

## COURSE DOCUMENTATION

### I. Course Justification:

In recent years there has been a definite increase in beekeeping as a hobby or as a profession and in the role of the bee as a pollinator of agricultural crops and plants that serve as food for wildlife. This interest in beekeeping has resulted in a corresponding increase of interest in honey bee behavior with particular emphasis on social interactions within the colony. This course is designed to satisfy students who are interested in acquiring a basic knowledge of beekeeping based on an understanding of the bee's biology and behavior and those students who are interested in familiarizing themselves with the sociological aspects of a non-human society.

There are no other courses at the introductory level offered at NC State, which emphasize beekeeping or the honey bee. A good educational curriculum should include the potential for exposure to an animal such as the honey bee, which combines economic importance with a complex and highly evolved, non-human system. The course is designed as a Group C elective for students in CALS; and as a course that satisfies the Natural Science or the Science, Technology, and Society (Science Perspective) of the University's GER requirements for all interested students.

### II. Proposed Revisions:

This course is being revised to comply with the NC State requirements for GER courses, which include a listing of Student Learning Outcomes, including GER outcomes (see Item # III) and GER Course Documentation (see Item # VII).

### III. Enrollment for last five years: (enrollment figures for ENT 203Q which is a FYI course and is separate from ENT 203, Section 001)

2003	Fall – 22	Spring - 22
2002	Fall – 20	Spring – 22
2001	Fall – 20	Spring – 20
2000	Fall - 20	Spring – not offered
1999	Fall – not offered	Spring – not offered

### IV. Resources:

N/A. This is an existing course.

### V. Consultation with other Departments:

N/A

### VI. GER Course Documentation

#### 1. GER Category Objectives: Natural Sciences

- a. Provide instruction and guidance that help students to use the methods and process of science in making hypotheses, solving problems, and making decisions; and

- b. Provide instruction and guidance that help students to articulate, make inferences from, and apply to solving problems, major concepts, principles, laws, and theories of science.
- 2. GER Student Learning Outcomes
  - a. Students should be able to discuss the importance and economic value of honey bees, with emphasis on honey bee pollination of plants and the production of various bee products, on the U.S. economy.
  - b. Students will be able to appraise the possibility and the consequences of a potential problem involving honey bees such as the probability that Africanized honey bees will arrive in North Carolina and the consequences of such an occurrence.
- 3. Means of Evaluating GER Outcomes
 

Students will demonstrate their achievement of the outcomes through:

  - a. preparing and delivering group presentations to the class on the importance and value of various bee products and pollination to our economy and lifestyle. Students will collect data and present their group evaluations on such topics as the impact of honey as an ingredient in the cost and sales of various food products, the scientific validity of using bee products in health food related products, etc. These presentations will be evaluated by the other class members and by a team of outside examiners who will be using a rubric to evaluate the presentations.
  - b. an essay assignment on the question(s) of whether Africanized honey bees will enter and become established in North Carolina in the near future based on the current establishment of the bees and an understanding of the biology and behavior of the insect. The essay will also appraise the consequences of such an occurrence on the state's economy and the potential health consequences to the citizens of North Carolina.

VIII. Syllabus (Current and Proposed) – see attached

## **SYLLABUS** *(Proposed)*

### **ENT 203Q, Section 003** **An Introduction to Honey Bee and Beekeeping** **Linked to MDS 101A, Section 033**

1. **Course Information:**
  - Number, Title & Credits: ENT 203Q, Section 003, An Introduction to the Honey Bee & Beekeeping (3 Credits)
  - Meeting Time & Place: Fall Semester, Tuesday and Thursday from 9:50-11:05 in Owen Lounge
2. **Course Instructor:**
  - Name: Dr. John T. Ambrose

Office: 43 Tucker Hall  
Phone: Office – 515-8498  
Home – 847-9570  
E-Mail: [john\\_ambrose@ncsu.edu](mailto:john_ambrose@ncsu.edu)  
Fax: 515-8267  
Office Hours: By appointment, call Janese Dockery at 515-8497  
Course Website: webct.ncsu.edu

**3. Course Prerequisites & Restrictions:**

There are no course prerequisites but the course is restricted to first year freshmen.

**4. Course Description:**

Introduction to honey bee biology and fundamental understanding of beekeeping management, including crop pollination by bees. Examination of the relationships between honey bees and humans from prehistoric through modern time and the behavior and social system of one of the animal world's most complex and highly organized non-human societies.

**5. GER Designation of Course & Course Objectives:**

A. GER Category: Natural Sciences

B. GER Objectives:

1. Provide instruction and guidance that help students to use the methods and process of science in making hypotheses, solving problems, and making decisions;
2. Provide instruction and guidance that help students to articulate, make inferences from, and apply to solving problems, major concepts, principles, laws, and theories of science.

**6. Student Learning Outcomes:**

- A. Students should be able describe various aspects of honey bee biology and behavior.
- B. Students should be able to compare and contrast the sensory systems of the honey bee to the sensory systems of humans.
- C. Students should be able to use their understanding of the sensory systems of the honey bee to predict behavioral responses to various stimuli and situations and compare and contrast those responses to those that would be expected from a human sensory system.
- D. Students should be able to discuss the importance of honey bees and the honey bee's society and the interpretation that has been placed on the insect and its society by various writers in comparing bee and human societies.
- E. Students should be able evaluate the importance and the economic value of honey bees, with emphasis on bee pollination of plants and the production of various bee products, on the U.S. economy.
- F. Students should be able to appraise the possibility and the consequences of a potential problem involving honey bees such as the probability that Africanized honey bees will arrive in North Carolina and the consequences of such an occurrence.

**7. Course Requirements and Grading:**

- A. The course grade will be based on three exams & related activities with the following weight:

Two Unannounced Quizzes	-	05%
Two Inquiry Based Papers	-	05%
Two Group Presentations	-	30%
First Preliminary Exam	-	25%
Final Exam	-	35%

**Note:** Extra credit (up to 2% of the total grade) may be obtained by preparing a term paper on a subject approved by the instructor.

**Grade Schedule:**

A+ = 98-100%	C+ = 78-79%
A = 93-97%	C = 73-77%
A- = 90-92%	C- = 70-72%
B+ = 88-89%	D+ = 68-69%
B = 83-87%	D = 63-67%
B- = 80-82%	D- = 60-62%
	F = less than 60%

\*Based on total points for the semester not including extra credit or bonus points.

**Grade Activation:**

In order to earn any points in ENT 203Q, Section 003, you must first activate the system. Activation requires that you schedule an appointment with me in my office no later than September 5, 2003. Call 515-8497 to schedule this appointment.

B. Attendance Policy:

Students are expected to attend class on a regular basis. If a student misses a quiz, a preliminary or a final examination and has an approved excused absence, then the student will be allowed to take a make-up examination. Otherwise, missed examinations will receive a 0 grade. For additional information see [http://www.ncsu.edu/provost/academic\\_policies/attend/reg.htm](http://www.ncsu.edu/provost/academic_policies/attend/reg.htm)

C. Academic Integrity:

Students in this course are expected to comply with NC State University's policy on academic integrity found in the Code of Student Conduct and the NCSU Honor Pledge. Each examination will require the student's signature on the Honor Pledge statement certifying that he/she has neither given nor received unauthorized aid on the test. The student's signature represents his/her commitment to the spirit of the Honor Pledge. For additional information see [http://www.ncsu.edu/provost/academic\\_policies/integrity/reg.htm](http://www.ncsu.edu/provost/academic_policies/integrity/reg.htm)

D. Students with Disabilities:

If you have a disability that may affect your participation in this class, please notify me as soon as possible so that any necessary adjustments can be made. For additional information see [http://www.ncsu.edu/provost/offices/affirm\\_action/dss/](http://www.ncsu.edu/provost/offices/affirm_action/dss/)

**8. Optional Textbook:**

The Hive and the Honey Bee, Joe M. Graham, 1992, Dadant and Sons, Inc., Hamilton, ILL. Cost - \$36.00

This is an optional text for the class. It would be a beneficial supplement to the students who plan to continue their studies or work with bees, but it is not required for this course. Appropriate handouts will be used to supplement the lecture material.

9. **Lecture Schedule:**

\*See attached schedule and note that two outdoor demonstrations are scheduled so that “hands-on” experience with bees may be obtained in this lecture course. The outdoor demonstrations are scheduled as follows:

September 25, 2003

The Role of Pheromones (Chemicals) in Honey Bee Communication will be examined by working with a Swarm of approximately 12,000 Honey Bees

November 4, 2003

A Demonstration of Harvesting Honey from the Beehive and Processing Honey will be conducted

\*Any student who thinks that he/she may have an allergy to honey bee stings must contact the instructor **prior** to attending any demonstration. These are very safe exercises and stinging is not expected, but the precaution of contacting the instructor about any possible allergic conditions **required**.

## LECTURE SCHEDULE

<u>Date</u>	<u>Topic</u>
Aug 21	Introduction And Safety Lecture On Bee Stings And Allergic Reactions
Aug 26	Relationship Of The Honey Bee To Arthropods In General And To Other Social Insects In Particular
Aug 28	The Occupants Of The Beehive: Castes And Division Of Duties.
Sept 2	Thinking Like A Bee – Understanding How A Bee Perceives The World Based On Its Senses Of Sight, Sound, Touch, Taste, & Smell With A Comparison To Similar Senses In People
Sept 4	Thinking Like A Bee (cont.)
Sept 9	A Look At Some Senses Of The Bee That Are Not “Seemingly” Shared By Human, Such As Electromagnetism, Gravity, And More
Sept 11	The Use Of Chemical Communication By Bees And How We Can Eavesdrop On The Bee’s Language.
Sept 16	Other Communication Strategies Of Honey Bees, Including The Dance Language And A Discussion Of Whether There Really Is A Dance Language
Sept 18	People’s Involvement With Bees Throughout The Ages, With An Emphasis On The Bee Society Being Used As A Model(s) For Human Society
Sept 23	First Preliminary Exam
Sept 25	Outdoor Demonstration: The Role Of Pheromones (Chemicals) In Honey Bee Communication Will Be Examined By Working With A Swarm Of Approximately 12,000 Honey Bees
Sept 30	The Things That Bees Collect: A Survey Of The Relationship Between The Flowering Plants And Bees With An Emphasis On The Collection Of Nectar, Pollen, Propolis, And Water, And The Use Of Those Products By The Bees. Group Presentations On Learning And Learning Styles In Honey Bees And In Humans
Oct 2	Things Bees Collect (cont.)

Oct 7 Major Products Of The Beehive: The Importance Of Honey And Beeswax To Humanity Throughout History And Today  
A Demonstration of Mead-Making (Honey Wine) Will Be Conducted

Oct 9 No Class/Fall Break

Syllabus Continued  
page 6

Oct 14 Minor Products Of The Beehive: Emphasis On Such Products As Royal Jelly, Bee Venom, Propolis, And Pollen And Their Use By The Medical Community And In Apitherapy  
A Honey Tasting Will Be Conducted

Oct 16 Developmental Cycle Of The Honey Bee Colony – An Overview Of The Colony From Its Establishment Through Maturity  
Discussion About Student Participation At The Honey Exhibit At The NC State Fair

Oct 21 Development Cycle Of The Honey Bee Colony Will Continue, With An Emphasis On Honey Bee Swarming (Colony Reproduction) And Queen Supersedure.

Oct 23 Pests (Tracheal And Varroa Mites And Small Hive Beetles) And Predators Of Honey Bees

Oct 28 Diseases Of The Honey Bee And Dealing With Pesticides

Oct 30 Group Presentations

Nov 4 Second Outdoors Demonstration: A Demonstration Of Harvesting Honey From The Beehive And Processing The Honey

Nov 6 Africanized (Aka Killer Bees) Honey Bees: The Real Story

Nov 11 Beekeeping Management: Site Selection For The Apiary And Selecting The Necessary Equipment.

Nov 13 Beekeeping Management (cont.): Managing The Bee Colony Throughout The Year

Nov 18 Beekeeping Management (cont.): Product Harvesting And Marketing

Nov 20 Pollination And The Sex Life Of Plants: Yes, Both Birds And Bees Do It Too

Nov 25 Pollination And Honey Bees: Pollination Of Wild And Commercial Plants Is 1/3 Of Your Daily Diet Really From Bee Pollination?

Nov 27 No Class/Thanksgiving Holiday

Dec 2      Pollination (cont.), With An Emphasis On Developing Schemes For The  
Pollination Of Apples And Cucumbers Under NC Growing Conditions

Dec 4      Overview And Discussion For Final Exam

**Final Exam**