Biochemistry, Molecular Biology, Entomology, and Plant Pathology

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The department offers graduate study leading to the following degrees:

- Master of Science in Agricultural Life Sciences with a concentration in Biochemistry, Entomology, or Plant Pathology
- Master of Agriculture in Agriculture with a concentration in Entomology or Plant Pathology
- Doctor of Philosophy in Molecular Biology
- Doctor of Philosophy in Life Sciences with a concentration in Biochemistry, Entomology, or Plant Pathology

The department also participates in interdisciplinary programs leading to the following degrees:

- Master of Science in Agricultural Life Sciences with a concentration in Animal Physiology or Genetics
- Master of Science in Agriculture with a concentration in Animal Nutrition
- Doctor of Philosophy in Life Sciences with concentrations in Animal Physiology or Genetics
- Doctor of Philosophy in Agricultural Sciences with a concentration in Animal Nutrition

Admission Criteria

Prerequisites for admission include a bachelor's or master's degree in a physical or life science with a strong background in the program discipline of interest (biochemistry, molecular biology, entomology, or plant pathology). A graduate screening committee, composed of members of the Biochemistry, Molecular Biology, Entomology, and Plant Pathology faculty, screens all applicants. Final acceptance into a graduate program is contingent upon the availability of a suitable major professor. A minimum 2.75 overall grade point average on a 4.00 scale is required for admission. Test scores from the Graduate Record Examination (GRE) are **not** a required component of a completed application, but may be submitted for consideration if a candidate feels they may help offset another component of the application, such as a low GPA. International students are required to have a TOEFL (Test of English as a Foreign Language) score of 500 PBT (61 iBT) or an IELTS (International English Language Testing Systems) score of 5.5 (non-English speaking international students).

Provisional Admission

An applicant who has not fully met the GPA requirement stipulated by the University may be admitted on a provisional basis. The provisionally-admitted student is eligible for a change to regular status after receiving a 3.00 GPA on the first 9 hours of graduate courses at Mississippi State University (with no grade lower than a C). The first 9 hours of graduate courses must be within the student's program of study. Courses with an S grade, transfer credits, or credits earned while in Unclassified status cannot be used to satisfy this requirement. If a 3.00 is not attained, the provisional student **shall** be dismissed from the graduate program. Academic departments may set higher standards for students to fulfill provisional requirements; a student admitted with provisional status should contact the graduate coordinator for the program's specific requirements. **While in the provisional status, a student is not eligible to hold a graduate assistantship.**

Academic Performance

Maintenance of an overall GPA of 3.00 or greater is expected for students enrolled in M.S. or Ph.D. programs in the department. The student is allowed only two Cs. Any third C or the first grade below C (a D or F) is grounds for dismissal.

Approved "Programs of Study" are provided below. Students should develop programs of study with their major professor and graduate committee as Graduate Coordinator consent. If substitutions are made for required courses, these must be documented on the program of study form.

Master of Science in Agricultural Life Sciences with Biochemistry Concentration - Thesis

BCH 6603	General Biochemistry I (prerequisite)	3
BCH 6613	General Biochemistry II (prerequisite)	3
BCH 6414	Protein Methods	4

BCH 6804	Molecular Biology Methods [1]	4
BCH 8654	Intermediary Metabolism [1]	4
BCH 8101	Seminar [2]	2
Graduate-level coursework		4
BCH 8000		6
Total Hours		**30**

1 Students completing the split-level BCH core courses at MSU at the 4000-level are exempt from these classes and other approved courses will be substituted in consultation with the major professor and the student's graduate committee, and a final oral examination.

2 All students are required to present two seminars; the first usually in the second semester in residence (e.g., proposal topic) and one on the final research results.

At least 12 hours of coursework must be taken at the 8000 level.

Master of Science in Agricultural Life Sciences with Biochemistry Concentration - Non-Thesis

BCH 6603	General Biochemistry I (prerequisite)	3
BCH 6613	General Biochemistry II (prerequisite)	3
BCH 6414	Protein Methods	4
BCH 6804	Molecular Biology Methods [1]	4
BCH 8654	Intermediary Metabolism [1]	4
BCH 8101	Seminar [2]	2
Graduate-level coursework		10
BCH 7000	Directed Individual Study in Biochemistry, Molecular Biology, Entomology and Plant Pathology [3]	3
Total Hours		**33**

1 Students completing the split-level BCH core courses at MSU at the 4000-level are exempt from these classes and other approved courses will be substituted in consultation with the major professor and the student's graduate committee, and a final oral examination.

2 All students are required to present two seminars; the first usually in the second semester in residence (e.g., proposal topic) and one on the final research project.

3 The research paper will be the equivalent of a research literature review and will be reviewed by the student's committee.

At least 15 hours of coursework must be taken at the 8000 level.

Master of Science in Agricultural Life Sciences with Entomology or Plant Pathology Concentration - Thesis

Coursework at 8000-level or higher		12
Other graduate-level coursework		10
EPP 8111	Seminar	1
EPP 8121	Seminar	1
EPP 8000		6
Total Hours		**30**

Master of Agriculture in Agriculture with Entomology Concentration - Non-Thesis

Graduate Seminar	2
(EPP 8111, EPP 8121, or BCH 8101)	
Directed Individual Study	6
(EPP 7000 or BCH 7000)	
Graduate-level coursework at the 8000 level or higher	12
Other graduate-level coursework	10
Total Hours	**30**

Students are required to complete 30 hours of coursework as approved by his/her graduate committee. Some Directed Individual Study courses, numbered at the 7000 level, may be approved to meet the 8000-level course requirement. Students will also have to complete a scholarly activity, participate in research projects, and develop a scholarly document focused on subject area.

Master of Agriculture in Agriculture with Plant Pathology Concentration - Non-Thesis

Graduate Seminar	2
(EPP 8111, EPP 8121, or BCH 8101)	
Directed Individual Study	6
(EPP 7000 or BCH 7000)	
Graduate-level coursework at the 8000 level or higher	12
Other graduate-level coursework	10
Total Hours	**30**

Students are required to complete 30 hours of coursework as approved by his/her graduate committee. Some Directed Individual Study courses, numbered at the 7000 level, may be approved to meet the 8000-level course requirement. Students will also have to complete a scholarly activity, participate in research projects, and develop a scholarly document focused on subject area.

Doctor of Philosophy in Life Sciences with Biochemistry Concentration

Baccalaureate Degree to Ph.D.

BCH 6603	General Biochemistry I (prerequisite)	3
BCH 6613	General Biochemistry II (prerequisite)	3
Select one of the following:		3-4
BCH 6414	Protein Methods	
BCH 6623	Integrative Metabolic and Medical Biochemistry	
BCH 8633	Enzymes	
BCH 8654	Intermediary Metabolism [1]	4
or BCH 6804	Molecular Biology Methods	
BCH 8101	Seminar [2]	2
BCH 9000	Research in Biochemistry,Molecular Biology, Entomology, and Plant Pathology	20
Enrichment courses [3]		12
Additional graduate-level courses		12-13
Total Hours		**60**

1. Or equivalent BCH or Life Science-related coursework; students completing the split-level BCH core courses at MSU at the 4000-level are exempt from these classes, and other approved courses will be substituted in consultation with the major professor and the student's graduate committee.
2. The first formal seminar should be within the first 1.5 years the student is in residence. The final seminar will be a presentation of the final research results of the student.
3. It is recommended that the doctoral program include enrichment courses to be approved by the graduate committee. The enrichment program would consist of 12 course credits or equivalent special projects or directed individual study related to the specific interests and needs of the student.

This program requires a minimum of 40 credit hours of coursework and at least 20 research hours above the baccalaureate degree (60 hours total) for students entering with only a baccalaureate degree.

Doctor of Philosophy in Life Sciences with Biochemistry Concentration

Master of Science Degree to Ph.D.

BCH 6603	General Biochemistry I (prerequisite)	3
BCH 6613	General Biochemistry II (prerequisite)	3
Select one of the following:		3-4
BCH 6414	Protein Methods	
BCH 6623	Integrative Metabolic and Medical Biochemistry	
BCH 8633	Enzymes	
BCH 8654	Intermediary Metabolism [1]	4

or BCH 6804	Molecular Biology Methods	
BCH 8101	Seminar [2]	2
BCH 9000	Research in Biochemistry,Molecular Biology, Entomology, and Plant Pathology	20
Enrichment courses [3]		12
Total Hours		**47**

1. Or equivalent BCH or Life Science-related coursework; students completing the split-level BCH core courses at MSU at the 4000-level are exempt from these classes, and other approved courses will be substituted in consultation with the major professor and the student's graduate committee.
2. The first formal seminar should be within the first 1.5 years the student is in residence. The final seminar will be a presentation of the final research results of the student.
3. It is recommended that the doctoral program include enrichment courses to be approved by the graduate committee. The enrichment program would consist of 12 course credits or equivalent special projects or directed individual study related to the specific interests and needs of the student.

Students entering the program with an M.S. degree have a required minimum of 40 hours past that degree utilizing a combination of coursework and research hours (with a minimum of 20 hours of research/dissertation).

Doctor of Philosophy in Molecular Biology

Baccalaureate Degree to Ph.D.

BCH 6603	General Biochemistry I (prerequisite) [1]	3
BCH 6613	General Biochemistry II (prerequisite) [1]	3
Select one of the following: [2]		3-4
BCH 6414	Protein Methods	
BCH 6713	Molecular Biology	
BCH 8643	Molecular Genetics	
BCH 8654	Intermediary Metabolism [2]	4
BCH 8101	Seminar [3]	2
BCH 9000	Research in Biochemistry,Molecular Biology, Entomology, and Plant Pathology	30
Enrichment Courses [4]		12
Total Hours		**57-58**

1. Or equivalent.
2. Or equivalent BCH or Life Science-related coursework; students completing the split-level BCH core courses at MSU at the 4000-level are exempt from these classes, and other approved courses would be substituted in consultation with the major professor and the student's graduate committee.
3. The first formal seminar should be within the first 1.5 years the student is in residence. The final seminar will be a presentation of the final research results of the student.
4. It is recommended that the doctoral program include enrichment courses to be approved by the graduate committee. The enrichment program would consist of 12 course credits or equivalent special projects or directed individual study related to the specific interests and needs of the student. Such enrichment courses or technical proficiencies could include (but are not limited to) statistics, biocomputing, electron microscopy, plant transformation, tissue culture, production of monoclonal antibodies, etc.

The Molecular Biology Ph.D. degree is primarily a research degree. However, a minimum of 30-40 hours of coursework and 30 hours of research beyond the B.S. degree are required. A student entering the program with a master's degree will be required to take 30-40 hours past that degree. The courses shall come from the offerings of the department and from supporting programs. If the student desires a specific minor, 12 hours should be in that field. The selection of courses is left to the student in consultation with the major professor and graduate committee.

The student's Ph.D. graduate committee will consist of a total of at least five members with at least three of these members from the department faculty. The student will submit a research proposal to the committee. No time limit is imposed, but it is suggested that the proposal be submitted within the first 1.5 years. The student will have yearly reviews with the graduate committee. The student is expected to produce publishable research.

The student must pass written and oral preliminary examinations dealing with his/her program of study. A student not passing the preliminary exams on a second attempt will be given the option of completing the research required for an M.S. (provided the coursework is also adequate). The student must pass a final oral defense of the dissertation upon completion of the research program.

Doctor of Philosophy in Molecular Biology

Master of Science Degree to Ph.D.

A student entering the program with a master's degree will be required to take 30-40 hours past that degree. The courses shall come from the offerings of the department and from supporting programs. If the student desires a specific minor, 12 hours should be in that field. The selection of courses is left to the student in consultation with the major professor and graduate committee.

The student must pass written and oral preliminary examinations dealing with his/her program of study. A student not passing the preliminary exams on a second attempt will be given the option of completing the research required for an M.S. (provided the coursework is also adequate). The student must pass a final oral defense of the dissertation upon completion of the research program.

Doctor of Philosophy in Life Sciences with Entomology Concentration

EPP 8111	Seminar	1
EPP 8121	Seminar	1
Enrichment courses [1]		12
Additional graduate-level coursework		46
Total Hours		**60**

[1] It is recommended that the doctoral program include enrichment courses to be approved by the graduate committee. The enrichment program would consist of 12 course credits or equivalent special projects or study areas related to the specific interests and needs of the student.

This program requires 60 credit hours of coursework above the baccalaureate degree.

The student's Ph.D. graduate committee will consist of a total of at least five members with at least three of these members from the department faculty. The student will submit a research proposal to the committee.

The student must pass written and oral preliminary examinations dealing with his/her program of study. A student not passing the preliminary exams on a second attempt will be given the option of completing the research required for an M.S. (provided the coursework is also adequate). The student must pass a final oral defense of the dissertation upon completion of the research program.

Doctor of Philosophy in Life Sciences with Plant Pathology Concentration

EPP 8111	Seminar	1
EPP 8121	Seminar	1
Enrichment courses [1]		12
Additional graduate-level coursework		46
Total Hours		**60**

[1] It is recommended that the doctoral program include enrichment courses to be approved by the graduate committee. The enrichment program would consist of 12 course credits or equivalent special projects or study areas related to the specific interests and needs of the student.

This program requires 60 credit hours of coursework above the baccalaureate degree.

The student's Ph.D. graduate committee will consist of a total of at least five members with at least three of these members from the department faculty. The student will submit a research proposal to the committee.

The student must pass written and oral preliminary examinations dealing with his/her program of study. A student not passing the preliminary exams on a second attempt will be given the option of completing the research required for an M.S. (provided the coursework is also adequate). The student must pass a final oral defense of the dissertation upon completion of the research program.