

Biology MEDICAL
ENTOMOLOGY Class
syllabus
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Arthropod borne diseases such as malaria, yellow fever, dengue, west Nile virus, lime 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.

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

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

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

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

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

Field trip to Conrad beach, Lawrencetown beach, the Hope for the wildlife animal shelter.

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

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

Field trip to Tantallon, York Redoubt, Frogs Pond.

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

Quiz 2

Diptera and disease

Video

Presentations

Finalising and submitting lab reports, PowerPoint presentations.

Review of slides and collections

Final exam

Insect buffet

Laboratory exercises and field trips include collecting vectors in natural habitats, sorting and identifying of collected specimens of vectors to the species level. Students make presentation in the class on the library research or individual research on chosen topic.

There are two field trips to the forest, farm, for collecting arthropod vectors of diseases and learning methods of diagnosis and treatment of patients.

Organization:

The SEASIDE class is scheduled for eight three hour **lectures**, eight four-hour **labs**, and two **field trips**.

Lectures: Monday to Saturday from 9:05 to 11:55

Labs: Monday to Saturday from 13:05 to 16:55

Grading:

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.

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 (10%) and presentation in the class on the library research or individual research (15%). Topic must be approved to prevent possible difficulties. Guidelines on keeping a notebook will be given in lab.

Important Dates:

There are two field trips to the forest, farm, veterinary hospital and hospital for collecting arthropod vectors of diseases and learn methods of diagnosis and treatment of patients.

Grading scheme:

Passing Percentage: 50.00	
Minimum Percentage	Letter Grade
90.00	A+
85.00	A
80.00	A-
77.00	B+
73.00	B
70.00	B-
65.00	C+
60.00	C
55.00	C-
50.00	D
.00	F

BOOKS:

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.