

BIOSC 1190: Aquatic entomology

Summer 2017; 15 May to 2 June 2017; University of Pittsburgh Pymatuning Laboratory of Ecology
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COURSE INFORMATION

Course Description

BIOSC 1190: Aquatic entomology is the study of a unique assemblage of insects that inhabit freshwater ecosystems, including streams, wetlands, lakes, and ponds, during part of their life history. Because of the high level of diversity and range of tolerance to environmental stressors exhibited by aquatic insects, these organisms are widely used as bioindicators for regulatory purposes. Consequently, familiarity with the assemblage allows environmental practitioners to rapidly and accurately assess the ecological state of aquatic ecosystems by quantifying insect collections. BIOSC 1190 will introduce the taxonomy, ecology, and physiology of aquatic insects with emphasis on identification. The combined suite of lectures, field trips, and laboratory exercises will give students a primer on aquatic entomology that will allow them to use aquatic insects as a management tool in environmental science.

All students must be prepared for extensive time spent in the field collecting insects, mostly from streams but occasionally from lentic ecosystems as well. Please come to class each day prepared for field work outside.

Student Learning Outcomes

At the completion of this course, students will be able to:

- Identify the major orders of aquatic insects without the use of a dichotomous key and the families of Ephemeroptera, Plecoptera, and Trichoptera with the aid of a key.
- Pass the Society of Freshwater Science family-level EPT identification certification exam.
- Link collections of aquatic organisms with the ecological health of streams through the calculation and interpretation of indices of biotic integrity (IBIs).
- Describe the major ecological roles of aquatic insects at fine and broad spatiotemporal scales.
- Demonstrate understanding of the physiological adaptations aquatic insects have evolved to thrive in aquatic environments.

Required Texts and Materials

Lancaster, J. and B. Downes. Aquatic Entomology. Oxford University Press, Oxford, U.K. (ISBN-10: 0199573220)

Microsoft Excel and the Excel Analytical Toolpak *or* Program R and RStudio

Optional Texts and Materials- Excerpts from various books and academic journals will be provided throughout the semester.

COURSE ASSIGNMENTS

Exams (50 points ×3) will consist of the theoretical and applied content presented in class. Exams will be non-cumulative, meaning that the third and final exam will only cover material from the final third of the class. The content and design of the exams will vary throughout the course and be comprised of open-book, closed-book, and specimen identification challenges. Each exam will be preceded by a study guide and in-class review session.

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Each student will develop a **personal specimen collection (50 points)** throughout the class that they can use as a reference tool following course completion. The accurate identification of at least 50 organisms to the family-level and 20 organisms within to the genus-level will be assessed for accuracy.

Each student will choose a favorite organism to study and create an **in-depth report (50 points)** on the ecology, life history, and biodiversity of a particular *family* of insects that they choose. The report will require students to scour and summarize peer-reviewed literature pertinent to their chosen family, generate a literature review on each of the three attributes, and give an in-class presentation that introduces the family to the entire class.

At the end of the class students will take the **online Society for Freshwater Science Ephemeroptera, Plecoptera, and Trichoptera family-level identification exam** as a practice run and report the results to Dr. Utz for **30 points**. If compelled to do so, the students may pay to take the exam for official certification from the SFS that they can use as a formal contribution to their curriculum vitae.

Assignments:

Exams (50×3)	150
Family review in-depth project (50)	50
SFS EPT family-level exam	30
Participation	25
TOTAL	340 to 390

Course Policies

Attendance and/or participation: Every student enrolled at Chatham accepts the responsibility to attend all required class meetings. To obtain the fullest benefit from their courses, students must participate fully. This implies attending regularly, engaging in course activity, completing work on time, and making up work missed because of an emergency absence. It is the student's responsibility to let the course instructor know within the drop-add period if he or she will have to miss class for religious reasons, athletics, or other.

Moodle: **Please turn in all assignments on Moodle rather than emailing them to me.** This helps me make sure you get the credit you deserve, as finding your assignment on Moodle is very easy relative to digging through my email inbox. Some assignments may make more sense to turn in a paper copy, and doing so is fine. **However, assignments emailed to me will not be graded.** Sometimes I forget to post the assignment on Moodle. If this happens and you are ready to turn in your assignment, send a quick note and I'll get the assignment on Moodle ASAP. I will also make sure that Moodle allows you to make edits to something you have already turned in.

Undergraduate Grading Scale (%):

A	93-100	C	73-76
A-	90-92	C-	70-72
B+	87-89	D+	67-69
B	83-86	D	63-66
B-	80-82	D-	60-62
C+	77-79	F	<60

Missed exams/assignments: missing an exam due to an emergency or illness is acceptable but the exam must be taken as soon as is possible. Late assignments will be penalized 10% per day overdue.

Computers: Please bring computers for class activities but limit use of computers to course-relevant applications. I can tell if you are paying attention to class or what is on your laptop and many studies have shown that not having a laptop improves classroom learning. Thus, if I continually notice laptop distraction and you have less than an A, I may intervene and suggest a new strategy for what you do during class.

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An undergraduate course workload is set to be 3 hours per week for every 1 credit hour. For a 3 credit hour undergraduate course, students are expected to spend 9 hours per week attending class and working on assignments out of class. Thus, for a schedule of 15 credit hours, students should expect to spend approximately 45 hours on course work in and out of class.

COURSE SCHEDULE-LECTURE COMPONENT

The following course schedule is a **live document**, meaning that it may be updated as the semester proceeds. Updates to the schedule, including changed dates for assignments, and/or additional readings will be announced in class. However, if you are unsure of anything, **check the syllabus on Moodle for the most up-to-date version of the schedule**. The posted schedule will be what you are responsible for.

Date	Agenda	Action items due (on date listed)
WEEK 1		
5/15	-Introduction to course structure and plans -What are aquatic insects and why study them? -Evolutionary history of aquatic insects -Overview of D-net sampling and Surber sampling -FIELD WORK: stream sampling	
5/16	-Quick overview of Linnean hierarchy and use of dichotomous keys -Introduction to the major orders of aquatic insects -Overview of sample sorting -LAB WORK: order-level identification of samples from 5/15	
5/17	-Introduction to the major orders of aquatic insects, continued -FIELD WORK: stream sampling	
5/18	-Ecophysiology and adaptation to environmental conditions -LAB WORK: family-level identification of samples from 5/15 and 5/17	
5/19	-Ecophysiology, continued -LAB WORK: family-level identification of samples from 5/15 and 5/17 -EXAM 1	
WEEK 2		
5/22	-Sensory systems -Indices of biotic integrity (IBIs): theory, application, and calculation -LAB WORK: setup of dissolved oxygen experimental apparatuses -FIELD WORK: collection of organisms for dissolved oxygen lab	

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5/23	-Locomotion in the aquatic environment - LAB WORK: dissolved oxygen and behavior experiment	
5/24	- Dispersal and reproduction in the terrestrial environment - FIELD WORK: entomology of lentic environments: sampling lakes	
5/25	- Exam 2 - LAB WORK: family-level identification of samples from 5/24	
WEEK 3		
5/28	- Reproduction and population dynamics - LAB WORK: detritivore feeding preferences laboratory setup - FIELD WORK: collection of individuals for detritivore laboratory	
5/29	- Reproduction, continued - Feeding and trophic interactions - LAB WORK: detritivore feeding preferences laboratory - FIELD WORK: collection of individuals from impacted stream	
5/30	- Feeding and trophic interactions, continued - LAB WORK: family-level sample identification from 5/29	
6/1		
6/2	- Exam 3 - Take SFS family-level online EPT identification exam	- Report SFS EPT family-level exam by the end of the day

CREDIT HOUR REQUIREMENTS

All courses, including those offered fully online, in a blended format, and in a seven-week session, must meet for a minimum of 14 hours per credit, **plus** the final examination period. If your class is not scheduled to physically meet for the appropriate number of hours, you must include a set of *Equivalent Instructional Activities* (EIAs) on the syllabus showing how the contact hours will be met.

POLICY STATEMENTS

Chatham University Honor Code

Chatham University students pledge to maintain the Honor Code, which states in part: "Honor is that principle by which we at Chatham form our code of living, working, and studying together. The standards of honor at Chatham require that all students act with intellectual independence, personal integrity, honesty in all relationships, and consideration for the rights and well being of others."

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Information about the Honor Code is available in the [Student Handbook](#).

Cheating and Plagiarism -- Cheating is defined as the attempt, successful or not, to give or obtain aid and/or information by illicit means in meeting any academic requirements, including examinations. Plagiarism is defined as the use, without proper acknowledgement, of the ideas, phrases, sentences, or larger units of discourse from another writer or speaker.

Turnitin.com and FERPA -- In all classes, faculty must notify students if the Turnitin service may be used. Student papers are protected by the Family Educational Rights and Privacy Act as they are educational records that contain personally identifiable information. If faculty submits a paper or an excerpt from a paper on behalf of a student for evaluation by Turnitin, an alias must be used instead of the student's name and faculty will ensure that any identifiable personal information is removed before submission.

Disability Statement -- Chatham University is committed to providing an environment that ensures that no individual is discriminated against on the basis of her/his disability. Students with disabilities, as defined under the Americans with Disabilities Act of 1990 (ADA) and who need special academic accommodations, should notify the assistant dean of the PACE Center as soon as possible. The PACE Center will work with students and the course instructor to coordinate and monitor the provision of reasonable academic accommodations.

Non-Registered Students Policy -- In accordance with University policy, only officially registered students may attend this class and all other classes offered at the University after the drop/add period. Please confer with your academic advisor if you need assistance with the registration process or you need additional information.

Minimum Grade Requirements -- Graduate students must earn a grade of B- or above in all courses. Undergraduates must earn a grade of C- or above in all courses completed after spring 2011 used to fulfill major or minor requirements. Please refer to the University catalog or individual program manuals for additional information.

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MINIMUM TECHNOLOGY REQUIREMENTS

Internet Access	Broadband cable or DSL with a minimum connection speed of 768k bit is recommended; slower connections may not provide optimal course experience and performance
Operating System	Microsoft Windows 7 or higher (PC) Mac OS X 10.6 or higher (MAC) Current students may purchase Operating System upgrades from the Chatham Helpdesk
Processor Type	2.0 GHz or higher
System Memory	4GB RAM or higher
Monitor	1024x768 or higher screen resolution
Software	Microsoft Office 2013 or higher (PC) Microsoft Office 2011 or higher (MAC) R and R Studio (freeware) All students will be provided with Microsoft Office 365 Current students may purchase Microsoft Office from the Chatham Helpdesk
Web Browser	Mozilla Firefox (Recommended for Moodle), or Google Chrome Incognito (Recommended for myPortal); other browsers such as Internet Explorer, Opera and Apple Safari are not recommended
Storage	500GB of hard drive or greater
Audio	Computer speakers and headphones
Visual	Web Camera
E-mail	Chatham University email account (Microsoft Office 365)
Web Conferencing	Courses using web conferencing for online meetings require the following: <ul style="list-style-type: none">• For audio: headphones and microphone• For video: web camera
Plug-ins	Course content may include file types that require special plug-in software, which are typically available as free downloads (ex: Real Player, Java, QuickTime, Silverlight, Adobe Reader and Adobe Flash)
Mobile Devices	Some resources are available via smartphones and tablets. Please note: Mobile devices will not be able to complete all course requirements. Students will still need regular access to a computer.
On Campus Resources	Current students have access to the following resources: 24 Hour Computer Lab – JKM Library 106 Computer Lab – JKM Library 101 Computer Lab – Buhl 236 (no printer) Computer Lab – Coolidge 42 Computer/CAD Lab – Eastside 209 Chatham IT Helpdesk – Woodland 100, Eastside 219, Eden Hall Lodge Library
Off Campus Resources	Current students have access to the following resources: Atomic Learning (http://www.atomiclearning.com/) Chatham IT (http://www.chatham.edu/its) Chatham IT Helpdesk (http://services.chatham.edu)
Current Technologies	For the most up-to-date technology, please visit Chatham IT (http://www.chatham.edu/its)

