Institute of Zoology,
Faculty of Life Sciences
University of the Punjab, Lahore
Course Outline

Programme	BS Zoology	**Course Code**	ZOOL-205	**Credit Hours**	2
Course Title	**Economic Zoology**				

Course Introduction

This course covers the economic significance of various animals and their impact on human activities, agriculture and industry. The course will explore parasitic protozoans and diseases, vectors of human and animal diseases, ecto and endo-parasites of fish, poultry, cattle and humans. It will also help to gain knowledge about pests affecting crops, vegetables and fruits, as well as their control measures. Additionally, study of apiculture, sericulture, lac insect culture, pearl culture, fisheries and aquaculture, bird farming will provide a comprehensive understanding of the field.

Learning Outcomes

Upon successful completion of the course, the student will be able to:

1. **ACQUIRE** basic knowledge of commerce and economics related to Zoology
2. **UNDERSTAND** the economic relationship of animals with humans
3. **SOLVE** problems related to animal husbandry and pest management by applying theoretical knowledge with practical efficacy.
4. **ANALYZE** and enhance animal husbandry techniques by using different entrepreneurship skills
5. **EVALUATE** problems using practical knowledge related to different farming systems in Zoology
6. **DEMONSTRATE** the economy based interactions of man and animals

	Course Content for Theory	**Assignments/Readings**
Week 1	**Unit-I: Basic Concepts in Economic Zoology** 1.1 Introduction to Economic Zoology 1.1.1 Definitions and Scope 1.2 Applications and Importance 1.2.1 Scope in Agriculture	Assignment on economic impact of insects in agriculture followed by discussion in classroom
	Unit-II: Parasitic Protozoans and Human Diseases 2.1 Overview of Parasitic Protozoans 2.1.1 Classification, Lifecycle and Epidemiology	Research and Presentation on Parasitic Protozoans
Week 2	2.2 Protozoans parasites of human 2.2.1 *Entamoeba histolytica* 2.2.2 *Entamoeba gingivalis* 2.2.3 Giardia 2.2.4 Leishmania	Assignment on Plasmodium and *Trypanosoma brucei*
	2.3 Economic Importance of Protozoa 2.3.1 Impact on Public Health	Group project: Economic analysis of Protozoan diseases
Week 3	**Unit-III**: **Vectors of Human and Domestic Animals** 3.1 Introduction to Vectors 3.1.1 Types and Roles 3.1.4 Wasps 3.1.5 Mosquitos 3.1.6 Ticks & Mites	Group presentation on following topics • Flies • Mites Along with the presentation, each group will submit a written report (4-6 pages) detailing their findings.
Week 4	**Unit-IV: Ecto and Endo-parasites of Fish, Poultry,**	Parasites of fish: Crustaceans

	Cattle and Man 4.1 Introduction to Ecto and Endo-parasites 4.1.1 Definitions and Classifications 4.2 Ectoparasites 4.2.1 Fleas 4.2.2 Bed Bugs 4.2.3 Human louse 4.3 Endoparasites 4.3.1 Tapeworm 4.3.2 Roundworm 4.3.3 Hookworm	and Helminths Assignment on Liver fluke and Pinworm Short quiz
Week 5	**Unit-V: Insect Pests of Various Crops** 5.1 Stored grain pests 5.2 Insect pest of sugarcane 5.2.1 Sugarcane early shoot borer 5.2.2 Sugarcane top borer 5.2.3 Sugarcane leaf hopper	Assignment on Banana weevil, Sugarcane Whitefly, Sugarcane root borer and Gurdaspur borer
Week 6	5.3 Insect pests of fruit and fruit trees 5.4 Lemon butterfly 5.4.1 Identification 5.4.2 Life Cycle 5.4.3 Damage and Impact 5.4.4 Control Methods and Management 5.5 Mango mealy bug 5.5.1 Identification 5.5.2 Life Cycle 5.5.3 Damage and Impact 5.5.4 Control Methods and Management	Assignment on Management and Impact of Major Insect Pests in Fruit and Fruit Trees, Cotton, pulses, oil seed crops and vegetables
Week 7	**Unit-VI: Apiculture** 6.1Introduction to Apiculture 6.2 Classification 6.3 Lifecycle 6.4 Advantages and disadvantages 6.5 Methods of Bee-keeping By-products	Read and prepare a report on various byproducts of beekeeping, such as beeswax, propolis, royal jelly, and their uses in different industries.
Week 8	**Unit-VII: Sericulture** 7.1 Introduction, classification and history 7.2 Types of silkworm 7.3 Life cycle of silkworm 7.4 Steps involved in silk production 7.5 Diseases of silkworm 7.6 Importance of sericulture 7.7 Sericulture in Pakistan	Read and create a detailed timeline of the history of sericulture, from its origins in ancient China to modern practices around the world.
Week 9	**Unit-VIII: Lac culture** 8.1 Introduction and history 8.2 Life cycle of lac insect 8.3 Applications 8.4 Economic Importance	Develop a detailed diagram of the lifecycle of the organism or process in question, illustrating each stage from larval stage to maturity.
Week 10	**Unit-IX: Fisheries and Aquaculture** 9.1 Introduction and History 9.2 Common definitions 9.3 Objectives 9.4 Culture practices/Systems	Read various fish culture methods, including pond culture, cage culture, and recirculating aquaculture systems.

	9.5 Economic Importance of fishes 9.6 Characteristics of carps and catfishes 9.7 Edible Freshwater and Marine fishes	
Week 11	9.8 Shrimp and Prawn culture 9.9 Types and Life Cycle 9.10 Culture practices and importance	Report on the history and development of shrimp and prawn culture.
Week 12	9.11 Mollusc Culture 9.12 Types, life cycle, culture systems and importance	Presentation on future Trends in Mollusc and Crustacean Culture
Week 13	**Unit-X: Pearl Culture** 10.1 Intoduction, Common species 10.2 Types of pearls 10.3 Steps of pearl culture 10.4 Advantages 10.5 Economic Importance	Research and categorize different types of pearls, including natural, cultured, freshwater, and saltwater pearls. Short quiz
Week 14	**Unit XI: Livestock production and management** 11.1 Dairy farming 11.2 Introduction 11.3 Breeds of cow, buffalo and goat 11.4 Key aspects of dairy housing 11.5 Types of dairy housing 11.6 Management of herd 11.7 Nutrition and health management 11.8 Handling and transport 11.9 Dairy waste management 11.10 Diseases of cattles	Assignment on Innovations in Dairy Farming: Technological Advancements and Future Trends
Week 15	**Unit XII: Poultry production and management** 12.1 Introduction, classification 12.2 Common breeds 12.3 Steps in chicken rearing 12.4 Factors involved in breeding 12.5 Byproducts of poultry 12.6 Poultry farming in Pakistan	Reading on Innovations in Poultry Breeding: Modern Techniques and Technologies
Week 16	**Unit XIII: Wool industry** 13.1 Introduction 13.2 Wool manufacturing process 13.3 By products and uses of wool 13.4 Advantages and disadvantages	Assignment on Byproducts and Uses of Wool: Beyond the Fabric
	Unit XIV: Leather industry 14.1 Introduction 14.2 Stages in leather production 14.3 Applications	Assignment on Challenges in Leather Production: Industry Issues and Solutions

Textbooks and Reading Material

1. Economic Zoology. Vinita Jaiswal and Kamal Kumar Jaiswal. 2014. PHI Learning Private Limited, Delhi.
2. Akhtar, M. and Muzaffar, N., 2008. Introduction to Apiculture, Department of Zoology, Punjab University Press, 36 pp.
3. Economic Zoology. Ravindranathan, K. R. 2003. 1st ed. Dominent Publishers and Distributers. New Delhi. India
4. Blackiston, H., 2001. Beekeeping for Dummies. Wiley Publishing, Inc. Indiana, USA, pp. 303.
5. A Primer of Conservation of Biology. Primack R. B. 2000. 2nd ed. Sinauer Associates Inc. USA.

6. Anon, 1999. FAO Bulletins on Sericulture Nos. 1 & 2. FAO Office, Rome, Italy.
7. Animal biodiversity of Pakistan. Mirza, Z. B. 1998. 1st ed: Printopack, Rawalpindi. Pakistan.
8. Shukla, G.S. and Upadhayay, V.B., 1997. Economic Zoology, 3rd Ed. Rastogi Publications, Mearut, India, pp. 369.
9. Ahmad, R. and Muzaffar, N., 1987. Rearing of Silkworm. Misc. Pub. Pak. Agric. Res. Council, pp. 53.
10. Principles of Wildlife Management. Bailey, J. A. 1986. John Wiley and Sons Inc.USA
11. Anon, 1986. The Hive and the Honeybee. Dadant & Sons. Illinois, USA, pp. 740.
12. Wildlife ecology and management. Robinson, W. L. and Bolen, E. G. 1984. McMillan Publishing Company. Cambridge, UK.

Teaching Learning Strategies

Teaching will be a combination of written assignments, class quizzes, presentations and class participation

Assignments: Types and Number with Calendar

Presentations: Week 1,3, &12
Reading assignment: Week 7,8,10 & 15
Group projects: Week 2
Quiz: Week 4 & 13
Report: Week 11

Assessment

Sr. No.	Elements	Weightage	Details
1.	Midterm Assessment	35%	Written Assessment at the mid-point of the semester.
2.	Formative Assessment	25%	Continuous assessment includes: Classroom participation, assignments, presentations, viva voce, attitude and behavior, hands-on-activities, short tests, projects, practical, reflections, readings, quizzes etc.
3.	Final Assessment	40%	Written Examination at the end of the semester. It is mostly in the form of a test, but owing to the nature of the course the teacher may assess their students based on term paper, research proposal development, field work and report writing etc.