Faculty of Science Course Syllabus
Department of Biology
BIOL 3328 Medical 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 C240
Laboratories: Time 13:05-16:55 Location: B2102

Field trips: May 17-18 – Harrison Lewis Centre, Port Joli; May 21 – Cole Harbour; May 24 – Hammonds plains

Course Description
Medical Entomology covers direct injuries caused by arthropods such as phobias, annoyance, allergies, toxins, venoms and myiasis, arthropod transmission of vertebrate parasites, epidemiology of arthropod-borne diseases. Students study transmission of diseases, methods of surveillance of diseases, management by vector control and other methods of arthropod-borne diseases. Laboratory exercises and field trips include collecting insects in natural habitats, sorting and identifying of collected specimens. There are three field trips to the forest, beach, wildlife shelter, for collecting insects.

Course Prerequisites
BIOL 2003.03 or permission of instructor

Overview
Arthropod borne diseases such as malaria, yellow fever, dengue, west Nile virus, Lyme disease, filariasis and many others continue to cause human suffering and death. Problems in animal production, pets and wildlife caused by arthropods continue to cause financial losses. In last two decades the invasion of exotic pests and pathogens has presented a new problem in many countries including Canada and USA. Medical Entomology covers direct injuries caused by arthropods such as phobias, annoyance, allergies, toxins, venoms and myiasis, arthropod transmission of vertebrate parasites, epidemiology of arthropod born diseases. Students study transmission of diseases, methods of surveillance for diseases, management by vector control and other methods of prevention of arthropod born diseases.

Course Objectives/Learning Outcomes
Students will study transmission of diseases, methods of surveillance for diseases, management by vector control and other methods of prevention of arthropod born diseases.

Course Materials
- BOOKS (not mandatory):

- Course website: http://tatiana.rossolimo.com/medical-entomology/
Course Assessment
Two quizzes (20% each, 40% 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 direct injuries caused by arthropods, arthropod transmission of vertebrate parasites, epidemiology of arthropod born diseases, transmission of diseases, methods of surveillance for diseases, management by vector control and other methods of prevention of arthropod born diseases.

The remainder of the grade is based on the laboratory work – collection submission (15%) and presentation in the class on the library research or individual research (10%). Also 5% of the grade will be based on the lab assignments and attendance. Topic for the presentation must be approved.

May 16 – quiz 1 (13:05-14:00)
May 23 – quiz 2 (13:05-14:00)
May 27 – insect collection submission (16:00)
May 28 – lab exam 10 am

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight (% of final grade)</th>
<th>Date</th>
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<tbody>
<tr>
<td>Tests: Quiz 1</td>
<td>20%</td>
<td>May 16</td>
</tr>
<tr>
<td>Quiz 2</td>
<td>20%</td>
<td>May 23</td>
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<tr>
<td>Lab exam</td>
<td>30%</td>
<td>May 28</td>
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<tr>
<td>Insect collection</td>
<td>15%</td>
<td>May 27</td>
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<tr>
<td>Presentation</td>
<td>10%</td>
<td>May 23, 25, 27</td>
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<tr>
<td>Lab work</td>
<td>5%</td>
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Conversion of numerical grades to Final Letter Grades follows the Dalhousie Common Grade Scale

<table>
<thead>
<tr>
<th>Grade</th>
<th>Numerical Range</th>
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<tbody>
<tr>
<td>A+</td>
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<tr>
<td>B+</td>
<td>(77-79)</td>
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<tr>
<td>C+</td>
<td>(65-69)</td>
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<tr>
<td>D</td>
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<tr>
<td>A</td>
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<td>B</td>
<td>(73-76)</td>
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<td>C</td>
<td>(60-64)</td>
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<td>F</td>
<td>(&lt;50)</td>
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<tr>
<td>A-</td>
<td>(80-84)</td>
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<tr>
<td>B-</td>
<td>(70-72)</td>
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<tr>
<td>C-</td>
<td>(55-59)</td>
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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.)

May 13
Lecture 3 hours:
Introduction to course
Arthropods
Classification
Morphology, anatomy, physiology, behavior, biology.
Life cycles, reproduction, development
Lab 4 hours:
Introduction to collections, diversity of Arthropods important for human and animal health.
Morphology, anatomy.
Video

May 14
Lecture 3 hours:
Historical Public health and vector-borne diseases, direct injury by arthropods
Introduction to the classes of vector borne pathogens, Arachnids, scorpions, spiders, etc. of medical importance
Lab 4 hours:
Araneae. Arachnids, scorpions, spiders, etc. of medical importance, transmitted diseases, bite reactions.

Video

May 15
Lecture 3 hours:
Host-parasite interactions, evolution of the blood feeding habit
Tick biology and behavior
Ticks and disease. Lyme disease, Alkhurma virus (KFDV), Kyasanur forest disease, Babesia, Human ewingii ehrlichiosis, Human granulocytic ehrlichiosis, Scrub typhus
Emerging tick-borne infections.
Mites and disease typhus, scabies, Demodex -hair follicle mites, face mites, Cats Mange.
Lyme disease

Lab 4 hours:
Acari. Ticks and disease. Mites and disease
Video
LabDNA extraction of mosquitoes, ticks and black flies

May 16
Lecture 3 hours:
Blattaria, cockroaches. Gastroenteritis, allergies, watery eyes, skin rashes, congestion of nasal passages and asthma.
Hemiptera. Bed bugs, kissing bugs and disease, Chagas disease, allergies, bite reaction.
Phthiraptera. Lice and disease. Typhus.
Lab 4 hours:
Quiz 1
Hemiptera, disease and bite reaction.
Phthiraptera, Siphonaptera, disease and bite reaction.
Video
DNA -PCR of mosquitoes, ticks and black flies
Sorting and organizing collected arthropods

May 17
Field trip to Harrison Lewis Centre, Port Joli
Leaving Dalhousie at 9 am
Collecting ticks on flags and with insect nets. Collecting blood- sucking insects. Putting pitfall traps in the soil before dark.
Dinner at the Centre
Collecting ticks on flags and with insect nets. Collecting blood- sucking insects. Putting pitfall traps in the soil before dark.
Collecting flying insects on the light at night.

May 18
Field trip to Harrison Lewis Centre, Port Joli
Breakfast
Collecting pitfall traps
Collecting arthropods with flags and insect nets
Sorting and preserving collected animals
Lunch
Lab – sorting collected invertebrates
Leaving to Dalhousie at 3 pm

May 21
Field trip to Salt Marsh Trail and Cole Harbour Full day: 9:05 – 16:00
Lab -16:00-17:00

May 22
Lecture 3 hours:
Nematocerous Diptera (black flies, midges, sand flies, biting midges).
Leishmaniasis and Onchocerciasis.
Adult and larval mosquito ecology
Mosquitoes and malaria
Mosquitoes and arboviruses (Yellow fever and dengue)
Mosquitoes and arboviruses (West Nile and other arboviral infections)
Mosquitoes and filariasis
Lab 4 hours:
Diptera. Nematocera and disease.
Video

May 23
Lecture 3 hours:
Diptera (Brachycera: Muscidae, horse flies, stable flies) of Veterinary Importance
Development of Research on Emerging Vector-borne infections
Mating biology of Diptera: implications for vector biology
Epidemiology and transmission cycles, Vector borne disease surveillance and control strategies.
Genetically modified mosquitoes, future challenges in public health
Myiasis -infection by parasitic fly larvae that feed on their host living/dead tissue.
Botflies, Sheep Ked,
Quiz 2
Lab 4 hours:
Presentations
Diptera and disease
Video

May 24
Field trip to Hammonds Plains. Full day: 9:05 – 16:00
Lab -16:00-17:00

May 25
Collecting arthropods in South End Halifax and in Dalhousie area.
DNA extraction of ticks
Finalising lab reports, PowerPoint presentations.
Review of slides and collections

May 27
Collection: specimens identification, organization, sorting
16:00 - Collection submission
Presentations
DNA –PCR of bed bugs, lice and fleas
DNA gel of ticks, bed bugs, lice and fleas

May 28
Final lab exam

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:

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:

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>
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</table>
| General Academic Advising | Help with - understanding degree requirements and academic regulations - choosing your major - achieving your educational or career goals - dealing with academic or other difficulties | Killam Library Ground floor Rm G28 Bissett Centre for Academic Success | In person: Killam Library Rm G28 By appointment:
  - e-mail: advising@dal.ca
  - Phone: (902) 494-3077
  - Book online through MyDal |
| **Dalhousie Libraries** | **Killam Library** | **In person:** Service Point (Ground floor)  
By appointment:  
Identify your subject librarian (URL below) and contact by email or phone to arrange a time: [http://dal.beta.libguides.com/sb.php?subject_id=343](http://dal.beta.libguides.com/sb.php?subject_id=343) |
|------------------------|-------------------|--------------------------------------------------|
| Help to find books and articles for assignments  
Help with citing sources in the text of your paper and preparation of bibliography | **Ground floor**  
Librarian offices | |

| **Studying for Success (SFS)** | **Killam Library** | **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  
**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  
Match to a tutor for help in course-specific content (for a reasonable fee) | **3rd floor**  
Coordinator  
Rm 3104  
Study Coaches  
Rm 3103 | |

| **Writing Centre** | **Killam Library** | **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  
**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 | **Ground floor**  
Learning Commons & Rm G25 | |