



## **Postgraduate Course Book**

**Department: Biology**

**College: Education College**

**University: Salahaddin University**

**Subject: Advance Medical Entomology**

**Course Book Level: MSc.; Second semester**

**Lecturer's name: Banaz Sdiq Abdulla**

**Academic Year: 2023/2024**

## **Course Book**

<b>1. Course name</b>	Advance Medical Entomology
<b>2. Lecturer in charge</b>	Dr. Banaz Sdiq Abdulla
<b>3. Department/ College</b>	Biology/ Education
<b>4. Contact</b>	07504513669
<b>5. Time (in hours) per week</b>	Theory: 3 hrs Practical:
<b>6. Office hours</b>	
<b>7. Course code</b>	
<b>8. Teacher's academic profile</b>	<p><b>Education:</b></p> <ul style="list-style-type: none"> <li>- BSc in Biology (1998–1999), College of Education, Salahaddin University-Erbil</li> <li>- MSc in Entomology (2001-2002), College of Education, Salahaddin University- Erbil</li> <li>- PhD in Entomology (2013-2014), College of Education, Salahaddin University-Erbil</li> </ul> <p><b>Teaching experience:</b></p> <ul style="list-style-type: none"> <li>- Insect structures and Classification (3<sup>rd</sup> Class, Department of Biology, College of Education)</li> <li>- Cell Biology (4th Class Department of Biology, College of Education)</li> <li>- Biological Control (M.Sc. students, Department of Biology, College of Science)</li> <li>- Advance Insect Biology (Ph.D. students, Department of Biology, College of Education)</li> <li>- IPM (Ph.D. students, Department of Biology, College of Education)</li> </ul>
<b>9. Keywords</b>	<b>Insects of medical importance, Housefly, Cockroach, Biting insects, Fleas, Myiasis, Insect-borne diseases.</b>
<b>10. Course overview:</b>	<p>Medical Entomology continues to be of great importance focus on direct injuries caused by arthropods such as phobias, annoyance, allergies, toxins, venoms and myiasis, arthropod transmission of vertebrate parasites, epidemiology of arthropod-borne diseases.</p> <p>Arthropodborne diseases such as malaria, yellow fever, dengue, west Nile virus, Lyme disease and filariasis continue to cause considerable human suffering and death.</p> <p>Throughout the semester we will attempt to study transmission of diseases, methods of surveillance for diseases, management by vector control and other methods of prevention of arthropodborn diseases.</p> <p>Problems in animal production, wildlife and pets of humans caused by arthropods. Old and new health problems with arthropods occur, the traditional approaches to arthropod control have become more limited. Arthropod resistance to chemical pesticides by arthropods, a diminishing interest on the part of pesticide producers to develop new products for public health and veterinary uses, and the regulatory restrictions on pesticide use worldwide forces medical entomologists to seek entirely new methods to control arthropod vectors.</p>

## 11. Course objective:

- 1- Appreciate the diversity of human pathogens and their insect vectors. Understand the methods used to control the vectors and the diseases and what the barriers are to effective control of many insect-transmitted diseases.
- 2- Appreciate the diversity of human pathogens and their insect vectors.
- 3- Understand the biology of specific vector-pathogen interactions and of the disease in humans.
- 4- Be able to identify the major types of insects that transmit diseases to people and animals.
- 5- Identify most insects and other arthropods likely to transmit viruses, parasites, or bacteria.
- 6- Examine current issues in Medical Entomology, including the introduction of exotic vectors and pathogens and the future of genetic technology for vector control.

## 12. Student's obligation

The role of student and their obligation throughout the academic year include:

Quizzes

Seminar

Review Article

Monthly Examination

Final Examination

## 13. Forms of teaching

Lectures, Presentation, Seminar, Exam

## 14. Assessment scheme

## 15. Student learning outcome:

Upon completion of the course the participants should be able to:

- 1-Understand the basic biology and ecology of the arthropods of public health importance.
- 2-Comprehend the surveillance tools and control strategies of important public health vectors
- 3-Understand the influence of climate and environment on vector ecology
- 4- Enhance the skills in vector-borne disease surveillance, insect species identification and vector control

## 16. Course Reading List and References:

1- 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

- 2- 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
- 3- 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)
- 4- Kettle, D.S. 1995. Medical and Veterinary Entomology. 2nd edition. CAB International. New York, NY.

17. Topics Program	Lecture's Name
Week 1:	<p><b>Identification and Systematics of Arthropods of Medical-importance.</b></p> <p><b>Importance of Arthropods in Parasitology</b></p> <p>Epidemiology of Vector-Borne Diseases</p> <p><b>Components of Transmission Cycles</b></p> <p><b>Modes of Transmission</b></p> <p><b>Mechanical Transmission</b></p> <p>Direct Mechanical Transmission</p> <p>Indirect Mechanical Transmission</p> <p><b>Biological Transmission</b></p> <p>Propagative- Cyclopropagative -Cyclodevelopmental</p> <p>Vertical Transmission -Horizontal Transmission</p> <p><b>Host Preference and Host-Feeding Patterns</b></p>
Week 2:	<p><b>Diptera (Flies): The order of great public health</b></p> <p>Taxonomy, Morphology, Life History, Behavior and Ecology.</p> <p><b>Disease Transmitted by mosquitos and other biting Diptera</b></p> <p><b>Control and eradication of dipterans</b></p>

**Families of Medical or Veterinary importance**

**Family Culicidae e.g. Mosquitoes**

Taxonomy, Morphology, Life History, Behavior and Public Health Importance

Anopheles mosquitos

Culex mosquitos

Aedes mosquitos

Mansonia mosquitos

**Disease transmitted by mosquitos**

Malaria

Lymphatic filariasis (elephantiasis

Yellow fever

Dengue fever

**Family Ceratopogonidae (Biting Midges)**

Taxonomy, Morphology, Life History, Behavior and

Public Health Importance

Oropouche Fever

Other Viral Agents

Mansonellosis

**Family: Simuliidae ( Black Flies)**

Taxonomy ,Morphology ,Life History ,

Behavior and Ecology and Public Health Importance

Biting and Nuisance Problems

Human Onchocerciasis

Mansonellosis

Other Diseases Related to Black Flies

**Family: Psychodidae (Phlebotomine Sand Flies and Moth)**

Taxonomy, Morphology, Life History, Behavior and Ecology, and Public Health Importance

Leishmaniasis (cutaneous leishmaniasis, Mucocutaneous leishmaniasis and Visceral leishmaniasis)

Sand Fly Fever, Bartonellosis,

Vesicular Stomatitis Virus Disease,

Chandipura Virus Disease, Changuinola Virus Disease,

Prevention and Control.

**Family: Tabanidae (Horse Flies and Deer Flies)**

Taxonomy, Morphology, Life History, Behavior and Ecology and Public Health Importance

Loasis

Tularemia

Anthrax

**Family: Glossinidae (Tsetse Flies)**

Taxonomy, Morphology, Life History, Behavior and Ecology and Public Health Importance

African Sleeping Sickness

West African Sleeping Sickness

East African Sleeping Sickness

	<p>Nagana</p> <p>Prevention and Control</p> <p><b>Family: Muscidae</b> (Muscide flies)</p> <p>Taxonomy ,Morphology,Life History ,Behavior and Ecology .</p> <p>Species of Medical-Veterinary Importance</p> <p>House Fly (<i>Musca domestica</i>)</p> <p>Stable Fly (<i>Stomoxys calcitrans</i>)</p> <p>Horn Fly (<i>Haematobia irritans irritans</i>)</p>
<p><b>Week 3:</b></p>	<p><b>Myiasis</b> (Muscoidea, Oestroidea)</p> <p><b>Methods of classifying myiasis:</b></p> <p><b>Anatomical Classification of myiasis</b></p> <p><b>Ecological (Biological or Parasitological) method</b></p> <p>Cutaneous Myiasis(dermal or sub-dermal)</p> <p>Furuncular myiasis</p> <p>Migratory myiasis</p> <p>Wound myiasis</p> <p>Cavitary Myiasis</p> <p>Ophthalmomyiasis</p> <p>Ophthalmomyiasis externa</p> <p>Ophthalmomyiasis interna</p> <p>Orbital myiasis</p>

ENT myiasis

Oral myiasis

Aural myiasis

Nasal myiasis

Throat myiasis

Tracheostomy myiasis

Urogenital myiasis

External urogenital myiasis.

Internal urogenital myiasis.

Intestinal myiasis

Cerebral myiasis

Accidental Myiasis or Pseudomyiasis

**Flies Involved in Myiasis**

Fanniidae (Faniid Flies)

Muscidae (Dung Flies)

Calliphoridae (Blow Flies, Carrion Flies,  
Floor Maggots, Nest Maggots, and  
Screwworms)

Carrion-Associated Blow Flies

Sarcophagidae (Flesh Flies) 1

Oestridae (Bot Flies)

New World Skin Bot Flies (Cuterebrinae)



	<p>Old World Skin Bot Flies (Hypodermatinae)</p> <p>Nose Bot Flies (Oestrinae)</p> <p>Stomach Bot Flies (Gasterophilinae)</p> <p>Other Oestroid Flies</p> <p><b>Clinical Use of Maggots (Maggot therapy or Larval therapy)</b></p>
<b>Week 4:</b>	<p><b>Cockroaches (Blattaria)</b></p> <p>Taxonomy ,Morphology ,Life History ,Behavior and Ecology</p> <p><b>Common Cockroach Species</b></p> <p>Oriental Cockroach (<i>Blatta orientalis</i>)</p> <p>American Cockroach (<i>Periplaneta americana</i>)</p> <p>Australian Cockroach (<i>Periplaneta australasiae</i>)</p> <p>Brown-Banded Cockroach (<i>Supella longipalpa</i>)</p> <p>German Cockroach (<i>Blattella germanica</i>) 68</p> <p><b>Public Health Importance</b></p> <p>Pathogenic Agents</p> <p>Intermediate Hosts</p> <p>Cockroach Allergies</p> <p>Prevention and Control</p>
<b>Week 6:</b>	<b>Parasitic insects: Mallophaga and Anoplura, The Lice</b>

	<p>Taxonomy ,Morphology ,Life History</p> <p>Lice of Medical Importance</p> <p>(head louse) <i>Pediculus humanus capitis</i>,</p> <p>(body louse) <i>Pediculus humanus humanus</i> ,</p> <p>(crab louse or pubic louse) <i>Phthirus pubis</i></p> <p><b>Public Health Importance</b></p> <p>Epidemiology of Human Lice</p> <p><b>Louse infestation (Pediculosis)</b></p> <p>Pediculosis capitis</p> <p>Pediculosis corporis</p> <p>Pediculosis pubis</p> <p>Louse-borne Infectious Diseases</p> <p>Epidemic Typhus</p> <p>Louse-Borne Relapsing Fever</p> <p>Trench Fever</p> <p>Other Pathogens Transmitted by Human Body</p> <p>Lice</p> <p>Prevention and Control</p>
<p><b>Week 7:</b></p>	<p><b>Fleas (Siphonaptera)</b></p> <p>Taxonomy ,Morphology ,Life History, Behavior and Ecology.</p> <p>Fleas of MedicalVeterinary Importance</p> <p>Human Flea (<i>Pulex irritans</i>)</p> <p>Cat Flea (<i>Ctenocephalides felis</i>)</p>

	<p>Dog Flea (<i>Ctenocephalides canis</i>)</p> <p>Oriental Rat Flea (<i>Xenopsylla cheopis</i>)</p> <p>Chigoe (<i>Tunga penetrans</i>)</p> <p>Northern Rat Flea (<i>Nosopsyllus fasciatus</i>)</p> <p>Public Health Importance</p> <p>Flea-Associated Allergies</p> <p>Flea-borne diseases</p> <p><b>Plague</b></p> <p>pneumonic plague</p> <p>urban plague</p> <p><b>Rickettsial diseases</b></p> <p>Murine Typhus</p> <p>Other Flea-Borne Rickettsial Agents</p> <p>Flea-borne spotted fever</p> <p>Other Flea-Borne Pathogens</p> <p>Bacteria</p> <p>Viruses</p> <p><b>Tungiasis</b></p> <p>Bartonellosis</p> <p>Fleas as Intermediate Hosts of Helminths 162</p> <p>Flea Allergy Dermatitis</p> <p><b>Prevention and Control</b></p>
<p><b>Week 8:</b></p>	<p><b>Biting, stinging, and Venomous Arthropods</b></p>

Arthropods as direct agents and cause of allergies, and delusory parasitosis (Hymenoptera) Ants, Wasps, and Bees

Taxonomy, Morphology, Life History, Behavior and Ecology

### **Hymenoptera Venoms**

Ant Venoms

Vespid Venoms

Honey Bee Venom

### **Ants**

Fire Ants (*Solenopsis* spp.)

Harvester Ants (*Pogonomyrmex* spp.)

Pavement Ant (*Tetramorium caespitum*)

### **Wasps**

Solitary Wasps

Mutillidae ,Pompilidae ,Sphecidae

Social Wasps (Vespidae)

Yellowjackets (*Dolichovespula* and *Vespula*)

Hornets (*Vespa* spp.)

Paper Wasps (*Polistes* spp.)

### **Bees**

Solitary Bees

Halictidae

Anthophoridae

Social Bees

	<p>Apidae</p> <p>Bumble Bees (Bombus spp.)</p> <p>Honey Bees (Apis spp.)</p> <p><b>Public Health Importance</b></p>
<p><b>Week 9:</b></p>	<p><b>Moths and Butterflies (Lepidoptera)</b></p> <p>Taxonomy ,Morphology ,Spicule Hairs ,Spine Hairs</p> <p>Life History ,Behavior and Ecology</p> <p>Lepidopterism</p> <p>Erucism</p> <p>Dendrolimiasis</p> <p>Localized stings</p> <p>Urticarial wheals</p> <p>Papular urticaria and dermatitis</p> <p>Hemorrhagic diathesis (Lonomism)</p> <p>Prominent arthritis/arhralgias</p> <p>Ophthalmia nodosa</p> <p>Oral exposure</p> <p>Urticating Caterpillars</p> <p>Geometridae</p> <p>Crambidae</p> <p>Notodontidae</p> <p>Sphingidae</p>

	<p>Arctiidae</p> <p>Saturniidae,</p> <p>Megalopygidae,</p> <p>Limacodidae</p> <p><b>Prevention and Control</b></p>
<b>Week 10:</b>	<p><b>True Bugs (Hemiptera)</b></p> <p>Kissing Bugs (Reduviidae)</p> <p>Bed Bugs (Cimicidae)</p> <p>Taxonomy ,Morphology ,Life History , Behavior and Ecology</p> <p>Public Health Importance</p> <p>Chagas disease</p> <p>Prevention and Control</p>
<b>Week 11:</b>	<p><b>Beetles (Coleoptera)</b></p> <p>Taxonomy ,Morphology,Life History ,Behavior and Ecology</p> <p>Public Health Importance</p> <p>Canthariasis</p> <p>Scarabiasis.</p> <p>Meloidae (Blister Beetles)</p> <p>Oedemeridae (False Blister Beetles)</p> <p>Staphylinidae (Rove Beetles)</p> <p>Tenebrionidae (Darkling Beetles)</p>

	<p>Dermestidae (Larder Beetles)</p> <p>Scarabaeidae (Scarab Beetles)</p> <p>Coccinellidae (Lady Beetles)</p> <p>Prevention and Control</p>
<p><b>Week 12:</b></p>	<p><b>Forensic Entomology</b></p> <p>Legal Cases Involving Liability</p> <p>The Post-mortem Interval (PMI):</p> <p><b>Insects of Forensic Importance</b></p> <p>Stages of Human Decomposition and Associated Arthropods.</p> <p>Factors Affecting Body Decomposition</p> <p>Urban entomology</p> <p>Stored Products entomology</p> <p>Medico-legal entomology (criminal</p> <p>Legal Cases Involving Homicides, Suspicious</p> <p>and Accidental Deaths, and Abuse</p> <p><b>Uses of Forensic Entomology:</b></p> <ul style="list-style-type: none"> <li>• Estimating Time Since Death (Postmortem Interval; PMI)</li> <li>• Locating the Place of Death:</li> <li>• Finding the Cause and Circumstances of Death</li> <li>• Proving a Child or Senior Abuse/Neglect</li> <li>• Linking of Suspects to the Crime Scene (Association of Suspects with the Death Scene</li> <li>• Tracing of Contraband Trafficking (Illicit Drug Transport, Use, and Overdose</li> <li>• Suspicious Deaths</li> </ul> <p><b>Collection of Entomological Evidence at Death Scene</b></p>

<b>18. Grading procedure</b>  <b>Review Article= 15</b> <b>Seminar Presentation= 10</b> <b>Quiz= 5</b> <b>Midterm Examination= 20</b> <b>Final Examination= 50</b>	
<b>19. Examinations:</b>	



**20. Extra notes:**

**21. Peer review \***

\* Must have permission of the Scientific and Higher Education Committee