BIOLOGICAL SCIENCE OF INSECTS

Entomology and Nematology are interdisciplinary biological sciences that focus on the study of insects, mites, ticks, spiders, nematodes, and related organisms. These creatures can have both helpful and harmful effects on food security, the environment, and the health of humans and other animals. Entomology and Nematology students study ecology, behavior, physiology, evolution, systematics, biodiversity conservation, arthropods of medical and veterinary significance, the management of insect/nematode pests, and invertebrates as models in many different fields of research, including biomedical sciences, bioinspired engineering, and biotechnology.

About this Program

- **College:** Agricultural and Life Sciences (http://catalog.ufl.edu/UGRD/colleges-schools/UGAGL/)
- **Degree:** Bachelor of Science
- **Specializations:** Biological Science of Insects (p. 1) | Preprofessional (http://catalog.ufl.edu/UGRD/colleges-schools/UGAGL/ENY_BS/ENY_BS04/) | Urban Pest Management (http://catalog.ufl.edu/UGRD/colleges-schools/UGAGL/ENY_BS/ENY_BS07/)
- **Credits for Degree:** 120

To graduate with this major, students must complete all university, college, and major requirements.

Department Information

The Entomology and Nematology Department prepares students for exciting careers in a large variety of fields. Entomology and Nematology majors can enter medical, veterinary, or dental school; progress to graduate study in entomology, nematology, or any of several other biological sciences such as ecology and evolutionary biology, horticulture, or zoology; or move directly to a variety of careers (including industry and government positions) in fields such as pest management, agriculture, ecotourism, biosecurity, science policy, and education
Website (https://entnemdept.ufl.edu/)

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Map (http://campusmap.ufl.edu/#/index/0970)

Curriculum

- Beekeeping Certificate
- Combination Degrees
- Entomology and Nematology
- Entomology and Nematology Minor
- Entomology and Nematology Minor UF Online
- Landscape Pest Management Certificate
- Medical Entomology Certificate
- Pest Control Technology Certificate
- Urban Pest Management Certificate

The Department of Entomology and Nematology offers the major. Faculty within the department specialize in a diverse array of fields, including systematics and evolutionary biology, ecology, behavior, physiology, medical and veterinary entomology, genomics and molecular biology, apiculture, agricultural and urban pest management, biodiversity conservation, and more. The department has a long tradition of sending students to graduate school and professional programs (including medical, veterinary, and dental school). Given the widespread importance of insects and nematodes, there are many employment opportunities for students with a degree in Entomology & Nematology.

Biological Science of Insects

The Biological Science of Insects specialization prepares students for entry to entomological careers or to graduate school in entomology, nematology, and related biological disciplines. It provides students with a solid foundation in basic and applied insect science, and students can choose to further specialize in different subdisciplines via electives. This specialization also emphasizes undergraduate research. Students complete an Insect Research CURE (Course-based Undergraduate Research Experience) as well as at least 3 credits of supervised research under the direction of faculty in the Entomology and Nematology Department.

Coursework

In addition to these courses, students must also complete all university- and college-level requirements (e.g., General Education coursework).

A grade of C or above is required for all critical tracking, core, and elective courses. Students must also maintain a cumulative GPA of at least 2.0 and a critical tracking GPA of at least 2.5.

Critical Tracking Courses

Code	Title	Credits
BSC 2010	Integrated Principles of Biology 1	4
& 2010L	and Integrated Principles of Biology Laboratory	
BSC 2011	Integrated Principles of Biology 2	4
& 2011L	and Integrated Principles of Biology Laboratory 2	
CHM 2045	General Chemistry 1	4
& 2045L	and General Chemistry Laboratory	
CHM 2046	General Chemistry 2	4
& 2046L	and General Chemistry 2 Laboratory	
Select one Mathematics option:		4-6
MAC 2311	Analytic Geometry and Calculus 1	
MAC 1147	Algebra and Trigonometry	
MAC 1140	Precalculus Algebra	
& MAC 1114	and Trigonometry	

Core Requirements

Code	Title	Credits
ENY 2890C	Insect Research CURE	3
ENY 3005	Principles of Entomology	4
& 3005L	and Principles of Entomology Laboratory	
ENY 4161	Insect Classification	3
ENY 4660	Medical and Veterinary Entomology	2
ENY 4911	Supervised Research in Entomology	0-3
Select one:		4
MCB 2000	Microbiology	
& 2000L	and Microbiology Laboratory	
MCB 3020	Basic Biology of Microorganisms	
& 3020L	and Laboratory for Basic Biology of Microorganisms	
NEM 3002	Principles of Nematology	3
Select one:		3-4
PHY 2020	Introduction to Principles of Physics	
PHY 2004	Applied Physics 1	
& 2004L	and Laboratory for Physics 2004	
STA 2023	Introduction to Statistics 1	3
Approved Applied Entomology course [1]		3
Approved Ecology course [1]		3
Approved Evolution course [1]		3
Approved Genetics course [1]		3
Approved Insect Behavior course [1]		3

Elective Requirements

21 credits of 3000/4000-level courses in Entomology and Nematology or other biological sciences[1], subject to approval by an academic advisor in the Entomology and Nematology program.

[1] See an academic advisor in Entomology and Nematology for a list of courses that can be used to satisfy this requirement.

Critical Tracking

Critical Tracking records each student's progress in courses that are required for progress toward each major. Please note the critical-tracking requirements below on a per-semester basis.

Equivalent critical-tracking courses as determined by the State of Florida Common Course Prerequisites (https://cpm.flvc.org/advance-search/) may be used for transfer students.

Semester 1

- Complete 2 of 5 critical-tracking courses, excluding labs:
  - BSC 2010/BSC 2010L
  - BSC 2011/BSC 2011L
  - CHM 2045/CHM 2045L
  - CHM 2046/CHM 2046L
  - (MAC 1140 and MAC 1114) or MAC 1147 or MAC 2311
- 2.5 GPA required for all critical-tracking courses
- 2.0 UF GPA required

Semester 2

- Complete 1 additional critical-tracking course, excluding labs
- 2.5 GPA required for all critical-tracking courses
- 2.0 UF GPA required

Semester 3

- Complete 1 additional critical-tracking course, excluding labs
- 2.5 GPA required for all critical-tracking courses
- 2.0 UF GPA required

Semester 4

- Complete 1 additional critical-tracking course, excluding labs
- 2.5 GPA required for all critical-tracking courses
- 2.0 UF GPA required

Semester 5

- Complete all critical-tracking courses, including labs
- 2.5 GPA required for all critical-tracking courses
- 2.0 upper-division GPA required
- 2.0 UF GPA required

Semester 6

- Complete the Evolution requirement or the Genetics requirement by taking PCB 4674, ENY 4455C, AGR 3303, or PCB 3063 (grade of C or above required)
- 2.0 upper-division GPA required
- 2.0 UF GPA required

Semester 7

- Complete at least 1 of the following upper-level entomology requirements: ENY 4161 or ENY 4660 (grade of C or above required)
- 2.0 upper-division GPA required
- 2.0 UF GPA required

Semester 8

- Complete a minimum of 3 credits of ENY 4911 (grade of C or above required)
- 2.0 upper-division GPA required
- 2.0 UF GPA required

Model Semester Plan

To remain on track, students must complete the appropriate critical-tracking courses, which appear in bold. These courses must be completed by the terms as listed above in the Critical Tracking criteria.

This semester plan represents an example progression through the major. Actual courses and course order may be different depending on the student's academic record and scheduling availability of courses. Prerequisites still apply.

A grade of C or above is required for all critical tracking, core, and elective courses. Students must also maintain a cumulative GPA of at least 2.0 and a critical tracking GPA of at least 2.5.

Course	Title	Credits
Semester One		
BSC 2010	Integrated Principles of Biology 1	4
& 2010L	and Integrated Principles of Biology Laboratory (**Critical Tracking**; State Core Gen Ed Biological Sciences)	
Select one (**Critical Tracking**; State Core Gen Ed Mathematics): [1]		4
MAC 1147	Algebra and Trigonometry	
MAC 2311	Analytic Geometry and Calculus 1	
State Core Gen Ed Composition (Writing Requirement: 6000 Words)		3
State Core Gen Ed Humanities (http://catalog.ufl.edu/UGRD/academic-programs/general-education/#genedcoursestext)		3
	Credits	**14**
Semester Two		
Quest 1 (Gen Ed Humanities)		3
BSC 2011	Integrated Principles of Biology 2	4
& 2011L	and Integrated Principles of Biology Laboratory 2 (**Critical Tracking**; Gen Ed Biological Sciences)	
STA 2023	Introduction to Statistics 1 (Gen Ed Mathematics)	3
State Core Gen Ed Social and Behavioral Sciences (http://catalog.ufl.edu/UGRD/academic-programs/general-education/#genedcoursestext)		3
Gen Ed Composition (Writing Requirement: 6000 Words)		3
	Credits	**16**
Semester Three		
Select one CALS Advanced Oral Communication course:		3
AEC 3030C	Effective Oral Communication	
SPC 2608	Introduction to Public Speaking	
CHM 2045	General Chemistry 1	4
& 2045L	and General Chemistry Laboratory (**Critical Tracking**; State Core Gen Ed Physical Sciences)	
ENY 3005	Principles of Entomology	4
& 3005L	and Principles of Entomology Laboratory (Gen Ed Biological Sciences)	
Gen Ed TBD		3
Writing course (Writing Requirement: 6000 words)		3
	Credits	**17**
Semester Four		
Quest 2 (Gen Ed Social and Behavioral Sciences)		3
CHM 2046	General Chemistry 2	4
& 2046L	and General Chemistry 2 Laboratory (**Critical Tracking**)	
ENY 2890C	Insect Research CURE	3
NEM 3002	Principles of Nematology	3
Gen Ed International		3
	Credits	**16**
Semester Five		
Select one Genetics course (**Critical Tracking**):		3-4
AGR 3303	Genetics	
PCB 3063	Genetics (**Critical Tracking**)	
ENY 4161	Insect Classification (**Critical Tracking**)	3
Select one Insect Behavior course:		3
ENY 3451C	Insect Behavior	
ENY 4453	Behavioral Ecology and Systematics	
ENY 4455C	Social Insects	
ENY 4571	Honey Bee Biology	
ENY 4573	Beekeeping I	
Approved electives [2]		6
	Credits	**15-16**
Semester Six		
Select one CALS Advanced Written Communication course (Writing Requirement: 6000 words):		3
AEC 3033C	Research and Business Writing in Agricultural and Life Sciences	
ENC 2210	Technical Writing	
ENC 2256	Writing in the Disciplines	
Select one Ecology course:		3-4

ALS 3153	Agricultural Ecology	
ENY 4201	Insect Ecology	
ENY 4202	Ecology of Vector-Borne Disease	
ENY 4208	Ecology and Conservation of Pollinators	
ENY 4210	Insects and Wildlife	
PCB 4043C	General Ecology	
WIS 3401	Wildlife Ecology and Management	
Select one Evolution Course (**Critical Tracking**):		3
ENY 4455C	Social Insects	
PCB 4674	Evolution	
Approved elective [2]		3
	Credits	**12-13**
Semester Seven		
ENY 4660	Medical and Veterinary Entomology (**Critical Tracking**)	2
Select one CALS Economics Requirement course:		3-4
AEB 2014	Current Economic Issues, Food and You	
AEB 3103	Principles of Food and Resource Economics	
ECO 2013	Principles of Macroeconomics	
ECO 2023	Principles of Microeconomics	
Select one Physics option:		3-4
PHY 2004	Applied Physics 1	
& 2004L	and Laboratory for Physics 2004	
PHY 2020	Introduction to Principles of Physics	
Approved electives [2]		6
	Credits	**14-16**
Semester Eight		
Select one Applied Entomology course:		3
ALS 4161	Exotic Species and Biosecurity Issues	
ALS 4162	Consequences of Biological Invasions	
ALS 4163	Challenges in Plant Resource Protection	
ENY 3222C	Biology and Identification of Urban Pests	
ENY 3225C	Principles of Urban Pest Management	
ENY 3510C	Turf and Ornamental Entomology	
ENY 4574	Beekeeping II	
IPM 3022	Fundamentals of Pest Management	
IPM 4114	Insect Pest and Vector Management	
Select one Microbiology course with lab:		4
MCB 2000	Microbiology	
& 2000L	and Microbiology Laboratory	
MCB 3020	Basic Biology of Microorganisms	
& 3020L	and Laboratory for Basic Biology of Microorganisms	
ENY 4911	Supervised Research in Entomology (**Critical Tracking**) [3]	3
Approved electives [2]		6
	Credits	**16**
	Total Credits	**120**

1 This requirement can also be fulfilled by taking MAC 1140 and MAC 1114.

2 3000/4000-level courses in Entomology and Nematology or other biological sciences, subject to approval by an academic advisor in the Entomology and Nematology program.

3 To be conducted under the supervision of research faculty in the Entomology and Nematology department. See an advisor for more information.

Academic Learning Compact

The Entomology and Nematology curriculum develops an excellent knowledge base and an understanding of concepts and fundamental practices. Through formal courses, laboratory experimentation, and individual research experience, students will learn how the scientific method is applied to the biological world at the whole organism and population levels. Students will learn to evaluate hypotheses, to acquire and interpret experimental data, and to communicate results effectively in appropriate styles. Special focus will be information on insect identification, morphology, behavior, physiology, and ecology.

Before Graduating Students Must

- Pass the Entomology and Nematology competency exam, which will be tailored to individual specializations.
- Complete requirements for the baccalaureate degree, as determined by faculty.

Students in the Major Will Learn to

Student Learning Outcomes | SLOs

Content

1. Identify insects and describe and explain insect morphology, physiology, and behavior.

Critical Thinking

2. Acquire, analyze and synthesize entomological information.

Communication

3. Communicate proficiently in the sciences in oral and written forms.

Curriculum Map

I = Introduced; R = Reinforced; A = Assessed

Courses	SLO 1	SLO 2	SLO 3
AEC 3030C			A
AEC 3033C			A
ENY 3005	I, A	I, A	I
ENY 3005L	A	A	
ENY 4161	R, A		R, A

Assessment Types

- Assignments
- Exams
- Course grades
- Research collection