Faculty of Science Course Syllabus
Department of Biology
BIOL 3327
Entomology
Summer 2019

Instructor(s): Tatiana Rossolimo e-mail trossoli@dal.ca Office location TBA

Lectures: Time 9:05-11:55 Mon-Sat Location Studley LSC-COMMON AREA C 220 242

Laboratories: Time, 13:05-16:55 Location B2102

Field trips: June 17 Musquodoboit Harbour; June 21 McNabs Island; June 27 Stanley airport and Upper Sackville

Course Description
The course is an introduction to the study of insects. Topics include insect classification, evolutionary diversity, biology, ecology, behaviour, and various applied aspects. Through this survey of the insects, students will gain an appreciation of insect biodiversity as well as their economic and ecological importance.

Course Prerequisites
BIOL 2003.03

Overview
Insects are the most biodiverse group of organisms on the Earth. They far surpass other terrestrial animals in abundance of individuals and numbers of species, and they occur practically everywhere. Several hundred thousand different kinds of insects have been described - three times as many as there are in the rest of the animal kingdom. The total number of different species of insects may approach 30 million. Insects have lived on the Earth for at least 350 million years and during this time have evolved in many directions to become adapted to life in almost every type of terrestrial and freshwater habitat. Insects are extremely valuable to humans, and society could not exist in its present form without them. Many species of crop plants are pollinated by insects, some other species are pests, because they consume crops or stored food, are associated with the transmission of diseases, or interfere with some other human purpose.

Course Objectives/Learning Outcomes
In this class students will learn about the role of insects in nature. Specific topics will include the systematics and evolution of insects, their relationships with plants and animals, their value in economics, and their anatomy, physiology, development, life cycles, ecology, distribution, behaviour, classification, nomenclature, and identification. The class includes four field trips for the collecting of insects, following sorting, identifying, labeling and preliminary analysis of data on taxons and trophic group’s distribution in several habitats of NS.

Course Materials
- TEXTBOOKS (not mandatory)

- Course website: http://tatiana.rossolimo.com/entomology/
Course Assessment
Two quizzes (25% each, 50% total) and final lab exam (30%) will cover subjects from lectures, labs, and text reading. The final lab exam will be a comprehensive exam including all taxa from the beginning to the end of the course. The exam and quizzes include a wide variety of questions and problems, based on insects’ morphology, anatomy, physiology, development, ecology, behavior, taxonomy and importance for humans. Do not miss the exam. Any make-up exam (by prior arrangement or in dire emergency) will consist of a two hour oral examination covering the same general areas of the written exam. The remainder of the grade is based on the laboratory work and collection of insects with proper identification and labeling of specimens (20%). Guidelines on the collection will be given in lab.

June 20- quiz 1 (13:05-14:00)
June 26 – quiz 2 (13:05-14:00)
June 28 – collection submission (16:00)
June 29- lab exam 10 am

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight (% of final grade)</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tests:</strong> Quiz 1</td>
<td>25%</td>
<td>June 20</td>
</tr>
<tr>
<td>Quiz 2</td>
<td>25%</td>
<td>June 26</td>
</tr>
<tr>
<td><strong>Lab exam</strong></td>
<td>30%</td>
<td>June 29</td>
</tr>
<tr>
<td><strong>Insect collection</strong></td>
<td>20%</td>
<td>June 28</td>
</tr>
</tbody>
</table>

Conversion of numerical grades to Final Letter Grades follows the Dalhousie Common Grade Scale

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+</td>
<td>90-100</td>
</tr>
<tr>
<td>A</td>
<td>85-89</td>
</tr>
<tr>
<td>A-</td>
<td>80-84</td>
</tr>
<tr>
<td>B+</td>
<td>77-79</td>
</tr>
<tr>
<td>B</td>
<td>73-76</td>
</tr>
<tr>
<td>B-</td>
<td>70-72</td>
</tr>
<tr>
<td>C+</td>
<td>65-69</td>
</tr>
<tr>
<td>C</td>
<td>60-64</td>
</tr>
<tr>
<td>C-</td>
<td>55-59</td>
</tr>
<tr>
<td>D</td>
<td>50-54</td>
</tr>
<tr>
<td>F</td>
<td>≤50</td>
</tr>
</tbody>
</table>

Course Policies
Do not miss the exam. Any make-up exam (by prior arrangement or in dire emergency) will consist of a two hour oral examination covering the same general areas of the written exam.

Course Schedule (tentative – may change due to weather, etc.)
June 14
Lecture 3 hours
Theme: Place of Insects in Nature and Taxonomical Position.
Lab 4 hours
Instructions on the microscopes construction and use
Greenhouse, Dalhousie campus
Work with collection of insects: Orders, Families, and Species

June 15
Lecture 3 hours
Theme: Classification, Nomenclature, Identification.
Theme: Phylum Arthropoda
Trilobita
Chelicera: Classes Merostomata, Arachnida
Crustacea: Classes Branchiopoda, Copepoda, Ostracoda, Cirripedia, Malacostraca
Atelocerata: Classes Diplopoda, Chilopoda, Pauropoda, Symphyla.
Class Hexapoda. Classification, Phylogeny.
   The Entognathous Hexapods; Protura, Collembola, Diplura.
The Aptorygote Insects: Microcoryphia, Thysanura.
Theme: Order Ephemeroptera: Mayflies
        Order Odonata: Dragonflies and Damselflies
Lab 4 hours

June 17
Field trip to Musquodoboit Harbour, Lawrence town beach (9:00-16:00)
Lab – 1 hour

June 18
Lecture 3 hours
Order Grylloblattaria: Rock Crawlers.
        Order Phasmida: Walkingsticks and Leaf Insects
Theme: Order Orthoptera: Grasshoppers, Crickets, Katydid's
        Order Mantodea: Mantids
Theme: Order Blattaria: Cockroaches
        Order Isoptera: Termites
        Order Dermaptera: Earwigs
Lab – 4 hours
Diversity of insects
DNA extraction

June 19
Lecture 3 hours
Order Embiidina: Web-Spinners
        Order Plecoptera: Stoneflies
        Order Zoraptera: Zorapterans
        Order Psocoptera: Psocids
        Order Phthiraptera: Lice
Lab 4 hours

June 20
Lecture 3 hours
Theme: Development and Life Cycles
Theme: Ecology, Distribution, Behaviour.
Theme: Anatomy and Physiology of Insects. Morphology.
Theme: Anatomy and Physiology of Insects. Anatomy and Physiology
Theme: Order Hemiptera: Bugs
Order Homoptera: Cicads, Hoppers, Psyllids, Whiteflies, Aphids and Scale Insects.
        Order Thysanoptera: Trips
Lab 4 hours
Quiz 1
Identifying of Apterogota, Holometabola (Pterygota)
Sorting of field samples

June 21
Field trip to McNab's Island (9:00 – 16:00)
Lab – 1 hour

June 22
Lecture - 3 hours
Theme: Order Neuroptera: Alderflies, Dobsonflies, Fishflies, Snakeflies, Lacewings, Antions, Owlflies
Theme: Order Coleoptera: Beetles
Lab - 4 hours
Identifying of Apterogota, Holometabola (Pterygota)
Sorting of field samples

June 24
Lecture - 3 hours
Theme: Order Strepsiptera: Twisted-Wing Parasites
    Order Mecoptera: Scorpionflies, Hangingflies
    Order Siphonaptera: Fleas
Lab - 4 hours
Identifying of arthropods, Entognatha, Apterigota and Hemimetabola orders
Identifying of Holometabola orders
Lab 4 hours
Sorting of field samples
DNA - PCR

June 25
Lecture – 3 hours
Theme: Order Diptera
    Order Tricoptera: Caddisflies
Theme: Order Lepidoptera: Butterflies, Moths.
Theme: Order Hymenoptera: Sawnflies, Parasitic Wasps, Ants, Wasps, Bees
Lab - 4 hours
Sorting, identifying, labeling of the field samples.
Revising material for the lab exam

June 26
Quiz 2
DNA – gel
Sorting insects for the Insect collection

June 27
Field trip to Stanley airport and Upper Sackville - – full day (9:00 – 16:00)
Lab 1 hour

June 28
Sorting and labeling of insects.
Collection submission

June 29
Lab exam
Insect buffet

Laboratory exercises and field trips include collecting insects in natural habitats, sorting and identifying of collected specimens. There are four field trips to the forest, beach, wildlife shelter, for collecting insects.

What to bring on field trips
List of things students should bring on field trips:
backpack, field notebook, pencils, paper, apparel, footwear, lunch, water, snacks
killing jar, insect net, paper envelopes for Lepidoptera, plastic test tubes, jar for aquatic specimens, Ziploc bags
ACCOMMODATION POLICY FOR STUDENTS
Students may request accommodation as a result of barriers related to disability, religious obligation, or any characteristic protected under Canadian Human Rights legislation. The full text of Dalhousie’s Student Accommodation Policy can be accessed here: http://www.dal.ca/dept/university_secretariat/policies/academic/student-accommodation-policy-wef-sep--1--2014.html

Students who require accommodation for classroom participation or the writing of tests and exams should make their request to the Advising and Access Services Centre (AASC) prior to or at the outset of the regular academic year. More information and the Request for Accommodation form are available at www.dal.ca/access.

ACADEMIC INTEGRITY
Academic integrity, with its embodied values, is seen as a foundation of Dalhousie University. It is the responsibility of all students to be familiar with behaviours and practices associated with academic integrity. Instructors are required to forward any suspected cases of plagiarism or other forms of academic cheating to the Academic Integrity Officer for their Faculty.

The Academic Integrity website (http://academicintegrity.dal.ca) provides students and faculty with information on plagiarism and other forms of academic dishonesty, and has resources to help students succeed honestly. The full text of Dalhousie’s Policy on Intellectual Honesty and Faculty Discipline Procedures is available here: http://www.dal.ca/dept/university_secretariat/academic-integrity/academic-policies.html

STUDENT CODE OF CONDUCT
Dalhousie University has a student code of conduct, and it is expected that students will adhere to the code during their participation in lectures and other activities associated with this course. In general:

“The University treats students as adults free to organize their own personal lives, behaviour and associations subject only to the law, and to University regulations that are necessary to protect

- the integrity and proper functioning of the academic and non – academic programs and activities of the University or its faculties, schools or departments;
- the peaceful and safe enjoyment of University facilities by other members of the University and the public;
- the freedom of members of the University to participate reasonably in the programs of the University and in activities on the University's premises;
- the property of the University or its members.”

The full text of the code can be found here: http://www.dal.ca/dept/university_secretariat/policies/student-life/code-of-student-conduct.html

SERVICES AVAILABLE TO STUDENTS
The following campus services are available to help students develop skills in library research, scientific writing, and effective study habits. The services are available to all Dalhousie students and, unless noted otherwise, are free.

<table>
<thead>
<tr>
<th>Service</th>
<th>Support Provided</th>
<th>Location</th>
<th>Contact</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Academic Advising</td>
<td>Help with - understanding degree requirements and academic regulations - choosing your major - achieving your educational or career goals - dealing with academic or other difficulties</td>
<td>Killam Library Ground floor Rm G28 Bissett Centre for Academic Success</td>
<td>In person: Killam Library Rm G28 By appointment:  - e-mail: <a href="mailto:advising@dal.ca">advising@dal.ca</a>  - Phone: (902) 494-3077  - Book online through MyDal</td>
</tr>
<tr>
<td><strong>Dalhousie Libraries</strong></td>
<td><strong>Killam Library Ground floor</strong></td>
<td><strong>Syllabus for BIOL 3327.p. 6</strong></td>
<td></td>
</tr>
<tr>
<td>-------------------------</td>
<td>---------------------------------</td>
<td>----------------------------------</td>
<td></td>
</tr>
<tr>
<td>Help to find books and articles for assignments</td>
<td>In person: Service Point (Ground floor)</td>
<td>By appointment:</td>
<td></td>
</tr>
</tbody>
</table>
| Help with citing sources in the text of your paper and preparation of bibliography | Identify your subject librarian (URL below) and contact by email or phone to arrange a time:  

| **Studying for Success (SFS)** | **Killam Library 3rd floor** | **All information can be found on our website:**  
[www.dal.ca/sfs](http://www.dal.ca/sfs) |
|-----------------------------|-----------------------------|---------------------------------|
| Help to develop essential study skills through small group workshops or one-on-one coaching sessions | Coordinator  
Rm 3104  
Study Coaches  
Rm 3103 | To make an appointment:  
- Visit main office (Killam Library main floor, Rm G28)  
- Call (902) 494-3077  
- email Coordinator at: sfs@dal.ca or  
- Simply drop in to see us during posted office hours |
| Match to a tutor for help in course-specific content (for a reasonable fee) | |

| **Writing Centre** | **Killam Library Ground floor** | **See our website:**  
[writingcentre.dal.ca](http://writingcentre.dal.ca) |
|-------------------|--------------------------------|---------------------------------|
| Meet with coach/tutor to discuss writing assignments (e.g., lab report, research paper, thesis, poster)  
- Learn to integrate source material into your own work appropriately  
- Learn about disciplinary writing from a peer or staff member in your field | Learning Commons & Rm G25 | To make an appointment:  
- Visit the Centre (Rm G25) and book an appointment  
- Call (902) 494-1963  
- email writingcentre@dal.ca  
- Book online through MyDal |
| | | We are open six days a week |