1. Catalog description
   a. BIO 5210
   b. Insect Morphology and Physiology
   c. (3-3-4)
   d. S-even-numbered years
   e. Insect Morphol.
   f. An in-depth examination of the physiology processes and morphological adaptations by which insects function in their physical, chemical and biological environments. Experimental methods and research equipment appropriate to the discipline will be introduced.
   g. Prerequisites: BIO 3720 or equivalent, or by consent of instructor.
   h. Spring 2006

2. Objectives of the course
   a. Students will:
      1. learn and discuss basic principles used in the study of insect morphology and physiology through a systems approach illustrated by both generalized and specialized taxa.
      2. apply basic principles and develop skills using experimental methods and equipment relevant to the study of insect morphology and physiology.
      3. apply experimental techniques and analyze results of individualized projects investigating aspects of insect morphology and physiology in the laboratory.
      4. conduct library research of current literature relevant to their project topic and synthesize literature with their own project results.
      5. analyze experimental results to write a formal scientific research paper and demonstrate effective verbal communication of the application and synthesis of insect morphology and physiology through an oral presentation of project results.
   b. Assessment will be based on two term exams and a final exam (35 %); homework assignments from lecture and readings (15 %); lab exercises (10%), individual laboratory project, written report and oral presentation (40%)
| analyze experimental results | Conduct library research of current literature & synthesize literature with project results. | X |
| Analyze experimental results in a written research report and demonstrate effective verbal communication through oral presentation of project results. | X |

c. Not technology delivered  
d. Not applicable  
e. Not applicable

3. **Outline of the Course**
   a. Units of time: 3 fifty-minute lectures and 1 three-hour lab over 15 weeks.

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<th>Week</th>
<th>Subject</th>
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| 1    | Lecture: Introduction to insect body plan.  
      | Lab: Introduction to microscopy and staining techniques |
| 2    | Lecture: Insect integument  
      | Lab: Introduction to physiological measures |
| 3    | Lecture: Insect head and appendages  
      | Lab: Introduction to physiological measures continued. |
| 4    | Lecture: Thorax and abdominal structures  
      | Lab: Flight, mechanisms, physiology, and measures |
| 5    | Lecture: Digestive system  
      | Lab: Insect nutrition |
| 6    | Lecture: Nervous system and sensory structures  
      | Lab: Fluorescent antibody labeling |
| 7    | Lecture: Respiratory system  
      | Lab: Measuring respiration |
| 8    | Lecture: Reproductive system  
      | Lab: Student projects |
| 9    | Lecture: Embryogenesis  
      | Lab: Student projects |
| 10   | Lecture: Hormones in development  
      | Lab: Student projects |
| 11   | Lecture: Muscles and circulatory system  
      | Lab: Student projects |
| 12   | Lecture: Excretion  
      | Lab: Student projects |
| 13   | Lecture: Neuro-anatomy/pheromones  
      | Lab: Student presentations |
4. Rationale
   a. Purpose and need: Insects are the most abundant and speciose animals on Earth. They are also the most important pests of agriculture, transmit the most important vectored infectious diseases to animals and humans, and are key bio-indicators of ecological systems. This course builds on the foundations of BIO 3720 (Entomology) by providing students with the opportunity to explore morphology or physiology in depth.
   b. Justification of the course level and prerequisites: This course is intended for graduate students. Introduction to entomology is required, since this course builds on a basic understanding of general insect biology, classification, and behavior.
   c. This course does not significantly overlap with any existing course within our program, but focuses, at the graduate level, on two disciplines introduced in general entomology, physiology and morphology.
   d. Program impact: Elective for graduate students in the Biological Sciences.

5. Implementation
   a. The course will be initially taught by Dr. Ann H. Fritz.
   b. No additional costs required.

6. Not applicable

7. Date approved by the Departmental Curriculum Committee
   February 2, 2004

8. Date approved by COSCC
   April 30, 2004

9. Date approved by CGS
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