Biochemistry, Molecular Biology, Entomology, and Plant Physiology

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The department offers graduate study leading to the Master of Science in Agricultural Life Sciences with a concentration in Biochemistry, Entomology, or Plant Pathology; the Doctor of Philosophy in Molecular Biology; the 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 Master of Science in Agricultural Life Sciences with a concentration in Animal Physiology or Genetics;
- the Master of Science in Agriculture with a concentration in Animal Nutrition;
- the Doctor of Philosophy in Life Sciences with concentrations in Animal Physiology or Genetics;
- the 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. The GRE general test is required. International students are required to have a TOEFL (Test of English as a Foreign Language) score of 500 PBT (173 CBT or 61 iBT) or an IELTS (International English Language Testing Systems) score of 5.5 (non-English speaking international students).

Provisional Admission

A student who has not fully met the requirements stipulated by the University and the appropriate department for admission to graduate study may be granted admission as a degree-seeking graduate student with provisional status. Such students must have as their initial objective advancement to regular status. A provisional student must receive a 3.00 GPA on the first 9 hours of graduate-level courses on their programs of study taken at Mississippi State University in order to achieve regular status. 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 may be dismissed from graduate study.

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.

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

BCH 6603	General Biochemistry (prerequisite)	3
BCH 6613	General Biochemistry (prerequisite)	3
BCH 6414	Protein Methods	4
BCH 6804	Molecular Biology Methods [1]	4
BCH 8654	Intermediary Metabolism [1]	4
Graduate-level coursework		6
BCH 8101	Seminar [2]	2
BCH 8000	Thesis Research/ Thesis in Biochemistry, Molecular Biology, Entomology and Plant Pathology	6
Total Hours		32

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 (prerequisite)	3
BCH 6613	General Biochemistry (prerequisite)	3
BCH 6414	Protein Methods	4
BCH 6804	Molecular Biology Methods [1]	4
BCH 8654	Intermediary Metabolism [1]	4
Graduate-level coursework		12
BCH 8101	Seminar [2]	2
BCH 7000	Directed Individual Study in Biochemistry, Molecular Biology, Entomology and Plant Pathology [3]	3
Total Hours		35

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

Coursework at 8000-level or higher		12
Other graduate-level coursework		4
EPP 8111	Seminar	1
EPP 8121	Seminar	1
EPP 8000	Thesis Research/ Thesis in Entomology and Plant Pathology	6
Total Hours		24

Doctor of Philosophy in Life Sciences with Biochemistry Concentration

Baccalaureate Degree to Ph.D.

BCH 6603	General Biochemistry (prerequisite)	3
BCH 6613	General Biochemistry (prerequisite)	3
Select one of the following:		3-4
BCH 6414	Protein Methods	
BCH 6623	Biochemistry of Specialized Tissues	
BCH 8633	Enzymes	
BCH 8654	Intermediary Metabolism [1]	4
or BCH 6804	Molecular Biology Methods	
BCH 8101	Seminar [2]	2
BCH 9000	Dissertation Research/ Dissertation 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 (prerequisite)	3
BCH 6613	General Biochemistry (prerequisite)	3
Select one of the following:		3-4
BCH 6414	Protein Methods	
BCH 6623	Biochemistry of Specialized Tissues	
BCH 8633	Enzymes	
BCH 8654	Intermediary Metabolism [1]	4
or BCH 6804	Molecular Biology Methods	
BCH 8101	Seminar [2]	2
BCH 9000	Dissertation Research/ Dissertation 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 (prerequisite) [1]	3
BCH 6613	General Biochemistry (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	Dissertation Research/ Dissertation 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.