

# **BIOLOGY 4420A FALL 2021**

## **Insect Structure and Function**

### **Instructor**

Prof. Jeremy N. McNeil  
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BGS 3066  
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### **Time and Location:**

Lecture: 12:30-14:20 PAB 36  
Laboratory: 09:30-12:20 B&G 3000

### **Office Hours:**

I keep no specific office hours. Students may set up appointments (in class or by email) at mutually acceptable times to discuss the material. I will also be happy to answer questions immediately before or after lectures.

Please note that I **will not** answer questions in the 48 h preceding an exam.

### Email policy

1. When communicating with professors and TAs use your UWO email account only. We will not respond to emails originating from non-UWO email accounts. Make sure, at all times, that your UWO account doesn't go over quota as you may not be able to receive any messages or responses from us. Not checking your UWO account is not a valid excuse for missing essential communication.
2. Include "4420A" in the subject of any emails that you send. Emails containing unsolicited attachments will be automatically deleted.
3. All emails will be responded to within 48 hours during weekdays (not including weekends and holidays). Emails will usually be addressed during regular work hours (9–5). We may choose, at our discretion, to respond outside these hours, depending on availability.

### **Recommended textbooks**

Chapman, R.F. (author), S.J. Simpson and A.E. Douglass (Editors). 2012 *The Insects: Structure and Function*. 5th Edition. Cambridge University Press.

Gullan, P.J. and P.S. Cranston. 2014. *The Insects: An Outline of Entomology*. 5th Edition. Wiley-Blackwell. (note that there is a website where you may access chapters, etc)

Marshall, S.A. 2006. *Insects. Their Natural History and Diversity*. Firefly Books. 718pp. (has a photographic guide to insects of eastern North America)

## **Course Description:**

Insects are the most abundant macro-invertebrates and are found in all ecosystems, with the exception of the marine environment (although this is debatable). In the lectures we will first examine the basic external and internal anatomy, as well as the basic physiology, of insects. Subsequently, we will examine how adaptations in these different traits have allowed this group of organisms to exploit such a wide range of habitats at the global scale.

Module 1: External anatomy

Module 2: Internal anatomy

Module 3: The insect endocrine system

Module 4: Sensory systems and behaviour

Module 5: Reproduction

Module 6: Development and life histories

Module 7: Terrestrial insects

Module 8: Aquatic insects

Module 9: Insects and plants

Module 10: Social insects

Module 11: Insects as predators or parasitoids

Module 12: How insects avoid natural enemies

Module 13: Insects and humans (seen as pests or food!)

PDF files of PowerPoint presentations for each module will be posted on the course website no later than 08:30 on the Thursday that the module will be discussed for the first time. You should download them and use them to take notes during the lectures/tutorials.

Lectures may only be recorded with permission of the professor.

***The written exams will on the material presented in lecture and the taxonomic information about the different orders/families presented at the beginning of the laboratories.***

**Midterm 40%, Final 40%, Lab 15% for term project on IDing specimens and 5% for the lab quiz on the last day.**

Midterm: (TBA)

Final Exam: (TBA)

Each exam will be a combination of fill in the blanks and short answer questions.

*No electronic aids are allowed for exams and answers are to be written in pen.*

You will be notified by email when they have been marked and the results tabulated. We will go over the first exam in class...but you must return the copies to me. Please note that as I mark all the exams myself the turnaround time is longer than if it was a multiple-choice exam corrected by computer.

**Laboratory (Fridays, at 09:30-12:20) B&G 3000.**

*No electronic aids are allowed*

We will examine the characteristics that distinguish each major order of insects (e.g. what do all beetle species have in common) and look at the characteristics that separate the different major families within the order (e.g. what makes a lady beetle different from a bark beetle). Throughout the semester, at the start of each lab there will be a powerpoint presentation to describe the key characteristics for different orders of insects, and the major families within in the order, starting from the most primitive. A PDF of the powerpoints will be available on the class website after each tutorial

In the early lab sessions you will learn how specimens are prepared for conservation in a collection. You will be also given a large insect to examine and dissect, in order to familiarise yourself with both the external and internal morphology.

At the beginning of the course you will receive a collection of unidentified insects and you will use the time during the laboratories to identify (using the key provided) each specimen to family (explaining the morphological characters you used to arrive at your decision). This will be worth 15% of your final grade.

In the last laboratory you will be provided with a collection of unmarked specimens and you will have to identify, on the form provided, as many as specimens as possible and going to the lowest level possible. This test will be worth 5% of the final grade and will be marked comparatively, that is relative to the performance of all other students in the course.

### **Scholastic offences:**

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a scholastic offence, at the following Web site: [http://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/scholastic\\_discipline\\_grad.pdf](http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_grad.pdf)

### **Examination Policy:**

Examinations are compulsory.

If you are unable to meet a course requirement due to illness or other serious circumstances, you must provide valid medical or other supporting documentation to the academic counselors in your Dean's Office as soon as possible and contact me immediately. It is the student's responsibility to make alternative arrangements with me if the request for accommodation has been approved, and I have been informed that this is the case by the academic counselors in your Dean's Office. In the event of a missed final exam, a "Recommendation of Special Examination" form must be obtained from the academic counselors in your Dean's Office immediately. For further information please see:

*<http://www.uwo.ca/univsec/handbook/appeals/medical.pdf>*

A student requiring academic accommodation due to illness should use the Student Medical Certificate when visiting an off-campus medical facility or request a Records Release Form (located from the academic counselors in your Dean's Office) for visits to Student Health Services. The form can be found here:

[https://studentservices.uwo.ca/secure/medical\\_document.pdf](https://studentservices.uwo.ca/secure/medical_document.pdf)

#### Accessibility:

Please contact the professor if you require material in an alternate format or if you require any other arrangements to make this course more accessible to you. You may also wish to contact Services for Students with Disabilities (SSD) at 661-2111 x 82147 for any specific question regarding an accommodation.

#### **Make-up exams:**

As part of university policy, students that have been granted permission by the academic counselors in your Dean's Office to write the make-up examination will write the exam at a time scheduled by the professor. There will be one written make-up examination given within two weeks of the originally scheduled exam that was missed. Arrangements may be made for students that have valid reasons for missing this make-up; however the format and timing of any additional make-ups, are at the discretion of the professor.... for example, it could be an oral exam or taking the exam the next time the course is taught.

#### **Academic Accommodations for Religious Holidays:**

The Faculty of Science strictly adheres to the University policy on accommodation for students based upon conflicts with religious holidays. Accommodation will only be granted for the specified date of the religious holiday. Only holidays appearing on the University-approved list of dates will be accommodated. See the academic counselors in the Office of your Dean for the list of approved dates. Students requesting accommodation must do so, in writing, to the academic counselors in the Office of their Dean at least a month before the scheduled exams.

**SDC's Learning Skills Services**, Rm 4100 WSS, [www.sdc.uwo.ca/learning](http://www.sdc.uwo.ca/learning)

LS counsellors are ready to help you improve your learning skills. We offer presentations on strategies for improving time management, multiple-choice exam preparation/writing, textbook reading, and more. Individual support is offered throughout the Fall/Winter terms in the drop-in Learning Help Centre, and year-round through individual counselling.

#### **Learning outcomes**

As a result of attending lectures and participating in the hands-on laboratory activities, students should be able to:

- Identify the morphological characteristics of the major insect Families.
- Describe the basic morphological and physiological characteristics that enable insects to occupy such a wide diversity of terrestrial and aquatic habitats.
- Discuss the importance of both abiotic and biotic factors affecting development at both the individual and population levels.
- Discuss both the advantages and drawbacks of different forms of control used in the management of pest species.