DALHOUSIE UNIVERSITY

Faculty of Science Course Syllabus
Department of Biology
BIOL 3328
Medical Entomology
Summer 2016

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

Lectures: *Time 9:05-11:55 Mon-Sat Location C240*

Laboratories: *Time, 13:05-16:55 location* B2102

Field trips: *June 15 Tantallon; June 20 Hope for the wildlife; June 25 Burnside and Eastern Passage*

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):*
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 (25% each, 50% total) and final lab exam (25%) 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%). Topic must be approved to prevent possible difficulties. Guidelines on keeping a notebook will be given in lab.

June 18 - quiz 1 (13:05-14:00)
June 24 – quiz 2 (13:05-14:00)
June 29 – collection submission (16:00)
June 30- lab exam 10 am

Component	**Weight (% of final grade)**	**Date**
Tests: quiz 1	*25%*	*June 18*
Quiz 2	*25%*	*June 24*
Lab exam	*25%*	*June 30*
Insect collection	*15%*	*June 29*
Presentation	*10%*	*June 15-29*

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.)
June 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

June 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

June 15
Field trip to Tantallon
Full day : 9:05 – 16:00
Lab -16:00-17:00

June 16
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.
Lab 4 hours:
Acari. Ticks and disease
Video
DNA extraction of mosquitoes, ticks and black flies

June 17
Lecture 3 hours:
Mites and disease typhus, scabies, Demodex -hair follicle mites, face mites, Cats Mange.
Lyme disease
Lab 4 hours:
Acari. Mites and disease
Video

June 18, Saturday
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.
Lab 4 hours:

Quiz 1
Hemiptera, disease and bite reaction.
Video

June 20
Field trip to animal shelter "Hope for the wildlife"
9am -4pm
Lab – sorting collected invertebrates
4pm-5pm

June 21
Lecture 3 hours:
Phthiraptera. Lice and disease. Typhus.
Siphonaptera. Fleas and disease. Bubonic plague, Typhus.
Lab 4 hours:
Phthiraptera, Siphonaptera, disease and bite reaction.
Video
DNA -PCR of mosquitoes, ticks and black flies

June 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

June 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,
Lab 4 hours:
Presentations
Diptera and disease
Video

June 24
Collecting arthropods in South End Halifax and in Dalhousie area.
Quiz 2
Finalising lab reports, PowerPoint presentations.
Review of slides and collections

June 25, Saturday
Field trip to Burnside, Eastern passage
9am -4pm
Lab – sorting collected invertebrates
4pm-5pm

June 27
Collection: specimens identification, organization, sorting
Presentations
Discussion
DNA extraction of bed bugs, lice and fleas

June 28
Collection: specimens identification, organization, sorting
Presentations
Discussion
DNA –PCR of bed bugs, lice and fleas
DNA gel of bed bugs, lice and fleas

June 29
Finalising and submitting lab reports, PowerPoint presentations.
Review of slides and collections
DNA gel of mosquitoes, ticks and black flies

June 30
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 ***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	Help to find books and articles for assignments Help with citing sources in the text of your paper and preparation of bibliography	**Killam Library Ground floor** Librarian offices	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=34328
Studying for Success (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)	**Killam Library 3rd floor** 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 **All information can be found on our website: www.dal.ca/sfs**
Writing Centre	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	**Killam Library Ground floor** 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 **See our website: writingcentre.dal.ca**