

ENVS*3090 - Insect Diversity and Biology

Winter 2025 Course Outline

Section: 01

Credits: 0.50

Land Acknowledgement: Guelph

The University of Guelph resides on the ancestral lands of the Attawandaron people and the treaty lands and territory of the Mississaugas of the Credit. We recognize the significance of the Dish with One Spoon Covenant to this land and offer respect to our Anishinaabe, Haudenosaunee and Métis neighbours. Today, this gathering place is home to many First Nations, Inuit, and Métis peoples and acknowledging them reminds us of our important connection to this land where we work and learn.

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.

Prerequisite(s): BIOL*1040 or (2 of BIOL*1050, BIOL*1070, BIOL*1080, BIOL*1090)

Department(s): School of Environmental Sciences

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. During in person labs students will learn to recognize family-level taxa and become familiar with dichotomous keys

Lecture Schedule

TuTh 10am-11:20am in CRSC*117 (1/6 to 4/21)

Lab / Seminar Schedule

<instructor can choose which table they'd like to use. **Title and Content within this block is fully editable & removeable**>

NOTE: To add another ROW, go to the bottom right cell of table and press 'tab' button. To delete a ROW contact courseleaf@uoguelph.ca

Day	Time	Location	Sections
Tues	2:30-5:30PM	3309 GRHM Hall	01
Tues	7:00-10:00PM	3309 GRHM Hall	02

Instructor Information

Andrew Young

Email: ayoung26@uoguelph.ca

Office: 2218 Bovey

Office Hours:

11:30-2PM Thursdays

Textbooks

Group	Title	Author	ISBN
Recommended	Insects: Their Natural History and Diversity	S.A. Marshall	1552979008

Cost of Textbooks and Learning Resources

Delete these instructions: Include the itemized cost of all textbooks and learning resources required or recommended for this course. If there are no costs for textbooks or learning resources indicate that here as well. To add a row in the table, go to the bottom right cell of the table and press 'tab'.

Textbook / Learning Resource	Required / Recommended	Cost
Insects: Their Natural History and Diversity	Recommended	\$95

Students are advised that prices are often determined by the publisher or bookstore and may be subject to change.

Course Learning Outcomes

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.

Course Level 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, but 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. Labs will be student-guided exploration of major insect families, where pinned insects and dichotomous keys will be provided. TAs will be available during labs to assist with identification and microscopy skills.

Schedule of Topics and Assignments

Day	Date	Topic	Activities	Due
Tue	1/7	What will be covered in this course? Why study insects? What is NOT an insect? A general overview of invertebrate life	Reading: Chapter 13 - Non insect Arthropods	
Thu	1/9	Introduction to insect morphology, taxonomy, phylogenetics An overview of non-insect Hexapods The First Insects	Reading: Chapter 1 – The Wingless Insects	
Tue	1/14	The origin of wings and the main lineages of winged insects Introduction to the Dragonflies (Odonata) and Mayflies (Ephemeroptera)	Reading: Chapter 2 – Mayflies, Dragonflies, and Damselflies	
Thu	1/16	Introduction to the Neoptera: Stoneflies (Plecoptera) Introduction to the Orthopteroid insects	Reading: Chapter 3 – Stoneflies; Chapter 4 – Cockroaches, Termites, Mantids and other Orthopteroids	

Tue	1/21	Orthoptera (grasshoppers, katydids, crickets)	Reading: Chapter 4 – Grasshoppers, Crickets and Katydid	LAB TEST 1 TODAY
Thu	1/23	Thrips and Hemiptera part 1, "Homoptera"	Reading: Chapter 6 – True Bugs and Other Hemipteroids	
Tue	1/28	Hemiptera part two - Heteroptera	Reading: Chapter 6 – True Bugs and Other Hemipteroids	
Thu	1/30	Psocodea (barklice, lice, and louse-bourne disease) Introduction to the Holometabola	Reading: Chapter 6 – True Bugs and Other Hemipteroids	
Tue	2/4	Holometabola intro con't, Hymenoptera part 1	Reading: Chapter 12 – Sawflies, Wasps, Bees, and Ants	LAB TEST 2 TODAY
Thu	2/6	Hymenoptera pt 2: Aculeata	Reading: Chapter 12 – Sawflies, Wasps, Bees, and Ants	
Tue	2/11	Hymenoptera 3: Formicidae, sociality Introduction to Neuroptera	Reading: Chapter 12 – Sawflies, Wasps, Bees, and Ants Readings: Chapter 9 – Lacewings, Antlions, Fishflies, and Related Insects	
Thu	2/13	Neuroptera Strepsiptera Introduction to Coleoptera	Reading: Chapter 10 – Beetles	Take-home midterm assigned
Tue	2/18	Winter Break		
Thu	2/20	Winter Break		
Tue	2/25	Coleoptera 1	Reading: Chapter 10 - Beetles	
Thu	2/27	Coleoptera 2	Reading: Chapter 10 – Beetles	Take-home midterm due
Tue	3/4	Coleoptera 3	Reading: Chapter 10 – Beetles	LAB TEST 3 TODAY
Thu	3/6	Coleoptera 4	Reading: Chapter 10 – Beetles	
Tue	3/11	Trichoptera	Reading: Chapter 8 – Caddisflies	
Thu	3/13	Micromoths & Butterflies	Reading: Chapter 7 – Butterflies and Moths	
Tue	3/18	Macromoths	Reading: Chapter 7 – Butterflies and Moths	
Thu	3/20	Mecoptera & Siphonaptera	Reading: Chapter 11 – Flies Scorpionflies and Fleas	
Tue	3/25	Diptera 1 - "Nematocera"	Reading: Chapter 11 – Flies Scorpionflies and Fleas	LAB TEST 4 TODAY
Thu	3/27	Diptera 2 - "nematocera" concluded "Lower Brachycera"	Reading: Chapter 11 – Flies Scorpionflies and Fleas	
Tue	4/1	Diptera 3 - Aschiza, Acalypterates	Reading: Chapter 11 – Flies Scorpionflies and Fleas	INSECT COLLECTION DUE
Thu	4/3	Diptera 4 - Calypterates	Reading: Chapter 11 – Flies Scorpionflies and Fleas	

Lab / Seminar Schedule

Lab Topics

Tue, Jan 7: Introduction to Insect Orders: Winged Adults

Tue, Jan 14: Introduction to Insect Orders: Wingless Adults and Immature Forms

Tue, Jan 21: Lab Test 1 & Introduction to Orthoptera

Tue, Jan 28: Introduction to Hemiptera; Note: both "Homoptera" & Hemiptera study boxes to be used.

Tue, Feb 4: Lab Test 2 & Lepidoptera

Tue, Feb 11: Introduction to the Coleoptera (Coleoptera Box 1)

Tue, Feb 18: WINTER BREAK, NO LAB

Tue, Feb 25: Coleoptera 2

Tue, Mar 4: Lab Test 3 & Introduction to the Diptera (Diptera Box 1)

Tue, Mar 11: Diptera 2

Tue, Mar 18: Introduction to Hymenoptera

Tue, Mar 25: Lab Test 4

Tue, Apr 1: Insect Collection Assignment Due

Labs and Lab tests

LABS

Labs begin the first week of classes. Most laboratory time will be spent learning to recognize the common orders and families of hexapods. By the end of the course, you should be able to recognize all hexapods to the level of order, and you will be able to identify most to the family level.

Each lab is based on a "study box" containing specimens of each group you are required to learn. The bottom of each study box has a branching, illustrated key with specimens pinned into the box at the appropriate point in the key. The keys are simplified versions of those in the back of your textbook, emphasizing only those families that you need to learn to recognize for this course. The textbook keys also include many relatively small or uncommon insect families that you are not expected to recognize. To identify a specimen that you do not recognize, or to confirm that you are correctly recognizing a family, follow through the key until you reach a name.

Be sure to handle the pinned specimens with care, as they are fragile. Position the specimen on a cork or a bit of modeling clay under your microscope rather than trying to manipulate the pin in your fingers. Live material will be brought into the lab when possible, and you are encouraged to bring in your own specimens as you prepare your own small insect collection.

The insect collection, worth 15%, will include only 25 specimens, of which a maximum of 5 are to be submitted in vials of ethanol (provided) and the balance to be submitted as a "virtual" collection of digital images that must be labeled properly, certified as your own images, and based on specimens

examined and identified by you. Specimens (and photos) must be properly labeled and identified for full marks. Further instructions for collecting and preparing insect specimens can be found in your text and will be provided in the lab. Students will have time to work on their Insect Collection assignment during lab hours. Students should be prepared to bring their textbook with them to every lab to reinforce the lab exercises, and to use the identification keys contained within it for their Insect Collection. The collection is due at the end of the final lab.

LAB TESTS

Lab tests in this course are "bell ringers" in which you will receive two specimens, or a specimen and a question, every few minutes. Specimens are to be identified to family, if possible, otherwise to order or superfamily, giving both scientific and common names. Written questions will usually probe your knowledge of the general biology of the family of insects in front of you. You are responsible for learning the biology of each family from lectures, lecture notes or the text. Spelling is important, and incorrectly spelled taxon names will be penalized. All Lab Tests are cumulative, but there will be a greater focus on material learned since the prior test.

- Lab Test 1 requires a familiarity with the insect orders, their identification, and natural history.
- Lab Test 2 requires a familiarity with the identification and natural history of Orthoptera and Hemiptera (including both "heteropteran" and "homopteran" study boxes) in addition to the material tested in Lab Test 1.
- Lab Test 3 requires a familiarity with the identification and natural history of Lepidoptera and Coleoptera in addition to the material tested in Lab Tests 1+2.
- Lab Test 4 requires a familiarity with the identification and natural history of Diptera and Hymenoptera in addition to the material tested in Lab Tests 1+2+3.

Note: Lab Tests 2-4 are cumulative, but with a focus on recently studied material.

Assessment Breakdown

{NOTE: instructor can add another row by hitting "TAB" button when they are at the end of the row}

Description	Weighting (%)	Due Date
Insect Collection	15%	April 1
Take-Home Midterm	20%	Feb 27
Take-Home Final	25%	TBA (during exam week)
Lab Test 1	5%	Jan 21
Lab Test 2	10%	Feb 4

Lab Test 3	10%	March 4
Lab Test 4	15%	March 25

Last Day to Drop Course

The final day to drop Winter 2025 courses without academic penalty is the last day of classes: April 04

After this date, a mark will be recorded, whether course work is completed or not (a zero is assigned for missed tests/assignments). This mark will show on the student's transcript and will be calculated into their average.

Course Grading Policies

Submission of Assignments

Assignments are to be submitted to Courselink dropbox

Late Assignment

If you're not going to be able to make a deadline please email me in advance. In almost all cases I will not take off marks for late assignments.

Standard Statements for Undergraduate Courses

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 discourages misconduct. 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.

The Academic Misconduct Policy (<https://calendar.uoguelph.ca/undergraduate-calendar/undergraduate-degree-regulations-procedures/academic-misconduct/>) is outlined in the Undergraduate Calendar.

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 10 days in advance, and no later than the first business day in November, March or July as appropriate for the semester. Similarly, new or changed accommodations for online quizzes, tests and exams must be approved at least a week ahead of time. For students at the Guelph campus, information can be found on the SAS website. (<https://www.uoguelph.ca/sas/>)

Accommodation of Religious Obligations

If you are unable to meet an in-course requirement due to religious obligations, please email the course instructor within two weeks of the start of the semester to make alternate arrangements.

See the Academic calendar for information on regulations and procedures for Academic Accommodations of Religious Obligations (<https://calendar.uoguelph.ca/undergraduate-calendar/undergraduate-degree-regulations-procedures/academic-accommodation-religious-obligations/>).

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.

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 undergraduate students 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 the Undergraduate Calendar - Dropping Courses (<https://calendar.uoguelph.ca/undergraduate-calendar/undergraduate-degree-regulations-procedures/dropping-courses/>).

Email Communication

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

Health and Wellbeing

The University of Guelph provides a wide range of health and wellbeing services at the Vaccarino Centre for Student Wellness (<https://wellness.uoguelph.ca/>). If you are concerned about your mental health and not sure where to start, connect with a Student Wellness Navigator (<https://wellness.uoguelph.ca/navigation/>) who can help develop a plan to manage and support your mental health or check out our mental wellbeing resources (<https://wellness.uoguelph.ca/shine-this-year/>). The Student Wellness team are here to help and welcome the opportunity to connect with you.

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).

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.

Resources

The Academic Calendars (<http://www.uoguelph.ca/registrar/calendars/?index>) are the source of information about the University of Guelph's procedures, policies and regulations which apply to undergraduate, graduate and diploma programs.

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. See the Undergraduate Calendar for information on regulations and procedures for Academic Consideration. (<https://calendar.uoguelph.ca/undergraduate-calendar/undergraduate-degree-regulations-procedures/academic-consideration-appeals-petitions/>)