

# Entomology (ENTO)

## Faculty

**Ashley Patrick Gregg Dowling**, Associate Professor

**Fiona Goggin**, Professor

**John D. Hopkins**, Associate Professor

**Donn T. Johnson**, Professor

**Neelendra Joshi**, Assistant Professor

**Kelly M. Loftin**, Associate Professor

**Gus M. Lorenz**, Distinguished Professor

**Tanja McKay**, Associate Professor

**Nick Seiter**, Assistant Professor

**Donald C. Steinkraus**, Professor

**Fred M. Stephen**, University Professor

**Glenn Studebaker**, Associate Professor

**Allen Lawrence Szalanski**, Professor

**Tina G. Teague**, Professor

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### Degrees Conferred:

M.S., Ph.D. (ENTO)

**Primary Areas of Faculty Research:** Pest management, insect pathology, insect-plant interactions, arthropod-animal interactions, biological control, molecular biology, taxonomy, systematics, physiology, and insect ecology.

**Prerequisites to Degree Program:** Applicants for graduate degrees must meet all requirements for admission to the Graduate School. Applicants without a master's degree will be accepted into the departmental program based on grade-point average (GPA), letters of recommendation, résumé and an adviser in the student's area of interest. Applicants must present Graduate Record Examination scores for the verbal, quantitative, and writing tests. To be accepted for the Master of Science degree, an undergraduate background in physical and biological sciences is essential. An undergraduate major in entomology is not required. A cumulative GPA of 3.00 is highly desirable.

To be accepted for work toward the Ph.D. degree, the student will normally have a master's degree from an accredited institution in entomology or a closely related field. A minimum cumulative GPA of 3.25 for courses taken at the graduate level is highly desirable. Applicants without a master's degree will be evaluated for undergraduate research experience and strong academic credentials. Applicants must present Graduate Record Examination scores for the verbal, quantitative, and writing tests.

**Requirements for the Master of Science Degree:** Students studying for the Master of Science degree with a limited undergraduate background in entomology may be expected to complete more than the minimum number of credit hours (30) required for the degree. A thesis, reporting original research, and a final comprehensive oral examination are required. Specific requirements follow:

**General Course Requirements:** The degree program and coursework for each candidate will be arranged on an individual basis. M.S. students must register for a minimum of 30 hours of graduate credit including 6 thesis hours.

**Core Course Requirements:** The student must take or have taken courses equivalent to:

ENTO 3013	Introduction to Entomology (Fa)	3
ENTO 4024	Insect Diversity and Taxonomy (Even years, Fa)	4
ENTO 4053	Insect Ecology (Even years, Fa)	3
ENTO 4123	Insect Pest Management (Odd years, Sp)	3
ENTO 5013	Morphology of Insects (Odd years, Fa)	3
ENTO 6113	Insect Physiology and Molecular Biology (Even years, Sp)	3

A course in statistics for graduate credit is also required.

**Seminar Requirements:** Two semester hours of seminar are required. Seminar hours may be taken in Entomology (ENTO 6071) or, with Department Head approval, as a formal for-credit seminar offered in another department within the university. In addition, each student is required to present a seminar on his/her thesis research plans during the first year of the degree program and an exit seminar on the thesis research prior to leaving the program.

**Residence Requirements:** A minimum of 30 weeks in residence is required for the M.S. degree.

**Grade Point Average Requirement:** A minimum 3.00 GPA must be maintained. If the cumulative GPA falls below 3.00, or research or general academic progress is unsatisfactory, the student's performance will be reevaluated by the Advisory Committee and a recommendation made on continued status as a graduate student. For details about this process, please see the Graduate Student Handbook on the departmental Web site.

**Comprehensive Examination:** A comprehensive oral examination covering coursework and defense of the thesis research is required. The examination is generally taken during the student's final semester.

Students should also be aware of Graduate School requirements with regard to master's degrees (<http://catalog.uark.edu/graduatecatalog/degreerequirements/#mastersdegreestext>).

**Requirements for the Doctor of Philosophy Degree:** A major requirement for the Ph.D. degree is a dissertation based on original research in an area of entomology. Written and oral candidacy examinations covering the student's program of study are required. A final oral examination over course work and in defense of the dissertation is required. Specific requirements follow:

**General Course Requirements:** The degree program and coursework for each candidate will be arranged on an individual basis by the major professor, the Advisory Committee, and the student. A minimum of 30 hours of graduate coursework, excluding seminar, must be completed. Students progressing directly from the B.S. to the Ph.D. degree may require additional coursework as defined by the Advisory Committee.

**Core Course Requirements:** The student must take or have taken courses equivalent to:

ENTO 3013	Introduction to Entomology (Fa)	3
ENTO 4024	Insect Diversity and Taxonomy (Even years, Fa)	4

ENTO 4053	Insect Ecology (Even years, Fa)	3
ENTO 4123	Insect Pest Management (Odd years, Sp)	3
ENTO 5013	Morphology of Insects (Odd years, Fa)	3
ENTO 6113	Insect Physiology and Molecular Biology (Even years, Sp)	3

A course in statistics for graduate credit is also required. Students with credit for core courses will meet requirements with relevant courses in biology, chemistry, plant or animal science, or as approved by the Advisory Committee.

**Seminar Requirements:** Four semester hours of seminar are required. Seminar hours may be taken in entomology (ENTO 6071) or as a formal for-credit seminar offered in another department within the University. At least three of the seminar hours must be in entomology unless approved in advance by the Department Head. In addition, each student is required to present a seminar on his/her dissertation research plans during the first year of the degree program and an exit seminar on the dissertation research.

**Graduate Hour Requirements:** A minimum of 30 hours of graduate coursework, excluding seminar, is required.

**Residence Requirement:** Students must complete two consecutive semesters of full-time graduate study to achieve residency.

**Grade Point Average Requirement:** A minimum 3.25 GPA must be maintained. If the cumulative GPA falls below 3.25, or research or general academic progress is unsatisfactory, the student's performance will be reevaluated by the Advisory Committee and a recommendation made on continued status as a graduate student. For details about this process, please see the Graduate Student Handbook on the departmental Web site.

**Candidacy Examination:** Before completion of the fourth semester, the student will take written candidacy examinations as specified by the Advisory Committee and a comprehensive oral examination covering entomology and supporting areas. These examinations must be successfully completed at least one academic year before the degree is conferred.

**Comprehensive Examination:** A comprehensive oral examination covering coursework and defense of the dissertation research is required. The examination is generally taken during the student's final semester.

Students should also be aware of Graduate School requirements with regard to doctoral degrees (<http://catalog.uark.edu/graduatecatalog/degree requirements/#phdandeddgreestext>).

## Courses

**ENTO 4013. Insect Behavior and Chemical Ecology (Even years, Sp). 3 Hours.** Basic concepts in insect senses and patterns of behavioral responses to various environmental stimuli. Previous knowledge of basic entomology is helpful, but not required. Lecture 2 hours, laboratory/discussion 2 hours per week. Corequisite: Lab component. This course is cross-listed with BIOL 4013.

**ENTO 4024. Insect Diversity and Taxonomy (Even years, Fa). 4 Hours.** Principles and practices of insect classification and identification with emphasis on adult insects. Corequisite: Lab component. Prerequisite: ENTO 3013. This course is cross-listed with BIOL 4024.

**ENTO 4043. Apiculture (Odd years, Sp). 3 Hours.** Review of social behavior of insects and its exemplification in Honeybees. Previous knowledge of basic entomology is helpful but not required. Lecture 2 hours, laboratory 2 hours per week. Corequisite: Lab component.

**ENTO 4053. Insect Ecology (Even years, Fa). 3 Hours.** To develop understanding of important ecological concepts through study of dynamic relationships among insects and their environment. To become familiar with the literature of insect ecology, and interpretation and critique of ecological research. Previous knowledge of basic entomology and/or ecology will be assumed. Corequisite: Lab component. This course is cross-listed with BIOL 4053.

**ENTO 410V. Special Topics (Irregular). 1-3 Hour.** Special Topics course available to both undergraduate and graduate students, to address emerging issues and timely topics. This would supplement our graduate-only special topics course. May be repeated for degree credit.

**ENTO 4123. Insect Pest Management (Odd years, Sp). 3 Hours.** Study of principles and concept of insect pest management. Areas covered include survey of arthropod pests and damage, population dynamics, damage thresholds, physiological units, prediction models, surveillance, arthropod sampling, strategies and tactics utilized to maintain pest populations below economic injury levels. Prerequisite: ENTO 3013.

**ENTO 4133. Advanced Applied Entomology (Even years, Sp). 3 Hours.** Biology and ecology of major arthropod pests as model applied management systems. Activities include independent study, literature review and group discussions. Knowledge of general entomology and pest management is required. Self-learning modules are available. Lecture 2 hours/week and direct self-study laboratory 2 hours/week. Corequisite: Lab component. Prerequisite: ENTO 3013.

**ENTO 500V. Special Problems (Sp, Su, Fa). 1-4 Hour.** Prerequisite: graduate standing. May be repeated for up to 4 hours of degree credit.

**ENTO 5013. Morphology of Insects (Odd years, Fa). 3 Hours.** Origin, evolution, and functional significance of external insect structure. Structure and function of major internal systems. Previous knowledge of basic entomology is helpful, but not required. Lecture 2 hours, laboratory 4 hours per week. Corequisite: Lab component.

**ENTO 5123. Biological Control (Odd years, Fa). 3 Hours.** Theoretical and practical basis for biological control of arthropod pests and weeds via parasites, predators, and pathogens. Lecture 2 hours, laboratory 2 hours per week. Corequisite: Lab component.

**ENTO 5133. Insect Molecular Genetics (Even years, Sp). 3 Hours.** A hands on course in insect molecular genetic techniques including molecular diagnostics and population genetics. Students will learn how to apply advanced molecular genetic methodologies and Internet database resources to insects that they are using for their graduate research. This course is cross-listed with BIOL 5133.

**ENTO 600V. Master's Thesis (Sp, Su, Fa). 1-6 Hour.** Master's Thesis. Prerequisite: graduate standing. May be repeated for degree credit.

**ENTO 6071. Seminar (Sp, Fa). 1 Hour.** Fall: special topics not covered in regular course work. Spring: critical review of research papers in entomology. Seminar will be taken by graduate student majors for both semesters. May be repeated for up to 6 hours of degree credit.

**ENTO 6113. Insect Physiology and Molecular Biology (Even years, Sp). 3 Hours.** Overview of insect physiology and modern molecular techniques to study physiological processes. Previous knowledge of basic entomology is helpful, but not required. Two lectures per week (1 hour 20 minutes each). This course is cross-listed with BIOL 6113.

**ENTO 6213. Insect Toxicology (Odd years, Fa). 3 Hours.**

Toxicology of chemicals to insects and humans including techniques of testing collecting data, and factors that influence reactions to different classes of insecticides. Previous knowledge of organic physiological chemistry is helpful, but not required. Lecture 2 hours, laboratory 2 hours per week. Corequisite: Lab component.

**ENTO 700V. Doctoral Dissertation (Sp, Su, Fa). 1-18 Hour.**

Doctoral Dissertation. Prerequisite: Graduate standing. May be repeated for degree credit.