluation, recommend the student for continuation into the Ph.D. program if appropriate.

Dissertations must be written in compliance with the rules of the Graduate School of New Brunswick, Rutgers, the State University of New Jersey.

#### V. Seminars

- A. There are two weekly seminar series at times determined at the start of each semester. One series will be primarily for presentations by invited speakers and faculty, the other will be primarily for student presentations.
- B. At least one course credit of "Seminar in Plant Biology" is required for the M.S. degree, and at least two credits for the Ph.D. degree (1 pre-qualifying, 1 post-qualifying). All full-time students and those part-time students who can attend are expected to do so regularly for each semester of matriculation. Credit in the seminar course requires presentation of a seminar to the program. Thesis or dissertation defense seminars do not constitute seminars for course credit. In some circumstances, a student's research may be included as a component of a seminar for course credit, but it is not intended that these seminars be personal research presentations. Approval of seminar topic is by the faculty member in charge of the seminar series.

#### VI. Forms and Fees

- A. These are the student's responsibility entirely.

B. The regulations of the Graduate School must be followed. Graduate School or University requirements always supersede Graduate Program requirements. Since the Graduate School regulations change from time to time, it is important that the student keep informed and up-to-date by consulting the graduate catalogue and the Graduate School Office. All forms are obtained from the Plant Biology Office. One copy is returned to the Plant Biology Office. The original is taken to the Graduate School Office, College Avenue Campus.

C. M.S.

1. After the first committee meeting: if credits are to be transferred, obtain forms for transfer of credit, fill in, get appropriate transcript, have signed by Graduate Director, return one copy to the Plant Biology Office, turn in three copies to the Graduate School.
2. Semester in which degree is to be awarded:
  - a. Early in semester: obtain M.S. candidacy form, fill out, have signed by Graduate Director, return copy to Plant Biology Office. File original with the Graduate School, College Avenue Campus. This admits student to candidacy for M.S. when approved. Obtain booklet giving instructions for preparation of thesis. File diploma application and pay graduation fee before deadline date set by Graduate School (approximately mid-semester).
  - b. Prior to final exam, pick up form submitted earlier at Graduate School. Upon completion of exam have form signed by committee members, file copy with Plant Biology Office, return original to Graduate School immediately (3 weeks before Graduate School deadline date).
  - c. Turn in two copies of thesis, prepared according to instructions in the Graduate School "Style Guide" booklet, by deadline date set by Graduate School. The copies must be signed by all committee members (3 weeks before Graduate School deadline date). File abstract and title page with the Graduate Plant Biology Office.

D. Ph.D.

1. Prior to oral qualifying exam: obtain Ph.D. candidacy form, fill out, have available at exam to be signed by committee members, have signed by the Graduate Program Director, return copy to Plant Biology Office, file original with the Graduate School. This admits student to candidacy for Ph.D. when approved.
2. If credits are to be transferred, obtain form for transfer of credit, fill in, get appropriate transcript(s), have signed by Graduate Director, return to Plant Biology Program Office for processing.
3. Semester in which degree is to be awarded:
  - a. Early in semester: Obtain booklet giving instructions for preparation of dissertation.
  - b. File diploma application and pay graduation and dissertation microfilming fees before deadline date set by Graduate School (approximately mid-semester).
  - c. Prior to final exam: pick up candidacy form submitted after qualifying exam, have signed by committee at time of exam, file copy with Plant Biology Office, return original to Graduate School immediately (3 weeks before Graduate School deadline date).
  - d. Turn in two copies of dissertation, prepared according to instructions in the "Style Guide" booklet provided by the Graduate School, by deadline date set by Graduate School. The copies must be signed by all committee members (at least 3 weeks before Graduate School deadline date). File abstract and title page with the Plant Biology Graduate Program Office.

VII. Time Requirements

A. Time Limits for Completion of Degrees

1. M.S. - 3 years full-time or 5 years part-time
2. Ph.D. - 7 years

- B. A student requesting an extension of time must petition the Executive Council of the Graduate School on a form available from the Graduate School Office.

#### VIII. Assistantships and Fellowships

When possible, a combination of fellowship, research assistantship, and teaching assistantship funding should be sought to support a student through graduate school. Ideally, every Ph.D. student will serve for at least one year as a teaching assistant.

- A. Teaching and Graduate Research Assistantship appointments are for one year only (normally the academic or calendar year; rarely one semester).
- B. Renewal of an appointment is possible but not automatic. New applications must be submitted each year. Renewal depends upon:
  - 1. Availability of assistantship positions.
  - 2. Satisfactory performance academically.
  - 3. Satisfactory performance as an assistant.
  - 4. Number of previous assistantship appointments held; the maximum number of years for which a student will normally be supported is the following:
    - a. Entering with B.S.: to M.S. - 3 years
    - b. Entering with M.S.: to Ph.D. - 4 years
    - c. Entering with B.S.: to Ph.D. - 6 years
- C. Teaching Assistantships serve to train students in this important component of their future professions and to fulfill the needs of the University. They are not intended to serve as the sole source of funding for a student through the Ph.D. Except in unusual circumstances, a student will be limited to two years of funding through teaching assistantships. Applications for new or renewed teaching assistantships should be acquired through the program office and returned in January for consideration of a Fall assistantship.
- D. The time limits are to ensure regular and reasonable turnover in the graduate student body. There is no guarantee that a student will be supported until a degree has been completed.
- E. A small number of fellowships are available and may be awarded to the most outstanding students and applicants.

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