ENTO 3000: Principles of Entomology, Fall 2014

I. General Information:

Professor: Dr. Kenneth Schoenly
Office: N271
Phone: 667-3949
Office Hrs: M,W 9:00-10:30 (and by appointment)

Email: kschoenly@csustan.edu
Credits: Lec/Lab 4
Lecture: Tu,Th 8:00-8:50 (N210)
Lab: TuTh 9:00-11:50 (N210)

II. Course Description:

(Catalog Description): Classification, control, life history, structure, ecology and basic physiology of insects. Satisfies the departmental diversity requirement. Corequisites: ENTO 3002. Prerequisite: ZOOL 1050 or equivalent. (Lecture, 2 hours; laboratory, 6 hours; field trips) (Fall).

Entomology is the study of insects, the most diverse class of animals on Earth. Entomologists draw upon every field of biology to understand insects, including evolution, ecology, behavior, anatomy, physiology, biochemistry, genetics, and molecular biology. One semester is not enough time to explore all aspects of entomology, so **we will explore major themes of diversity, life history and development, form & function, behavior, and management aspects.** In order to understand current trends and future directions, we will also examine some classic observations and experiments to see their lasting effect on entomology.

III. Course Requirements:

The course grade for this upper-division class is four credits determined from the combined grades of lecture and laboratory work. It is your responsibility to know where you stand in the class at any one time. As per university regulations, students with excessive absences or tardiness will be dropped from the course.

The rigors of this upper-division course **demand regular attendance, commitment and concentration** to the readings and lectures. Success in this course (with a good grade!) is achieved by attending every class (on time!), by taking complete and comprehensible notes, and keeping abreast of exam dates, other assignments, and updates. Allow at least 2 weeks for exams, lab exercises, and homework to be graded and returned. The instructor reserves the right to give unannounced quizzes/other assignments if it becomes apparent that students are not keeping up with the material, are misusing lab time, and/or there are an unacceptable number of absences or tardy students**.** If you are absent or late that day you will receive a grade of zero. **All assignments have due dates and will lose 20% of their value each day they are late (except collection).** On field-trip days, we will meet in the classroom/lab and leave promptly at 8:05; if you are late or miss this trip, you will incur a 10% penalty in your final grade.

Students who are physically present, but inattentive (including, but not limited to, sleeping, excessive conversation, texting, emailing, web-surfing, being disruptive, arriving late, leaving early, etc.) may be asked to leave. Repeat offenders will be turned over to the Dean of Students. Unexcused absences for gradable events will result in no score, but in the event of documented compelling circumstances, attempts will be made to work out conflicts prior to the absence.
Turn off all cell phones at or before arriving to class.

Executive Order 1037 (effective August 2009) allows students to only repeat a course twice and in which they have earned less than a C grade. Students are only allowed to replace the first 16 units they repeat; those reaching the 16 unit limit may repeat an additional 12 units, but the resulting grade is averaged with all other grades.

IV. Student Learning Goals:

1. The student will demonstrate familiarity with all aspects of insect biology, including details of insect products & ecosystem services, evolutionary history, taxonomy, ecology, development and physiology.

2. The student will become proficient in family-level identification of insects to the extent that s/he should be able to 'key out' to order and family any insect presented to her/him from anywhere in the world.

3. The student will demonstrate familiarity with topics originating with or largely unique to entomology, including but not limited to: exoskeleton structure and function, metamorphosis, haplodiploidy, integrated pest management, and insecticidal resistance.

4. Through scientific understanding of evolutionary relationships of extinct and extant insects, completion of a crop food-web project, and preparation of a 40-family insect collection, the student will gain further appreciation of natural history and regional biodiversity.

V. Required Textbook (to be purchased 1st week of class):

Borror and Delong's Introduction to the Study of Insects, 7th edition, by Triplehorn and Johnson. Bring to class every class period; you will use the book's taxonomic keys and illustrations (no sharing and possible test questions!). Chapters for the text are listed in the schedule below.

On an episodic basis, I will also assign primary literature (journals/book chapters), web site information (see also below), and show videos (some with Q/A sheets to answer) that you will also need to know for exams. Lab will rely mostly on ***handouts***; these will be provided one week (or less) before the next lab meeting.

VI. Grading Procedure:

From the lecture portion, there will be **two unit exams** (on **Sep 30** and **Nov 13**), a **crop food-web PowerPoint presentation** (**Oct 21** or **23**), and a **comprehensive final** (**Dec 11**). From the lab, there will be **two practicals (Oct 9, Dec 4), two insect ID quizzes (Sep 25, Oct 16), and a 40-family insect collection (due Nov 26)**. Lecture exams will be mixed format (short answer/essay, matching, some multiple choice, long essay). Questions for the exams will come from the lecture notes, textbook, video questions, and primary literature (if assigned). A mandatory field trip is scheduled for September 11 (departure time 8:05); missing this trip will result in a 10% penalty in your final grade.

Use of cameras/phones to photograph live, pinned, or microscopic specimens is forbidden and considered cheating (see recording policy below). Lab practicals will be fill-in-the-blank questions taken from slides, specimens, field materials, and demonstrations.

The final exam will be comprehensive of the entire class (lecture) material. All requests to take exams at other than scheduled times must be in writing to the instructor **at least one week** prior to the scheduled exam date. **It is your responsibility to contact me in the event you miss an exam or assignment and to provide me with relevant written information (e.g., letter from a physician) documenting your absence.** The final decision to offer makeup exams rests with me. **No extra credit will be offered beyond the points shown below.**

Insect Collection: You are required to prepare an insect collection comprising one or more representatives from **40 insect families**. Lab time will provide you most (but not all) of the needed time to attend field trips to collect insects, identify specimens, and prepare your collection. Additional field trips taken outside of lecture/lab time are strongly encouraged to insure that you have enough specimens to complete your 40-family collection (**5% of your collection grade will be deducted for each missing family!**). Collection will be graded for completeness, neatness, proper curatorial technique, and accuracy of order- and family-level determinations. **Under no circumstances should you use or request specimens you did not collect and identify yourself (doing so is a form of cheating!).** Your collection is worth **250 points (1/4 of your total grade)** and is due on or before **Wednesday, Nov 26 at/before 5 PM (no exceptions)**.

Crop Food Web Project: To bolster awareness and appreciation of our region's agrobiodiversity (before it disappears!), you will seek out published information (in the library, authoritative websites, or agricultural extension agents) on arthropods associated with a specific crop plant of the Merced-Turlock-Modesto region. Natural history information on the pests, predators, parasitoids, and parasites of your crop will help you construct a reasonable food web of the crop-pest-natural enemy associations (details to follow). **You will deliver a 10-13 min oral presentation on your food web and, afterward, turn in a written (graphical) version of the web containing full scientific citations of the primary (journals, technical reports) and secondary (text, specialty books) literature.** You will be graded on your oral delivery, entomological accuracy, completeness, and neatness (grading rubric to follow). The food web project is worth **100 points (10% of your grade) and the written version is due Oct 28 (at start of lab time).**

Grade Component	Total Possible Points	Weight (%)
2 Unit Lecture Exams	100 each (200 total)	20%
Comprehensive Final	150	15%
2 Lab Practicals	75 each (150 total)	15%
Insect Collection	250	25%
2 ID Quizzes	50 each (100 total)	10%
Crop Food Web	100	10%
Miscellaneous (e.g., homework, driving, punctuality, attendance, participation)	50	5%
Total Possible Points	1000	100%

Grades: A = 100-90%, B = 89-80%, C = 79-70%, D = 69-60%, F < 60%, No +/- grading will be applied to your final grade.

Recording Policy: Recording of classes or of live, pinned, or microscopic specimens is not permitted. If you do not wish to comply with this policy, please discuss this with the instructor or take another class. An exception is made for students registered with Disability Resource Services, who are approved for this accommodation. In such exceptions, DRS students will be asked to sign a "Recording Agreement" which disallows them from sharing recordings with other individuals unless approved by the DRS program.

Cheating in any form is inappropriate conduct and will be dealt with swiftly and severely according to Sections 41301 through 41304 of Title 5 of the *California Code of Regulations*" which includes expulsion, suspension and probation.

VII. IMPORTANT DATES TO REMEMBER:

AUG 21: Fall classes begin
SEP 1: Labor Day (no class)
SEP 11: Field Trip (Knight's Ferry)
SEP 18: Census Date: Last day to add/drop
SEP 25: 1st ID Quiz (Orders)
SEP 30: 1st Lecture Exam
OCT 9: 1st Lab Practical
OCT 10: Columbus Day (no class)
OCT 16: 2nd ID Quiz (Families)
OCT 21 & 23: Food Web Presentations
OCT 28: Food Webs (Written version due)
NOV 11: Veterans Day (no class)
NOV 13: 2nd Lecture Exam
NOV 26: Insect Collections due (5 pm)
NOV 27-28: Thanksgiving holiday (no class)
DEC 4: 2nd Lab Practical
DEC 9: Last Day of Classes
DEC 10: Reading Day (no classes)
DEC 11: Comprehensive Final

LECTURE SCHEDULE*

Topic(s)	Chapters in Text or Exam Date
Insect Biodiversity, Tree-Thinking, Success & Dominance, Collecting	1, 5 (part), 6, 7, 35
Insect Orders (Entognathous & Apterygote Orders, Ephemeroptera, Odonata)	7-10 (part)
Insect Orders (Remaining Insect Orders)	11-34 (part)
Insect Body I: External Anatomy	2
EXAM 1	**September 30**
Insect Body II: Development & Reproduction	3
Insect Body III: Digestive, Respiratory, Excretory & Muscular Systems	3
Insect Body V: Nervous System, Senses & Communication, Behavior	3, 4
EXAM 2	**November 13**
Physical, Cultural and Genetic Controls of Insect Pests	
Chemical Controls: Classes, Modes of Action, Regulations	
FINAL EXAM (Comprehensive), starts 8:30	**December 11**

LAB SCHEDULE*

Week Beginning	Topic(s), Video(s), Field Trip, Quiz/Practical Dates
Aug 21 (Th)	(a), Insect Products & Services, Drawer Assignments, Online Lab Safety Quiz, Drivers Needed
Aug 26	Microscope Review, Cladistics Exercise, (b), Practice Pinning, Roll Call of Insect Orders I
Sep 2	(c), Roll Call of Insect Orders II, Field Collecting Methods I (Th, BioAg)
Sep 9	Field Collecting Methods II (Tu), **Field Trip – Knight's Ferry (Th)**
Sep 16	Pin Collected Insects, Preparation & Curation Methods, (d), Insect Anatomy I (antennae), Grasshopper Dissection (Th), Insect ID
Sep 23	Insect Anatomy II (mouthparts), (e), **1st ID Quiz (Orders)** (Th), Insect ID
Sep 30	(f), Vegetable Entomology (Tu), Pollinators (Th), Insect ID
Oct 7	(g), Review for Practical (Tu), **1st Lab Practical (Th)**, (h), Insect ID
Oct 14	PowerPoint Review (FW Talk) (Tu), Insect ID, **2nd ID Quiz (Families**) (Th)
Oct 21	**Food Web Presentations (Tu, Th)**
Oct 28	**Food Web Project (written version due Tu)**, Aquatic Entomology I (Tu), Aquatic Entomology II (Biomonitoring) (Th), Insect ID
Nov 4	(i), Medical Entomology I, Insect ID
Nov 13 (Th)	Medical Entomology II, Insect ID
Nov 18	(j), Forensic Entomology Insect ID
Nov 25	Insect ID, **Collections Due Nov. 26 by 5 pm**
Dec 2	Catch-up Lab, Review for Practical (Tu), **2nd Lab Practical (Th)**

*The instructor reserves the right to change lecture, lab topics, or textbook readings in extenuating circumstances.

List of Scientific Videos for ENTO 3000
(Shown during lab time)

The following videos are listed in chronological order in the lab syllabus (10-60 min in length). Some will have Q/A sheets for you to complete which make good study guides for lecture exams (indicated by *)

a) Rats, Bats and Bugs (Bugs only portion) (50 min)
b) Collection and Preservation of Insects (23 min)
c) Insects: The Little Things that Run the World (60 min)*
d) Dissection and Anatomy of the Grasshopper (10 min)
e) How to Use a Dichotomous Key in Identifying Aquatic Insects (24 min)
f) Integrated Pest Management in Agriculture (30 min)
g) Tales from the Hive (60 min)*
h) Silence of the Bees (60 min)*
i) Deadly Bugs (60 min)*
j) Creatures in Crime (60 min)*

Informative and Engaging Web Resources on Entomology

Entomological Society of America (ESA): http://www.entsoc.org/
Entomological Society of Canada: http://www.esc-sec.ca/
Sociedad Mexicana de Entomologia: http://sociedad-mexicana-entomologia.org/index-2.html
Royal (British) Entomological Society: http://www.royensoc.co.uk/
Australian Entomological Society: http://www.austentsoc.org.au/
UC-Davis IPM Program: http://www.ipm.ucdavis.edu/
University of Florida Book of Insect Records: http://entnemdept.ufl.edu/walker/ufbir/
NCSU, General Entomology: http://www.cals.ncsu.edu/course/ent425/library/tutorials/index.html
Songs of Insects: http://www.songsofinsects.com/
Singing Insects of North America: http://entnemdept.ifas.ufl.edu/walker/buzz/
Food Insects Newsletter: http://www.hollowtop.com/finl_html/finl.html
North American Forensic Entomology Association: http://www.nafea.net/
European Forensic Entomology Association: http://eafe2014.sciencesconf.org/
World Health Organization Photo Library: https://extranet.who.int/photolibrary/index_eng.htm
Knox Cellars Native Bee Pollinators: http://www.knoxcellars.com/
CDC Center for Vector-Borne Diseases: http://www.cdc.gov/ncidod/dvbid/misc/adb.htm
Iowa State University's Tasty Insect Recipes: http://www.ent.iastate.edu/misc/insectsasfood.html
Bioquip Products for entomology/botany: https://www.bioquip.com/
Tree of Life Project (Arthopods): http://tolweb.org/tree?group=Arthropoda&contgroup=Bilateria
Biotherapeutics, Ed. & Research Foundation: http://www.bterfoundation.org/indexfiles/findinfo.htm
USDA/Forest Service Insect Images: http://www.forestryimages.org/
US-EPA Benthic Macroinvertebrates: http://www.epa.gov/bioindicators/html/benthosclean.html
CalPhotos (Invertebrates): http://elib.cs.berkeley.edu/photos/fauna/com-Insect.html