

**Termite Biology and Control 2017**  
**ENY 4221 / ENY 6248**  
**2 credit hours**  
**Ft. Lauderdale Research and Education Center**  
**University of Florida**  
**3205 College Ave.**  
**Ft. Lauderdale, FL 33314**

**Dates:** Registration Deadline is Friday May 5, 2017 for Summer C  
Lectures and Laboratory Activities June 19-23, 2017  
in FLREC Teaching Lab Rm 121  
Exam and Term Papers due Friday July 28, 2017

**Instructors:** Dr. Rudolf Scheffrahn (954) 577-6312  
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Dr. William Kern, Jr. (954) 577-6329 [whk@ufl.edu](mailto:whk@ufl.edu)  
Dr. Thomas Chouvenc (954) 577-6320 [tomchouv@ufl.edu](mailto:tomchouv@ufl.edu)

**Teaching Assistant:** Aaron Mullins (954) 577-6395 [amull81@ufl.edu](mailto:amull81@ufl.edu)

**Course Objectives:**

- Students will learn about the natural history, ecology, behavior, and distribution of all seven major termite families.
- Students will be able to recognize three major termite families and 16 important genera.
- Six primary invasive pest species must be recognized to species.
- Students will produce a reference collection of termites for their future use.
- Student will learn and gain field experience in a range of techniques for the collection and control of subterranean and drywood termites.

**Topics to be covered**

Monday

8:00 Introduction to the Isoptera  
Anatomy and Terminology – Chouvenc  
Higher Taxonomy - Scheffrahn  
Evolution – Chouvenc  
Ecological Significance – Su/Scheffrahn

12:00 Lunch

1:00 Biology and ecology of Kalotermitidae – Scheffrahn

2:00 Biology and ecology of Rhinotermitidae – Chouvenc

3:00 Principles of IPM and the Use of Bait and Alternative Technologies for Control of Subterranean Termites – Mullins

4:00 Biology and ecology of Termitidae - Scheffrahn

5:00 Biology and ecology of “minor” families (Hodotermitidae, Serritermitidae, Mastotermitidae, Termopsidae) – Scheffrahn

5:30 Welcome Dinner

### Tuesday

8:00 – 12:00 Termite collection field trip to FLL property or Secret Woods Park – Scheffrahn/Kern

1:00 – 5:00 ID Laboratories (Rm 205) Scheffrahn

Identification of Important Rhinotermitidae Laboratory: *Coptotermes*, *Heterotermes*, and *Reticulitermes*, *Prorhinotermes*.

Identification of Important Kalotermitidae Laboratory: *Cryptotermes*, *Incisitermes*, *Neotermes*.

Identification of Important Termitidae Laboratory:

Apicotermitinae – *Anoplotermes parvus*

Macrotermitinae – *Macrotermes*

Nasutitermitinae – *Nasutitermes corniger*

Termininae - *Amitermes*, *Microcerotermes*, *Termes*

Syntermitinae – *Armitermes*, *Rhynchotermes*

Enteric Valve Armature (EVA) dissection of *A. Parvus*

### Wednesday

8:00 Fumigation preparation and introduction field trip. Kern/Scheffrahn

10:00 Fumigation Techniques for Drywood Termites – Structure preparation, dosage calculations, safety procedures, gas introduction, monitoring, clearing procedure. Scheffrahn

11:00 Alternative Techniques for Control of Drywood Termites – spot treatments, removal, heat, cold, microwave, Electrogun, etc. – Kern

12:00 Lunch

1:00 – 5:00 ID Laboratories Scheffrahn

### Thursday

8:00 – 9:30 Use of Liquid Termiticides for Control of Subterranean Termites – Pre-construction and Post-construction - Kern

10:00 – 12:00 Remedial liquid termiticide field trip. Kern

12:00 Lunch

1:00 – 2:30 Pre-construction demonstration - Kern

2:30 – 5:00 ID Lab to review for Friday's Practical Examination.

### Friday

8:00 Identification Practical Examination and Turn in Termite Collection.

9:30 – 2:00 Subterranean baiting technology field trip. (Active site and station installation, lunch in field) - Mullins

2:00 – 2:30 Construction, landscaping, and building maintenance practices to reduce the likelihood of subterranean termite infestations. – Kern

2:30 – 3:30 Biological control in termites, potential and delusion. –Dr. Thomas Chouvenc

4:00 Project topic assignments, wrap-up.

UF EDIS Termite Fact Sheets

### SUBTERRANEAN TERMITES

- Asian Subterranean Termite, *Coptotermes gestroi* (=havilandi) (Wasmann) (Insecta: Isoptera: Rhinotermitidae) <http://edis.ifas.ufl.edu/pdffiles/in/in28500.pdf>
- Cuban Subterranean Termite (proposed), Florida Dampwood Termite (old unofficial name), *Prorhinotermes simplex* (Hagen) (Insecta: Isoptera: Rhinotermitidae) <https://edis.ifas.ufl.edu/pdffiles/IN/IN55800.pdf>
- Florida Darkwinged Subterranean Termite, *Amitermes floridensis* Scheffrahn, Su, and Mangold (Insecta: Isoptera: Termitidae: Termitinae) <https://edis.ifas.ufl.edu/pdffiles/IN/IN26900.pdf>
- Formosan Subterranean Termite, *Coptotermes formosanus* Shiraki (Insecta: Isoptera: Rhinotermitidae) <https://edis.ifas.ufl.edu/pdffiles/IN/IN27800.pdf>
- Landscape Mulches: Will Subterranean Termites Consume Them? <http://edis.ifas.ufl.edu/pdffiles/FR/FR07500.pdf>
- Native Subterranean Termites: *Reticulitermes flavipes* (Kollar), *Reticulitermes virginicus* (Banks), *Reticulitermes hageni* Banks (Insecta: Isoptera: Rhinotermitidae) <https://edis.ifas.ufl.edu/pdffiles/IN/IN36900.pdf>

- Subterranean Termites <http://edis.ifas.ufl.edu/pdffiles/IG/IG09700.pdf>
- West Indian Subterranean Termite, Heterotermessp. (Insecta: Isoptera: Rhinotermitidae) <http://edis.ifas.ufl.edu/pdffiles/IN/IN28400.pdf>  
Termite Baits  
[https://www.freshfromflorida.com/content/download/3200/20121/mg363\\_1.pdf](https://www.freshfromflorida.com/content/download/3200/20121/mg363_1.pdf)
- NON\_SUBTERRANEAN TERMITES
  - Drywood Termite, Cryptotermes cavifrons Banks (Insecta: Isoptera: Kalotermitidae) <https://edis.ifas.ufl.edu/pdffiles/IN/IN53700.pdf>
  - Florida Dampwood Termites, Neotermes castaneus (Burmeister), Neotermes jouteli (Banks), and Neotermes luykxi Nickle and Collins (Insecta: Isoptera: Kalotermitidae)  
<http://edis.ifas.ufl.edu/pdffiles/IN/IN27900.pdf>
  - Drywood and Dampwood Termites  
<http://edis.ifas.ufl.edu/pdffiles/IG/IG09800.pdf>
  - West Indian Drywood Termite, Cryptotermes brevis (Walker) (Insecta: Isoptera: Kalotermitidae) <https://edis.ifas.ufl.edu/pdffiles/IN/IN23600.pdf>
  - Western Drywood Termite, Incisitermes minor (Hagen) (Insecta: Isoptera: Kalotermitidae) <http://edis.ifas.ufl.edu/pdffiles/IN/IN52600.pdf>

### Course Requirements

Production of a Termite Reference Collection containing at least three families is to be completed by June 26, 2015. Cooperation and trading of specimens between students is encouraged. This is a non-graded requirement and opportunity for students to produce a useful personal voucher collection.

	Undergraduate	Graduate	
Identification practical examination June 26, 2015		33%	40 %
Term Paper or Project due Friday July 31, 2015		33%	
Take Home Essay Exam due Friday July 31, 2015.		34%	60 %

Deadlines for turning in the final exam and term paper / project (for Graduate Students) are firm. A penalty of 10% per day will be levied for each day they are late.

These are the performance expectations for a take-home, open-book examination. All questions are to be answered fully and completely. Outside resources are expected to be used and citations given in order to fully answer each question. Since a dictionary is allowed, misspelled terms and names are not acceptable. Properly labeled drawings often are very helpful. You may not use figures or tables directly from the WEB, class folders, or scanned from the text. If you find figures or tables that help you answer questions you must re-draw them. Budget one to four hours per question for research and writing. No question should require more than six hours.

## **Attendance Policy**

Because of the concentrated nature of the lecture portion, attendance during all 5 days of lecture is strongly encouraged. If you miss the practical exam on the Friday morning of the lecture week and have a legitimate excuse, you will be responsible for contacting the instructors about scheduling a make-up exam.

## **Grading scale:**

A = 93-100 %	C = 73-76 %
A- = 90-92 %	C- = 70-72 %
B+ = 87-89 %	D+ = 67-69 %
B = 83-86 %	D = 63-66 %
B- = 80-82 %	D- = 60-62 %
C+ = 77-79 %	E = Less than 60 %

<http://www.registrar.ufl.edu/catalog/policies/regulationgrades.html>

## **Texts**

Selected readings and references will be copied and available on the first day of Class.

## **Recommended Literature**

Bennett, G. W., J. M. Owens, and R. M. Corrigan. 1997. Truman's Scientific Guide to Pest Control Operations, fifth edition. Purdue University and Advanstar Communications, Cleveland, Ohio, 520 pp.

Ebling, W. 1978. Urban Entomology, 2<sup>nd</sup> ed. Univ. Calif. 695 pp.

Edwards, R. and A. E. Mill. 1986. Termites in Buildings: Their biology and control. Rentokil Limited, East Grinstead, UK. 261 pp.

Krishna, K. and F. M. Weesner. 1969. Biology of Termites I. Academic Press, New York.

Krishna, K. and F. M. Weesner. 1970. Biology of Termites II. Academic Press, New York.

Krishna, Kumar.; Grimaldi, David A.; Krishna, Valerie.; Engel, Michael S.. 2013. TREATISE ON THE ISOPTERA OF THE WORLD. AMNH BULLETIN 377, Vol. 1-7. Available as 7 PDF files from <http://digitallibrary.amnh.org/handle/2246/6430>

Mallis, A. 2004. Handbook of pest control, 9<sup>th</sup> ed. Mallis Handbook & Technical Training Comp. 1456 pp.

Scheffrahn, R. H., B. J. Cabrera, and W. H. Kern, Jr. 2005. Florida Fumigation Manual. University of Florida / IFAS, Florida Cooperative Extension Service.

### **Useful Equipment and materials**

Appropriate field clothes for warm humid weather and rain, insect repellent, a camera, and canteen or water bottle for field trips.

**Academic Honesty:** As a result of completing the registration form at the University of Florida, every student has signed the following statement: I understand that the University of Florida expects its students to be honest in all their academic work. I agree to adhere to this commitment to academic honesty and understand that my failure to comply with this commitment may result in disciplinary action up to and including expulsion from the University.

*We, the members of the University of Florida, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.*

**Copyrighted Materials and Software Use:** All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are against University policies and rules, disciplinary action will be taken, as appropriate.

**Accommodations for Students with Disabilities:** Students requesting classroom accommodation must first register with the Dean of Students' Office. The Dean of Students will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation.

**UF Counseling Services:** Resources are available on campus for students having personal problems or lacking clear career and academic goals that interfere with their academic performance. These resources include:

1. University Counseling Center, 302 Peabody Hall, (352) 392-1575, personal and career counseling
2. Student Mental Health, Student Health Care Center, (352) 392-1171, personal counseling.
3. Sexual Assault Recovery Services, Student Health Care Center, (352) 392-1161, sexual counseling.
4. Career Resource Center, Reitz Union, (352) 392-1601, career development assistance and counseling.
5. Local Counseling Resources.

Broward County –

Crisis Information Hotline Dial 2-1-1 or 954-537-0211

Rape Hotline 954-761-7273 (954-761-RAPE)

First Call For Help Suicide Prevention

(954) 467-6333 (Helpline)

(954) 522-5220 (Seniors)

(954) 467-8336 (Teenline)

(954) 523-1222 (Phone Friend)

Dade County –

Switchboard of Miami Crisis Hotline 305-358-4357

Palm Beach County -

Crisis Hotline 561-383-1111

For assistance with Registration for this class contact Joanne Korvick, Student Support Services, Ft. Lauderdale Campus at [duckweed@UFL.EDU](mailto:duckweed@UFL.EDU) or (954) 577-6371.

For more information about the class contact Dr. Bill Kern at [whk@ufl.edu](mailto:whk@ufl.edu) or (954) 577-6329 or Dr. Thomas Chouvinc at [tomchouv@UFL.EDU](mailto:tomchouv@UFL.EDU) (954) 577-6320