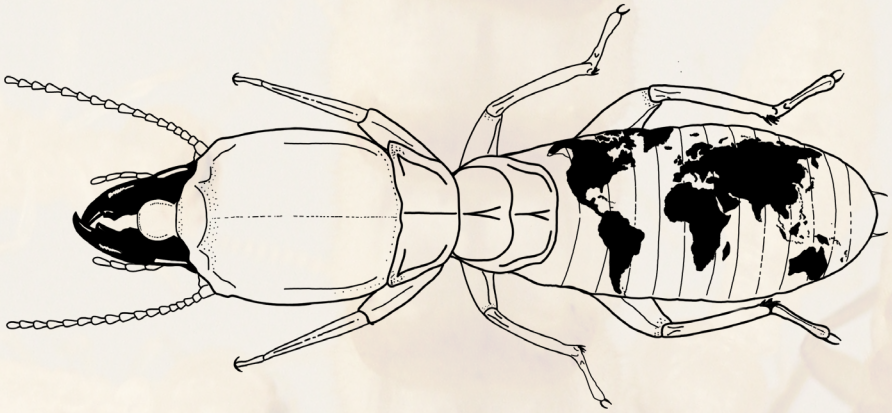
Termite Course 2019

University of Florida



June 3-8, 2019

Ft. Lauderdale Research and Education Center

3205 College Avenue | Davie FL, 33314

UF IFAS
UNIVERSITY of FLORIDA

Termite Course 2019
ENY 4221 / ENY 6248
2 credit hours

Ft. Lauderdale Research and Education Center
University of Florida, 3205 College Ave., Ft. Lauderdale, FL 33314

Important: You can register for this class for 2 credits (UF Entomology student),
or simply register as a workshop attendant (not for credit, open to all)
at https://conference.ifas.ufl.edu/termite2019/

Contact **Thomas Chouvenc** for information about registrations: tomchouv@ufl.edu

Dates: Registration Deadline is Wednesday May 1, 2019
Lectures and Laboratory Activities June 3-8, 2019
in FLREC Teaching Lab Rm 121 and seminar room T103-104
Exam and Term Papers due Friday July 28, 2019 (for credit students only)
Grades due Friday, August 7, 2019

Instructors:

Dr. Thomas Chouvenc	University of Florida	tomchouv@ufl.edu
Dr. Rudolf Scheffrahn	University of Florida	rhsc@ufl.edu
Dr. Nan-Yao Su	University of Florida	nysu@ufl.edu
Dr. William Kern, Jr.	University of Florida	whk@ufl.edu
Dr. Jan Šobotník	Czech Univ. Prague	sobotni.j@gmail.com
Dr. Thomas Bourguignon	OIST, Okinawa Japan	Thomas.Bourguignon@oist.jp
Dr. Kenji Matsuura	Kyoto University Japan	kenjijpn@kais.kyoto-u.ac.jp
Dr. Tiago Carrijo	Univ. ABC Brazil	tiagocarrijo@gmail.com
Dr. Gillian Gile	Arizona State University	ggile@asu.edu
Dr. Aram Mikaelyan	North Carolina State Univ.	amikael@ncsu.edu
Dr. Michael Engel	University of Kansas	msengel@ku.edu

Teaching Assistants:
Sang-Bin Lee, Joe Velenovsky, Aaron Mullins

Course Objectives:

- Students will learn about the natural history, ecology, evolution, behavior, and distribution of all major termite families.
- Students will be able to recognize most major termite families and genera.
- Primary invasive termite pests must be recognized to the species level.
- Students (for credit only) will produce a reference collection of termites for their future use.
- Students will learn and gain experience in a range of techniques for the collection and control of subterranean and drywood termites pest species.
- Graduate students participating to the course will be given the opportunity to give a 10min presentation of their graduate research project in a student mini-symposium

Monday

7:30-8:00 **Registration** (Front Lobby)

8:00-8:30 **Introduction and presentation** (*30min*)

8:30-9:00 Terminology, life cycle, anatomy – **Chouvenc** (*30min*)

9:00-10:00 Termites of the world - Overview of termite diversity – **Šobotník** (*60min*)

10:00-10:15 **Break** (*15min*)

10:15-11:30 Natural history of termites – **Scheffrahn** (*70min*)

11:30-12:00 Termite phylogenetic tools – **Bourguignon** (*30min*)

12:00-12:45 **Lunch** (provided) (*45min*)

12:45-2:00 Termite phylogeny and biogeography – **Bourguignon** (*75min*)

2:00-2:30 Termites at the geological time scale – **Engel** (*30min*)

2:30-2:45 **Break** (*15min*)

2:45-3:30 Review of the biology of “minor” families – **Bourguignon** (*45min*)

3:30-4:15 Biology and classification of Kalotermitidae – **Scheffrahn** (*45min*)

4:15-5:00 Biology and ecology of Rhinotermitidae – **Su** (*45min*)

5:00-5:20 Overview and preparations for Tuesday field trip – **Mullins** (*20min*)

5:20-… **Welcome Dinner** (provided) **/ Social time** / **Movie Session**

“The world according to termites” (Movie session and discussion) – **Šobotník**

Tuesday

8:00-11:00 Termite collection **field trip** to Secret Woods Park (*180min*)
-Mosquito repellent
-Dress up for field
-Water
-Collecting equipment (vials, pans, hatchet, aspirator…)
Be back at FLREC no later than 11:00

11:10-12:00 **Breakout session 1.1**
Identification laboratory session 1 – **Scheffrahn** (*45min*) room121
Termites in Florida, lab tour – **Chouvenc** (*45min*) room T103-104

12:00-12:45 **Lunch** (provided) (*45min*)

12:45-1:45 **Breakout session 1.2**
Identification laboratory session 1 – **Scheffrahn** (*45min*) room121
Termites in Florida, Lab tour – **Chouvenc** (*45min*) room T103-104

1:45-2:45 Biology and ecology of Termitidae
– **Scheffrahn** (*60min*)

2:45-3:00 **Break** (*15min*)

2:45-3:30 Microbiota in cockroaches and termites
– **Mikaelyan** (*45min*)

3:30-4:15 Protozoa in ‘lower’ termites
– **Gile** (*45min*)

4:15-5:00 Termite diversification: A symbiont perspective
– **Bourguignon** (*45min*)

5:00-5:30 Parasites in termite nests and host manipulation
– **Matsuura** (*30min*)

5:30 **End of session** (Dinner on your own or with your new friends)

Wednesday

8:00-8:50 Termite evolution: origin of eusociality
– **Chouvenc** (*50min*)

8:50-9:40 Evolution and origin of soldiers and workers
– **Bourguignon** (*50min*)

9:40-9:55 **Break** (*15min*)

9:55-10:45 Evolution of sexual division of labor in termites
– **Matsuura** (*50min*)

10:45-11:30 Evolutionary convergence in eusociality
– **Chouvenc** (*45min*)

11:45-12:35 **Lunch** (provided) (*45min*)

12:30-1:30 Termite communication: Glands, pheromones, vibroacoustic
– **Šobotník** (*60min*)

1:30-2:15 Termite defenses: mandibles and defensive glands
– **Šobotník** (*60min*)

2:15-2:30 **Break** (*15min*)

2:30-5:00 **Breakout session 2.1**
Identification laboratory session 2 – **Scheffrahn** (*150min*)
See the end of the syllabus for the list of samples to ID

Rotations for the subterranean termite lab tour
– **Chouvenc** (*20min*)

Students mini-symposium (10min presentations)

5:00 **End of session** (Dinner on your own or with your old friends)

Thursday

8:00-9:15 Life cycle, developmental pathways and breeding systems in termites – **Chouvenc** (*75min*)

9:15-10:00 Termite colony foundation strategies (overview) – **Matsuura** (45*min*)

10:00-10:15 **Break** (*15min*)

10:15-11:05 Parthenogenesis in termites and role of asexual reproduction – **Matsuura** (50*min*)

11:05-11:55 Epigenetic regulations in termites – **Matsuura** (*50min*)

11:55-12:40 **Lunch** (Provided) (*45min*)

12:40-1:30 Termite feeding biology and ecology – **Šobotník** *50min*)

1:30-2:15 Evolution and ecology of neotropical termites – **Carrijo** (*45min*)

2:15-2:30 **Break** (*15min*)

2:30-5:00 **Breakout session 2.2**

Identification laboratory session 2 – **Scheffrahn** (*150min*)

See the end of the syllabus for the list of samples to ID

Rotations for an overview of termite damage types – **Chouvenc** (*20min*)

Students mini-symposium (10min presentations) – **Chouvenc** (*20min*)

5:00 **End of session** (Dinner on your own or with your old friends)

Friday

8:00-8:30 Termite pest species of the world and termite control research – **Chouvenc** (*30min*)

8:30-9:20 Drywood termite pests and Fumigation techniques – **Scheffrahn** (*50min*)

9:20-10:00 Alternative techniques for control of drywood termites –**Kern** (*40min*)

10:00-10:15 **Break** (*15min*)

10:15-10:40 Use of liquid termiticides for control of subterranean termites, pre-construction and post-construction. – **Kern** (*40min*)

10:40-11:20 Building maintenance practices to reduce the likelihood of subterranean termite infestations – **Kern** (*40min*)

11:20-11:50 Review for the practical exam, termite ID exercise – **Scheffrahn (***30min***)**

11:50-12:35 **Lunch** (Provided) (*45min*)

12:35-1:05 Living with termites, a New Orleans' perspective – **Mullins** (*30min*)

1:05- 2:20 Principles of IPM and the use of bait technologies for control of subterranean termites – **Su** (*75min*)

2:20-2:35 **Break**

2:35-3:50 The importance of colony demographics in subterranean termite control strategies – **Chouvenc** (*75 min*)

3:50-4:20 Potential use of termite egg-tending behavior for control strategies – **Matsuura** (*30min*)

4:20-5:00 **Open discussion**. "Termites and human culture" – Stories from the group (*40min*)

5:00-5:30 Review for the practical exam, termite ID exercise – **Scheffrahn (***30min***)**

5:30: … **Farewell Dinner/Social time** at **Ye old Falcon Pub**

Saturday

8:00-9:00 **Breakout session 3**
-Identification **practical examination** and turn in termite collection.
(For students taking the class for credits only) (room 121)
– **Scheffrahn** (60min)

-Hybrid termites, a Floridian story
(*For the rest of the group*) (room T103-104)
– **Chouvenc** (60min)

9:00-9:30 Self-organization systems in termites
–**Mizumoto**/**Matsuura** (*30min*)

9:30-9:50 Polyethism in termites, Part one I
– **Chouvenc** (*20min*)

9:50-10:20 Polyethism in termites, Part one II
– **Matsuura** (30*min*)

10:20-10:35 **Break** (*15min*)

10:35-11:50 Biocontrol *vs*. termites immunity
– **Chouvenc** (*75min*)

11:50-12:00 Student awards and Concluding remarks

12:00 **Final Lunch** (Provided) (*45min*)

After Lunch: Project topic assignments (*for credit students only*)

Please keep in mind that:

- We are 15min away from the beach
- We are 45 min away from the Everglades national parks
- We have a diverse fauna of **social hymenoptera** in various parks in the area, ready to be surveyed.
- The lab will be open for more identification sessions if needed.
- Butterfly World is 30 min away
- Fairchild Botanical garden is 45 min away.

If you plan on doing group activities, we can help you organize it, per your request.

Thanks for attending this 2019 session!

Lab ID sessions will include

SOLDIERS and IMAGOS:

ID of Florida **Termitidae** genera:
Amitermes
Nasutitermes

ID of Florida **Rhinotermitidae** genera:
Coptotermes
Heterotermes
Reticulitermes
Prorhinotermes

ID of Florida **Kalotermitidae** genera:
Calcaritermes
Cryptotermes
Incisitermes
Neotermes.

Important **Invasive pests** to species:
Nasutitermes corniger
Cryptotermes brevis
Coptotermes formosanus
Coptotermes gestroi

SOLDIERS only:

Archotermopsidae: *Zootermopsis* (Nearctic only)

Rhinotermitidae: *Rhinotermes* (two soldier morphs)

Termitidae: **Apicotermitinae**: *Anoplotermes* (soldierless, workers only)

Termitidae: **Cubitermitinae**: *Cubitermes* (Old World only)

Termitidae: **Macrotermitinae**: *Macrotermes* (Old World only)

Termitidae: **Syntermitinae**: *Syntermes* (New World only)

Termitidae: **Syntermitinae**: *Rhynchotermes* (New World only)

Termitidae: **Termitinae**: *Microcerotermes* (Worldwide)

Termitidae: **Termitinae**: *Termes* (Worldwide)

Additional information about the termite course

For students taking the course for credits only

Course Requirements

Production of a Termite Reference Collection containing at least three families is to be completed by June 7th 2019. 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.

	Graduate	Undergraduate
Identification practical examination June 7, 2015	30%	30 %
Term Paper or Project due Friday July 28, 2015	30%	
Take Home Essay Exam due Friday July 28, 2015.	40%	70 %

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

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.

Texts
Selected readings and references will be copied and available on the first day of Class.
All presentations during the class will be provided in paper form to all students

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, 2nd ed. Univ. Calif. 695 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.

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

Grassé, P.P. 1982-1985. Termitologia (3 volumes) Masson, Paris.

Abe, T., D.E. Bignell, M. Higashi and T. Higashi. 2000. Termites: Evolution, sociality, symbioses, ecology. Springer.

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

Bignell, D.E. 2010. Biology of termites, a modern synthesis. Springer.

Online Resources

Krishna, Kumar.; Grimaldi, David A.; Krishna, Valerie.; Engel, Michael S 2013. Treatise on the Isoptera of the world. (Bulletin of the American Museum of Natural History, no. 377): http://digitallibrary.amnh.org/handle/2246/6430

Constantino's Termite database:
http://www.termitologia.net/

Šobotník's termite photo gallery:
https://termiti.fld.czu.cz/en/r-12998-galleries/r-13019-termites

Scheffrahn's termite database:
https://www.rudolfscheffrahn.com/

FLREC, Ft Lauderdale Research and Education Center map:
https://flrec.ifas.ufl.edu/termites-in-florida/

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.

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 more information about the class contact Dr. Thomas Chouvenc at tomchouv@UFL.EDU (954) 577-6320

V SymTermes

Symposium of Termitology

Federal University of ABC (UFABC)

São Bernardo do Campo, São Paulo, Brazil

September 01-06, 2019

http://eventos.ufabc.edu.br/symtermes/

Termite Biology field course

French Guiana, Petit Saut

June 18-26 2020

The course will cover following areas: Organization of the research campaigns, arranging long-term research activities, collecting termites, termite taxonomy, termite communication, safety during the field work and many others.

Improve your skills, learn more, discover the pristine tropical rainforest!

For more details see https://termiti.fld.czu.cz/en/r-13004-news