

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.

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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):

Mullen, G. and L. Durden. 2009 (or 2002). Medical and Veterinary Entomology. Elsevier Science Academic Press, New York, NY. ISBN 0-12-510451-0. ISBN 0123725003

Eldridge, B.F., J. D. Edman, 2004. Medical Entomology. A textbook on public health and veterinary problems caused by arthropods. Ed. B.F.Eldridge, J.D.Edman. Kluwer Academic Publishers. 672 p. ISBN 1402017944

Marquardt and others (eds) 2004. The Biology of Disease Vectors. Elsevier Academic Press, New York, NY. 2nd edition, ISBN 0-12-473276-3 (Ch. 1,2 and 19)

Kettle, D.S. 1995. Medical and Veterinary Entomology. 2nd edition. CAB International. New York, NY.

- *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

Component	Weight (% of final grade)	Date
Tests: Quiz 1	20%	May 16
Quiz 2	20%	May 23
Lab exam	30%	May 28
Insect collection	15%	May 27
Presentation	10%	May 23, 25, 27
Lab work	5%	

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

A+ (90-100)	B+ (77-79)	C+ (65-69)	D (50-54)
A (85-89)	B (73-76)	C (60-64)	F (<50)
A- (80-84)	B- (70-72)	C- (55-59)	

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

Lab DNA 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.

Siphonaptera. Fleas and disease. Bubonic plague, 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:

Nematoceros 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:

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.

Service	Support Provided	Location	Contact
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 <i>Bissett Centre for Academic Success</i>	In person: Killam Library Rm G28 By appointment: - e-mail: advising@dal.ca - Phone: (902) 494-3077 - Book online through MyDal

Dalhousie Libraries	<p>Help to find books and articles for assignments</p> <p>Help with citing sources in the text of your paper and preparation of bibliography</p>	<p>Killam Library Ground floor</p> <p>Librarian offices</p>	<p>In person: Service Point (Ground floor)</p> <p>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=34328</p>
Studying for Success (SFS)	<p>Help to develop essential study skills through small group workshops or one-on-one coaching sessions</p> <p>Match to a tutor for help in course-specific content (for a reasonable fee)</p>	<p>Killam Library 3rd floor</p> <p>Coordinator Rm 3104</p> <p>Study Coaches Rm 3103</p>	<p>To make an appointment:</p> <ul style="list-style-type: none"> - 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 <p>All information can be found on our website: www.dal.ca/sfs</p>
Writing Centre	<p>Meet with coach/tutor to discuss writing assignments (e.g., lab report, research paper, thesis, poster)</p> <ul style="list-style-type: none"> - Learn to integrate source material into your own work appropriately - Learn about disciplinary writing from a peer or staff member in your field 	<p>Killam Library Ground floor</p> <p>Learning Commons & Rm G25</p>	<p>To make an appointment:</p> <ul style="list-style-type: none"> - Visit the Centre (Rm G25) and book an appointment - Call (902) 494-1963 - email writingcentre@dal.ca - Book online through MyDal <p>We are open six days a week</p> <p>See our website: writingcentre.dal.ca</p>