99A

Change 4000/6000 Course

Change a Course

Subject: ENT-Entomology

Number: 4690/6690

Effective Term: ~~Spring~~ Fall 2017

Title: Aquatic Insects

Honors Course:

☑ Add Honors Course: ENT 4690

Last Term Course was taught: 201501

Brief Statement of Change Based on Assessment Results:
Assessment has revealed the level of morphological details necessary for this course to be self-contained. This material is now incorporated in the course, rather than relying on an Introductory Entomology course. As a result, we are requesting removal of the ENT3010/3011 prerequisite.

Rationale for Changing a Course

- ☐ Strengthen Program Requirement(s)
- ☐ Alignment of Student Learning Outcomes
- ☐ Alternative Delivery of Content
- ☐ Improve Time to Degree
- ☐ Evolution of the Discipline
- ☑ Changing Prerequisites
- ☐ Address DWF Rates
- ☐ General Education Modifications
- ☐ Other (Please specify.)

Honors

- ☐ Honors Students Only?
- ☑ Honors sections allowed to be offered?

☑ Change Prerequisite(s) / Corequisite(s)

From ENT3010, ENT3011

To BIOL1100 &1110 and sophomore standing or higher.

Learning Objectives

To learn
(1) the literature, characters, and methods for identification of aquatic insects and other benthic macroinvertebrates;
(2) morphological, physiological, and behavioral modifications for life in the water;
(3) life history characteristics and habitat preferences of the different aquatic insect groups;
(4) a variety of qualitative and semi-quantitative collecting techniques; and
(5) background for research and employment in aquatic ecosystems, supporting activities in ecology, biological monitoring, and freshwater fisheries biology.
(6) relevant research needs and techniques (ENT H4690/6690/H4691/6691);

Topical Outline

Special reasons to study aquatic insects.
How to collect/sample aquatic insects qualitatively/quantitatively.
Preserving & labeling specimens.
Advantages/disadvantages of using aquatic insects for monitoring water quality.
Rapid bioassessment protocols.
Slide preparation of specimens.
Freshwater habitats and communities; river continuum concept; nutrient spiralling.
Insect morphology and special adaptations for aquatic life.
Orders of aquatic insects.
Classification, biology, and literature of aquatic and semi-aquatic Collembola, Dermaptera, Orthoptera, and Ephemeroptera.
Classification, biology, and literature of Ephemeroptera and Odonata.
Classification, biology, and literature of Plecoptera.
Classification, biology, and literature of aquatic and semi-aquatic Hemiptera-Heteroptera.
Classification, biology, and literature of Megaloptera, Neuroptera (Sisyridae), Lepidoptera, Mecoptera (Nannochoristidae), and Hymenoptera.
Classification, biology, and literature of Trichoptera.
Classification, biology, and literature of aquatic and semi-aquatic Coleoptera.
Classification, biology, and literature of aquatic and semi-aquatic Diptera.
Classification, biology, and literature of Chironomidae.

Add course requirements for honors courses (if applicable)
Honors student semester project

Add course requirements for 6000-level courses
Graduate student semester project

Evaluation

4000				6000			
A	90	-	100	**A**	90	-	100
B	80	-	89	**B**	80	-	89
C	70	-	79	**C**	70	-	79
D	60	-	69	**F**	<		70
F	<		60				

35%	Collection	35%	Collection
16.25%	Average on the weekly quizzes	20%	Special project
16.25%	Mid-term examination	11.25%	Average on the weekly quizzes
16.25%	Final examination	11.25%	Mid-term examination
16.25%	Identification exam	11.25%	Final examination
		11.25%	Identification examination

Syllabus

Upload File: 1-Syllabus 2017-20161102164030.doc

Description: Morse Aquatic Insect Syllabus

Form

User ID: turnbul **Name:** Matthew Turnbull

Date: 11/03/2016 **Number:** 27491

Paula Agadelotti — Jan. 23, 2017

Chair, Department Curriculum Committee — Date

[signature] — 1/23/17

Department Chair — Date

[signature] — 2/20/17

Chair, College Curriculum Committee — Date

[signature] — 2/20/17

College Dean — Date

Director, Calhoun Honors College — Date

[signature] — 3/8/2018

Chair, Undergraduate Curriculum Committee — Date

Chair, Graduate Curriculum Committee — Date

Provost — Date

President — Date

AQUATIC INSECTS

Catalog Description: Life history, habitats, sustainability, and interrelationships of aquatic insects; experiential learning opportunities in field collecting and laboratory identification of biodiversity; important literature and research workers. Preq: BIOL 1100 and 1110 and sophomore standing or higher.

Objectives: To learn

(1) the literature, characters, and methods for identification of aquatic insects and other benthic macroinvertebrates;
(2) morphological, physiological, and behavioral modifications for life in the water;
(3) life history characteristics and habitat preferences of the different aquatic insect groups;
(4) a variety of qualitative and semi-quantitative collecting techniques;
(5) relevant research needs and techniques (ENT H4690/6690/H4691/6691); and
(~~5~~6) other background for research, employment, and recreation in aquatic ecosystems, supporting activities in ecology, biological monitoring, and freshwater fisheries biology.

Required Text: An Introduction to the Aquatic Insects of North America, **4th edition, 2008**, edited by R.W. Merritt, K.W. Cummins, and M.B. Berg. Additionally, other readings will be assigned.

Grading:

ENT 4690/4691:

(1) 35%Collection
(2) 16.25% Average on the weekly quizzes (after dropping the lowest quiz grade)
(3) 16.25% Mid-term examination
(4) 16.25% Final examination
(5) 16.25% Comprehensive identification examination

Successful completion of a written report on the practical exercise using the EPA Rapid Bioassessment Protocol will add 1–5 extra points to the final numerical grade.

ENT H4690/6690/H4691/6691:

(1) 35% Collection
(2) 20% Special project (project description attached)
(3) 11.25% Average on the weekly quizzes (after dropping the lowest quiz grade)
(4) 11.25% Mid-term examination
(5) 11.25% Final examination
(6) 11.25% Comprehensive identification examination

Successful completion of a written report on the practical exercise using the EPA Rapid Bioassessment Protocol will add 1–5 extra points to the final numerical grade.

Attendance: Students are responsible for attending all classes, laboratories, and field trips. Work missed because of absence must be completed on the student's own time. A missed quiz cannot be taken at another time. The instructor or an assistant will also be present and on time or will arrange for a substitute instructor. "If no advance arrangements are made, students are authorized to leave after a fifteen-minute wait." (C.U. Faculty Manual, p. 64)

Clemson University Statement of Academic Integrity: "As members of the Clemson University community, we have inherited Thomas Green Clemson's vision of this institution as a 'high seminary of learning.' Fundamental to this vision is a mutual commitment to truthfulness, honor, and responsibility, without which we cannot earn the trust and respect of others. Furthermore, we recognize that academic

dishonesty detracts from the value of a Clemson degree. Therefore, we shall not tolerate lying, cheating, or stealing in any form."
Your signature on any work submitted for a grade for this course will be considered your affirmation of this integrity statement and your pledge that you have acted accordingly.

Disability Statement. "It is University policy to provide, on a flexible and individualized basis, reasonable accommodations to students who have disabilities. Students are encouraged to contact Student Disability Services to discuss their individual needs for accommodation."

Instructor: J.C. Morse (656-5049, jmorse@clemson.edu), 310 Long Hall, 8:00 am –4:30 pm M–F

Course Outline:
Special reasons to study aquatic insects.
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Classification, biology, and literature of Megaloptera, Neuroptera (Sisyridae), Lepidoptera, Mecoptera (Nannochoristidae), and Hymenoptera.
Classification, biology, and literature of Trichoptera.
Classification, biology, and literature of aquatic and semi-aquatic Coleoptera.
Classification, biology, and literature of aquatic and semi-aquatic Diptera.
Classification, biology, and literature of Chironomidae.

AQUATIC INSECTS
BIOL/ENT/WFB H4690/6690
SPECIAL PROJECT

Each honors student or graduate student is expected to complete a small research project in consultation with the Instructor. An example is to associate and describe the immature stages of an aquatic insect species, preferably of a species whose immature stages are not yet known or are poorly described in the literature. (About 60% of the species in our region fall into this category.)

Describe the immature stages associated, including original black-and-white line drawings (India ink on special drawing paper or Adobe Illustrator), in a manuscript suitable for publication. Follow the format of a particular refereed journal and submit the paper to the course instructor with a photocopy of the journal's "Instructions for Authors" and a cover letter addressed to the actual journal editor. The submitted paper should include the following, in this order:

- Cover letter (on your department's letterhead stationary, including your complete title, author(s), confirmation that your work has not been published elsewhere, confirmation of ability to pay page charges, and list of potential reviewers and their contact information),
- Text (double-spaced, with pages numbered, including
  - Title page (counted as "Page 1," but without an explicit page number),
  - Abstract and key-words on a separate page,
  - Introduction concerning previous taxonomic work on the immatures of this species and related taxa,
  - Methods, with mention of the collection location, rearing or other association technique, specimen preparation and illustration techniques, and repository of voucher specimens,
  - Description of the immature stage(s) in telegraphic style (without verbs or articles),
  - Key or diagnosis for distinguishing related taxa (related taxa should be illustrated, but you may borrow or redraw illustrations from existing literature, provided that you credit your sources—If actually submitting for publication, be sure to obtain copyright permission for reproduced illustrations),
  - Geographical range and biological notes,
  - List of materials examined, and
  - Any other noteworthy information.
- Acknowledgements (including, "This is Technical Contribution No. XXXX of the Clemson University Experiment Station.")
- References cited (on a separate page or pages),
- Figure captions (on a separate page or pages, with reference credits for any borrowed or redrawn figures),
- Suggested running head (on a separate page),
- Original illustrations of diagnostic characters for your species. Templates for iIllustrations must be prepared with drawing tube or grid, finalized with India ink or Adobe Illustrator, mounted on plates, numbered and labeled, with scale bars. [SEE INSTRUCTOR FOR HELP!]
- Be sure to include any other material required by your chosen journal.
- For the instructor's information, also supply a photocopy of the journal's currently applicable "Instructions for Authors." Of course, you should read and follow these carefully yourself!

You are encouraged to discuss this project with the instructor early in the semester.

The project is due the last laboratory session of the semester (28 April 2017).

Evaluation -- The elements of the paper will be evaluated with the following weights:

- Cover letter (5%)
- Text (except key or diagnosis), acknowledgements, references, and running head (40%)
- Key or diagnosis (25%)
- Illustrations and captions 30%