



Course Book

Department of Plant Protection

College of Agricultural Engineering Sciences

Salahaddin University, Erbil

Subject: Advanced Insect Ecology

Theoretical lecturer: Pshtiwan Abdullah Jalil

High Diploma level

Academic Year: 2023-2024

1. Course name	Advanced Insect Ecology
2. Lecturer in charge	Dr. Pshtiwan Abdullah Jalil
3. Department/ College	Plant Protection/Agricultural Engineering Sciences
4. Contact	Email: Pshtiwan.jalil@su.edu Tel: +964750 482 3304
5. Time (in hours) per week	2 hours theory 2 hours practical
6. Office hours	All the days of the week except Friday and Saturday.
7. Course code	
8. Teacher's academic profile	<p>Lecturer Name: Pshtiwan Abdullah Jalil Date of Birth: 1st January 1982 Place of Birth: Kirkuk Nationality: Iraqi Marital Status: Married Sex: Male</p> <p>Education:</p> <p>* B.Sc. Plant Protection, Agriculture, Salahaddin University, Erbil, 2005. * M.Sc. Plant Protection, Agriculture Science, Salahaddin University, Erbil, 2011</p> <p>Work History:</p> <p>(A) College of Agriculture, Department of Plant Protection, Salahaddin University -Erbil, November 2005 to October 2009, I was assigned as an Assistant Agricultural Engineer and worked out as an assistant laboratory in teaching practical subjects in the department labs.</p> <p>(B) College of Agriculture, Plant Protection Department/ Salahaddin University -Erbil, June 2011 until now</p> <p>As an assistant lecturer, I have been taught:</p> <p>1- I assisted as an assistant lecturer in teaching Insect Morphology to second-year students. In the fall semester of 2012. I was teaching the subject of field crop insects to 4th-year students in the spring semester.</p> <p>2- I was teaching as an assistant lecturer the subject of Principles of entomology for 2nd -year students of the forestry department in the fall semester (2013 – 215).</p> <p>3- I was teaching as an assistant lecturer on the subject of Practical Pesticide for 3rd-year students in the Spring semester, 2013.</p> <p>4- I was teaching as an assistant lecturer, the subject of Forest Entomology for 4th year students of the forestry department, In the Fall semester, 2014. As well as</p>

9. Keywords	Theory: Insect Ecology, Insect ecosystem, Insect population, Environmental factors. Biotic Environment, Insect Relations. Practical Insect Ecology, Insect Sampling, Insect Survey, Insect Population
10. Course overview: The course includes fundamental lectures in insect ecology in a Theoretical format such as an introduction to insect ecology, and population ecology of insects, We will cover major principles of ecology as they apply to insects, how ecologists study these components of insect ecology, and how this information can be applied to conservation, agriculture, and public health issues. The course will follow a level of organization from the individual, to populations, and finally, to communities. The diversity of insects is far too great to cover in a single quarter course. Rather than try to be overly inclusive and provide examples from this great diversity, the course will mainly focus on terrestrial insects then aquatic insects if time allows. The course includes fundamental lectures in insect ecology in a practical format such as an introduction to insect ecology, population ecology of insects, insect surveys, insect sampling methods, and sampling equipment. We will cover major principles of ecology as they apply to insects, how ecologists study these components of insect ecology, and how this information can be applied to conservation, agriculture, and public health issues. The course will follow a level of organization from the individual, to populations, and finally, to communities. The diversity of insects is far too great to cover in a single quarter course. Rather than try to be overly inclusive and provide examples from this great diversity, the course will mainly focus on terrestrial insects then aquatic insects if time allows.	
11. Course objectives: The objectives of this course are to teach the students to deal with the fundamentals of insect ecology in the theory underlying. The components of the environment such as biotic & abiotic factors, the influences of the environment on the insects such as predators, prayers, Mimicry, immunity, concepts of balance of life.....etc. The objectives of this course are to teach the students to deal with the fundamentals of insect ecology in practice such as insect surveys, insect sampling methods, the theory underlying sampling, the need to calibrate samples, the design of sampling programs, and to evaluate the use of different sampling techniques. Thus, the main objectives are summarized in the following points. 1) Gain an understanding of ecological principles as they pertain to insects. 2) Gain an appreciation and knowledge of the natural history of insects. 3) Understanding of scientific inquiry associated with insect ecology.	
12. Student's obligation A. Attendance: Attendance is mandatory. You should attend all the classes on time otherwise; you may miss important discussions that may arise during the class. Such material may be asked on exams. Additionally, If the student doesn't attend the class for more than 3 lectures, the student will be fired, considered as fail and must repeat the course for the next academic year. The lectures will be taken at the Department hall. B. Exams: Students missing their exam with no valid reasons or deceiving during the exam, the grade for the exam will be zero and eventually maybe fired.	

C. Make-up exams or other work:

Arrangements for a makeup exam (required because of a valid reason) must be made at least 3 days before the exam. If the student misses an exam due to a medical or family emergency (accompanied by a note from a medical professional), a makeup exam will be scheduled as soon as the student returns to the class.

D. Class demeanor expected by the instructor:

Be kind, considerate, and respectful of others; Mobile phones should be turned off and no texting. The cooperation of the students with each other during the class lectures and field visits is highly appreciated.

13. Forms of teaching

Various forms of teaching will be used during the course including:

1 Information will be explained using a whiteboard, videos, etc.

3- Scientific Trip: by the end of this course or maybe sooner, A scientific trip will be arranged to a specific site (e.g. Sheraswar) to review the information learned during the course in a more practical form.

14. Assessment scheme

The whole grade will be **50** degrees and be divided as follows:

Marks distribution of 15% (Theoretical part)

Measures	Marks
Mid-term Examination	50
Weekly Quiz	10
Presentation	30
Samples	10
Total	100

15. Student learning outcome:

By the end of this course, the students are expected to:

1-Learn the concepts of insect ecology such as insect autecology and synecology, Insect dispersal, Population fluctuation; and biotic & abiotic factors that affect insects, and their abundance.

2- Get familiar with major insect pests in agricultural lands.

3- Get familiar with the beneficial insects such as honey bees, pollinator insects and insects used in biological control programs and the ways of preserving such beneficial insects.

16. Course Reading List and References:

A- Useful References:

- 1- **Gibb, T. J. & Oseto, C. Y. (2006).** *Arthropod collection and identification: field and laboratory techniques*, Academic Press.

- 2- **Price, P.W., Denno, R.F., Eubanks, M.D., Finke, D.L. and Kaplan, I. (2011)** Insect ecology: behavior, populations and communities, Cambridge University Press.
- 3- **Rinker, H. B. and Lowman, M. D. (2004). Insect herbivory in tropical forests. In Forest canopies, Second Edition**
- 4- **Roberts, R. H. (1972).** The effectiveness of several types of Malaise traps for the collection of Tabanidae and Culicidae. Mosquito News, 32: 542–547.
- 5- **Thomas, J. A. (2005).** Monitoring change in the abundance and distribution of insects using butterflies and other indicator groups. Philosophical Transactions of the Royal Society of London B, 360: 339–357.
- 6- **Varley, G.C., Gradwell, G.R. and Hassell, M.P. (1974)** Insect population ecology: an analytical approach, Univ of California Press.

B- Useful websites:

- 1- Sampling Methods for Forests and Shade Tree Insects of North America Vols. I and II available at <http://www.sampforestpest.ento.vt.edu/>
- 2-Insect scouting guidelines available at <http://extension.udel.edu/ag/tag/insect-scouting-guidelines/>

17. Theoretical Topics (Course Syllabus):

Weeks	
1	Ecology-introduction- autecology and synecology-population,
2	Abiotic factors, Temperature, Moisture, and Rainfall
3	Light-phototaxis, photoperiodism
4	Biotic factors- <i>Food</i> -classification of insects according to nutritional requirements <i>organisms</i> -inter and intra-specific associations-beneficial and harmful associations of Parasitoids are based on the site of the attack, stage of the attack, duration of the attack, degree of parasitism, and food habits.
5	Concept of a balance of life
6	Defense & mimicry in insects
7	Social insects, types of sociality
8	Insect-borne diseases
9	Insects in a changing climate.
10	Study of behavior and orientation of insects- repellency, deterrence, and stimulation
11	Study of terrestrial and aquatic ecosystems of insects.
12	Study of pollinators, weed killers, and scavengers.
13	Study of distribution patterns of insects in crop ecosystems.
14	Conservation of insect diversity.

18. Question forms in the theoretical part

Q1/ Definition

1-Insect ecology 2-community 3- Ecosystem 4- Habitat 5- Mutualism 6-Omnivorous insects 7- Endemic 8- Emigration 9- Abundance 10- Population 11- Carrying capacity 12- Insect outbreaketc.

Q2/ Compare between.....

- Biotic and abiotic factors?
- Hibernation and aestivation?
- Endo parasite and Ecto parasite?
- Nocturnal insects and Diurnal insects
- Predation and parasitism

Q3/ Enumeration

Q4/ Fill in the blanks with the best word or phrase for each of the following sentences:

Insect ecology has two main goals which are and

Answer/ Basic and Applied Goals

Q5/ a- Explain the role of (Temperature/ Relative humidity/ Wind/ Light/ Food) on the insect's life.

b- Compare between Rhio and Geo tropism.

20. Peer review	