School of Agriculture Trades & Environment

BK 132 HONEY BEE BIOLOGY 4(4-0-3) 8 WEEKS; 56 HOURS

COURSE OUTLINE – JANUARY 2012

INSTRUCTOR: TBA **PHONE:** TBA
OFFICE: TBA **E-MAIL:** TBA

OFFICE HOURS: TBA

POSSIBLE TEXT/RESOURCE MATERIALS:

Mark Winston, *The Biology of the Honey Bee* (First Harvard University Press, 1991).
Joe Graham, *The Hive and the Honey Bee* (Dadant and Sons, 1992) p. 1 – 61. *

PROPOSED RECOMMENDED READINGS:

R.E. Snodgrass, *Anatomy of The Honey Bee* (Government Printing Office, 1910).
H.A Dade, *Anatomy & Dissection of the Honey Bee* (International Bee Researcher Association, 1977). *
Journal of Apiculture Research (International Bee Research Association, 2009).
John B. Fee, *Pheromones of Social Bees* (Springer, 1987).
Martin Lindauer, *Communication Among Social Bees* (Harvard University Press, 1971).
Randolf Menzel & Alison Mercer, *Neurobiology and Behaviour of Honey Bees* (Menzel Group, 1987).

CALENDAR DESCRIPTION:

This course provides an in-depth study of honey bees, their behavior and anatomy. Honey bee genetics, bee breeding and selection, and the colony will also be covered.

CREDIT/CONTACT HOURS:

Course consists of 4 lecture hours and 3 lab hours per week for 8 weeks; 56 hours total.

DELIVERY MODE(S):

The course work includes lectures, discussions, assigned readings, a biology report, lab work including assignments and 3 quizzes, as well as a midterm and final exam.

OBJECTIVES

1. To gain a thorough understanding of honey bee behaviour and anatomy the physiology of the digestive, respiratory, circulatory, and nervous systems.
2. To provide students with the basic knowledge on which colony management, disease control, and queen rearing decisions are made.

PROPOSED **EVALUATIONS**

Midterm Exam	25 %
Class Participation	10 %
Laboratory and 3 Quizzes	15 %
Bee Biology Report	20 %
Final Exam	30 %

PROPOSED **COURSE TOPICS:**

- Intro Entomology as a discipline
- Understand the evolution and systematics of the hymenoptera
    - Link to plant – pollinator coevolution in BK122
    - *Very introductory* ID in labs
    - Comparison of native bees, honey bees, and wasps (museum collection in lab)
- Anatomy and Physiology
    - External Anatomy
        - General Body Organization
        - Specialized Anatomical Features
            - Head, mouthparts and antennae
            - Thorax and thoracic appendages
            - Abdomen
    - Food and Alimentary Canal
        - Very basic intro to the eukaryote cell
            - Cell Biology and The Natural Needs of The Bee (nutrition, temp, humidity, etc)
        - Digestion and Elimination of Wastes
    - Blood and Circulation
        - Blood composition and function
        - Circulatory anatomy and function
    - Respiratory System
        - Gas exchange and distribution
    - Nervous System and Sense Organs
- Behaviour
    - Colony as “superorganism”
    - physiological needs of individual vs. colony
    - Social Organizations of the Colony
    - The Role of Pheromones
    - Communication and Orientation
    - Reproductive Behaviour
- Genetics
    - Genes and the Inheritance of Characteristics
    - Honey Bee Genetics, A Special Case

- Bee Breeding

Rough outline

WK 1 – 2 Evolution and systematics
WK 2 – 3 Cell biology and gross worker body plan/lifecycle
Wk 4 – 5 Anatomy and physiology of Worker bees
Wk 6 – 7 The superorganism
Wk 8 link to management, intro genetics, etc.

Course will be 2 x 1.5 hour lectures, 1 x 1hr lecture/review, 1 x 3 hr lab, weekly