1 Course Details

1.1 Calendar Description

This course is an overview of insect diversity and biology emphasizing groups of importance in conservation biology, outdoor recreation and economic entomology. Labs focus on insect identification and the development of a small insect collection.

Pre-Requisites: BIOL*1040 or (2 of BIOL*1050, BIOL*1070, BIOL*1080, BIOL*1090)

Equates: ENVB*3090

1.2 Course Description

INSECT DIVERSITY AND BIOLOGY (ENVS*3090) is an introductory entomology course meant to provide a basic framework for the study of the biology, importance, and identification of insects. Insects, with their incredible variety of form and function, not only make up a huge majority of all species of living things, they also affect all other species through their economic, medical and ecological importance. The framework for the course will be an overview of the structure and diversity of insects in an evolutionary context. That framework will be used to illustrate general themes in insect biology, and to introduce the orders and most important families of insects. Lectures provide an evolutionary perspective on the basic taxonomy, habits, morphology, habitats, and life history strategies of insects. Due to COVID, the labs are an online introduction to insect identification. Students will learn to recognize ordinal-level taxa and become familiar with online dichotomous keys. Students will also watch several invertebrate-themed nature documentaries as a class and research topics of interest in more detail.

1.3 Timetable

Lecture:
Tuesday and Thursday, 11:30AM-12:50PM, online

Lab:
1.4 Final Exam

No final during exam period. Written exams and lab tests will be replaced with take-home open-book assignments and quizzes due to the online format of the class.

2 Instructional Support

2.1 Instructional Support Team

Instructor: Andrew Young
Email: andrew.young@uoguelph.ca
Telephone: -
Office: virtual
Office Hours: There will be a virtual "office hour" directly after each Thursday’s lecture, in the same Zoom call. Students are welcome to stay and ask questions, chat about insects, etc. I will also be taking office hours by appointment if individual students have concerns or questions.

2.2 Teaching Assistants

Teaching Assistant (GTA): Samm Reynolds
Email: sreyno08@uoguelph.ca
Office: virtual
Office Hours: By appointment

Teaching Assistant (GTA): Abigail Wiesner
Email: awiesner@uoguelph.ca
Office: virtual
Office Hours: By appointment

3 Learning Resources

3.1 Required Resources

Insects: Their Natural History and Diversity (second edition) - S.A. Marshall (Textbook)  

One copy available in the library (QL473 .M33 2006).
3.2 Recommended Resources

Evolution of the Insects – D. Grimaldi and M.S. Engel (Textbook)

One copy is available in the library (QL 468.7 .G75).

Borror and DeLong’s Introduction to the Study of Insects, 7th Ed. – C.A. Triplehorn, N.F. Johnson, and D.J. Borror (Textbook)
One copy is available in the library (QL 463 .B69 2004)

3.3 Additional Resources

Refer to pp. 615-667 in the required textbook (Marshall 2007) (Lab Manual)
Identification keys, as well as the assigned readings from lectures for information on natural history, evolution, and biology.

CourseLink (Website)
https://courselink.uoguelph.ca
Although the textbook is current and followed closely, the CourseLink site provides a useful forum for updates, interesting links and post-lecture addenda, as well as a convenient repository for general information about the course. Please note: Students must use their University of Guelph central login ID (e-mail account) and password to log on to CourseLink. If you forget your password, contact Computing and Communication Services.

4 Learning Outcomes

4.1 Course Learning Outcomes

By the end of this course, you should be able to:

1. Nomenclature, identification of required orders/families, and association of relevant natural history information.

2. Experience in collecting and identifying Ontario insects.

3. Familiarity with the natural history, diversity, and classification of insects.

4.2 Detailed Learning Outcomes

INSECT DIVERSITY AND BIOLOGY is an introductory entomology course meant to provide a basic framework for the study of the biology, importance, and identification of insects. Insects, with their incredible variety of form and function, not only make up a huge majority of all species of living things, they also affect all other species through their economic, medical and ecological importance. The framework for the course will be an overview of the structure and diversity of insects in an evolutionary context. That framework will be used to illustrate
general themes in insect biology, and to introduce the orders and most important families of insects.

Lectures provide an evolutionary perspective on the basic taxonomy, habits, morphology, habitats, and life history strategies of insects. Due to COVID, the labs are an online introduction to insect identification, and will not go into the same level of detail as in-person labs would. We will also be watching a nature documentary series and students will research chosen topics of interest in more detail.

5 Teaching and Learning Activities

5.1 Lecture

Tue, Jan 11

Topics: What will be covered in this course? Why study insects? What is NOT an insect? A general overview of invertebrate life.

Assigned Reading: Chapter 13 – Non-insect Arthropods

Thu, Jan 13

Topics: Introduction to insect morphology, taxonomy, phylogenetics, an overview of non-insect Hexapods, and the first insects.

(Assigned Reading: Preface and Introduction; Chapter 1 – The Wingless Insects)

Tue, Jan 18

Topics: The origin of wings and the main lineages of winged insects. Introduction to the Dragonflies (Odonata) and Mayflies (Ephemeroptera).

Assigned Reading: Chapter 2 – Mayflies, Dragonflies, and Damselflies

Thu, Jan 20

Topics: Introduction to the Neoptera: Stoneflies (Plecoptera) and an introduction to the orthopteroid insects.

Assigned Reading: Chapter 3 – Stoneflies; Chapter 4 – Cockroaches, Termites, Mantids and other Orthopteroids

Tue, Jan 25
Topics: Orthoptera (grasshoppers, katydids, crickets).

Assigned Reading: Chapter 4 – Grasshoppers, Crickets and Katydids

Thu, Jan 27

Topics: Thrips and Hemiptera part 1, "Homoptera"

Assigned Reading: Chapter 6 – True Bugs and Other Hemipteroids

Tue, Feb 1

Topics: Hemiptera part two - Heteroptera

Assigned Reading: Chapter 6 – True Bugs and Other Hemipteroids

Thu, Feb 3

Topics: Psocodea (barklice, lice, and louse-bourne disease). Introduction to the Holometabola

Assigned Reading: Chapter 6

Tue, Feb 8

Topics: Holometabola intro con’t, Hymenoptera part 1.

Assigned Reading: Chapter 12 – Sawflies, Wasps, Bees, and Ants

Thu, Feb 10

Topics: Hymenoptera pt 2: Aculeata

Assigned Reading: Chapter 12 – Sawflies, Wasps, Bees, and Ants

Tue, Feb 22


Assigned Reading: Chapter 12 – Sawflies, Wasps, Bees, and Ants, Chapter 9 – Lacewings, Antlions, Fishflies, and Related Insects

Thu, Feb 24

Topics: Neuroptera, Strepsiptera, intro to Coleoptera

Assigned Reading: Chapter 10 – Beetles

Tue, Mar 1
Topics: Take-home midterm - drop-in review class.

Thu, Mar 3
Topics: Coleoptera 2
Assigned Reading: Chapter 10 – Beetles

Tue, Mar 8
Topics: Coleoptera 3
Assigned Reading: Chapter 10 – Beetles

Thu, Mar 10
Topics: Coleoptera 4
Assigned Reading: Chapter 10 – Beetles

Tue, Mar 15
Topics: Trichoptera
Assigned Reading: Chapter 8 – Caddisflies

Thu, Mar 17
Topics: Micromoths & Butterflies
Assigned Reading: Chapter 7 – Butterflies and Moths

Tue, Mar 22
Topics: Macromoths
Assigned Reading: Chapter 7 – Butterflies and Moths

Thu, Mar 24
Topics: Mecoptera & Siphonaptera
Assigned Reading: Chapter 11 – Flies Scorpionflies and Fleas

Tue, Mar 29
Topics: Diptera 1 - "Nematocera"
Assigned Reading: Chapter 11 – Flies Scorpionflies and Fleas

Thu, Mar 31
**Topics:** Diptera 2 - "nematocera" concluded, "lower Brachycera"

Assigned Reading: Chapter 11 – Flies Scorpionflies and Fleas

**Tue, Apr 5**

**Topics:** Diptera 3 - Aschiza, Acalypterates

Assigned Reading: Chapter 11 – Flies Scorpionflies and Fleas

**Thu, Apr 7**

**Topics:** Diptera 4 - Calypterates

Assigned Reading: Chapter 11 – Flies Scorpionflies and Fleas

### 5.2 Lab

**Tue, Jan 11**

**Topics:** No lab week 1

**Tue, Jan 18**

**Topics:** Introduction to digital keys and insect Orders

**Tue, Jan 25**

**Topics:** Group watch of David Attenborough’s Life in the Undergrowth pt 1, with discussion.

**Tue, Feb 1**

**Topics:** Group watch of David Attenborough’s Life in the Undergrowth pt 2, with discussion.

**Tue, Feb 8**

**Topics:** Group watch of David Attenborough’s Life in the Undergrowth pt 3, with discussion.

**Tue, Feb 22**

**Topics:** Group watch of David Attenborough’s Life in the Undergrowth pt 4, with discussion.
Tue, Mar 1

Topics: Group watch of David Attenborough's Life in the Undergrowth pt 5, with discussion.

Tue, Mar 8

Topics: Winter collecting discussion

Tue, Mar 15

Topics: Student presentations

Tue, Mar 22

Topics: Student presentations

Tue, Mar 29

Topics: Student presentations

Tue, Apr 5

Topics: Discussion of useful insect identification resources

5.3 Labs

Labs begin the second week of classes.

Due to the ongoing COVID situation, the lab schedule will be different from normal, with a focus on class discussion of a nature documentary series and individual student presentations on independent research. We will also discuss collecting techniques with a focus on winter collecting. If COVID numbers allow us to return to in-person instruction, some in-person microscope-based content will be returned to the course.

Students will also be required to individually create a five-minute "bug of the day" presentation/video featuring an insect found by the class they are excited to have learned about.
5.4 Lab Tests

Lab assessments will be broken into written assignments and virtual oral presentations.

Written assignments will involve fact-checking a documentary series and researching topics of interest in more detail.

Virtual oral presentations will involve presenting information to the class about an insect of interest, either from the course content, or that was collected during the course itself.

6 Assessments

6.1 Marking Schemes & Distributions

<table>
<thead>
<tr>
<th>Name</th>
<th>Scheme A (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written lab assignment: fact checking Attenborough</td>
<td>20</td>
</tr>
<tr>
<td>Virtual Oral Presentation: Research findings</td>
<td>10</td>
</tr>
<tr>
<td>Virtual Oral presentation: bug of the day</td>
<td>5</td>
</tr>
<tr>
<td>Insect Collection</td>
<td>15</td>
</tr>
<tr>
<td>Take-home midterm</td>
<td>20</td>
</tr>
<tr>
<td>Take-home final</td>
<td>30</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
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6.2 Assessment Details

**Written lab assignment: fact checking Attenborough (20%)**
- **Date:** Tue, Mar 22
- **Learning Outcome:** 1, 3
  Students will watch and discuss David Attenborough's Life in the Undergrowth during labs. Students will be responsible for fact-checking topics of interest and researching other topics in more detail, presenting their findings in a written document.

**Virtual Oral Presentation: Research findings (10%)**
- **Date:** Tue, Mar 15 - Tue, Mar 29
- **Learning Outcome:** 1
  Students will be responsible for presenting their findings from the research they conducted after viewing Life in the Undergrowth in a powerpoint presentation (8-10 minutes).

**Virtual Oral presentation: bug of the day (5%)**
- **Date:** Tue, Feb 22 - Tue, Mar 29
- **Learning Outcome:** 1
  Students will give a brief (3-5 minute) presentation detailing their favourite insect they've
collected, or their favourite insect from the course.

**Insect Collection (15%)**
*Date:* Mon, Apr 4  
*Learning Outcome:* 2  
Students are required to submit 10 insects they found during the winter semester, as well as a “collection journal” detailing where they found the specimens, weather conditions while collecting, etc.

**Take-home midterm (20%)**
*Date:* Tue, Mar 1 - Tue, Mar 8  
*Learning Outcome:* 3  
1 week to complete.

**Take-home final (30%)**
*Date:* Tue, Apr 5 - Tue, Apr 19  
*Learning Outcome:* 3  
take-home final exam - two weeks to complete

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**7 Course Statements**

**7.1 Missed Midterm Exam Policy**

See "Late Assignments" policy.

**7.2 Missed Lab Test Policy**

See "Late Assignments" policy.

**7.3 Late Assignments**

Due to COVID, Midterms/finals/lab tests have been converted to take-home, open-book assignments and quizzes. Extensions will be granted for any take-home assignments, no questions asked. Just email the course instructor. Assignments will still need to be submitted by the final day of classes. Failure to submit the assignment by that time will result in a zero grade for the assignment unless extenuating circumstances are properly documented by your program counsellor.

**8 University Statements**

**8.1 Email Communication**

As per university regulations, all students are required to check their e-mail account regularly: e-mail is the official route of communication between the University and its students.

**8.2 When You Cannot Meet a Course Requirement**
When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons please advise the course instructor (or designated person, such as a teaching assistant) in writing, with your name, id#, and e-mail contact. The grounds for Academic Consideration are detailed in the Undergraduate and Graduate Calendars.

Undergraduate Calendar - Academic Consideration and Appeals
https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml

Graduate Calendar - Grounds for Academic Consideration
https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml

Associate Diploma Calendar - Academic Consideration, Appeals and Petitions
https://www.uoguelph.ca/registrar/calendars/diploma/current/index.shtml

8.3 Drop Date

Students will have until the last day of classes to drop courses without academic penalty. The deadline to drop two-semester courses will be the last day of classes in the second semester. This applies to all students (undergraduate, graduate and diploma) except for Doctor of Veterinary Medicine and Associate Diploma in Veterinary Technology (conventional and alternative delivery) students. The regulations and procedures for course registration are available in their respective Academic Calendars.

Undergraduate Calendar - Dropping Courses
https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml

Graduate Calendar - Registration Changes
https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/genreg-regregchg.shtml

Associate Diploma Calendar - Dropping Courses
https://www.uoguelph.ca/registrar/calendars/diploma/current/c08/c08-drop.shtml

8.4 Copies of Out-of-class Assignments

Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

8.5 Accessibility

The University promotes the full participation of students who experience disabilities in their academic programs. To that end, the provision of academic accommodation is a shared responsibility between the University and the student.

When accommodations are needed, the student is required to first register with Student Accessibility Services (SAS). Documentation to substantiate the existence of a disability is required; however, interim accommodations may be possible while that process is underway.

Accommodations are available for both permanent and temporary disabilities. It should be
noted that common illnesses such as a cold or the flu do not constitute a disability.

Use of the SAS Exam Centre requires students to make a booking at least 14 days in advance, and no later than November 1 (fall), March 1 (winter) or July 1 (summer). Similarly, new or changed accommodations for online quizzes, tests and exams must be approved at least a week ahead of time.

For Guelph students, information can be found on the SAS website
https://www.uoguelph.ca/sas

For Ridgetown students, information can be found on the Ridgetown SAS website
https://www.ridgetownc.com/services/accessibilityservices.cfm

8.6 Academic Integrity

The University of Guelph is committed to upholding the highest standards of academic integrity, and it is the responsibility of all members of the University community-faculty, staff, and students-to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University’s policy on academic misconduct regardless of their location of study; faculty, staff, and students have the responsibility of supporting an environment that encourages academic integrity. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.

Undergraduate Calendar - Academic Misconduct
https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml

Graduate Calendar - Academic Misconduct
https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml

8.7 Recording of Materials

Presentations that are made in relation to course work - including lectures - cannot be recorded or copied without the permission of the presenter, whether the instructor, a student, or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

8.8 Resources

The Academic Calendars are the source of information about the University of Guelph’s procedures, policies, and regulations that apply to undergraduate, graduate, and diploma programs.
8.9 Disclaimer

Please note that the ongoing COVID-19 pandemic may necessitate a revision of the format of course offerings, changes in classroom protocols, and academic schedules. Any such changes will be announced via CourseLink and/or class email.

This includes on-campus scheduling during the semester, mid-terms and final examination schedules. All University-wide decisions will be posted on the COVID-19 website (https://news.uoguelph.ca/2019-novel-coronavirus-information/) and circulated by email.

8.10 Illness

Medical notes will not normally be required for singular instances of academic consideration, although students may be required to provide supporting documentation for multiple missed assessments or when involving a large part of a course (e.g., final exam or major assignment).

8.11 Covid-19 Safety Protocols

For information on current safety protocols, follow these links:

- https://news.uoguelph.ca/return-to-campuses/how-u-of-g-is-preparing-for-your-safe-return/
- https://news.uoguelph.ca/return-to-campuses/spaces/#ClassroomSpaces

Please note, these guidelines may be updated as required in response to evolving University, Public Health or government directives.