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

Programme	BS Zoology	**Course Code**	**ZOOL-416**	**Credit Hours**	1
Course Title	**Lab. Applied Fisheries**				

Course Introduction

The Applied Fisheries practical course offers students a hands-on approach to understanding fisheries through a multidisciplinary lens, incorporating principles from limnology, oceanography, freshwater biology, marine biology, conservation, ecology, population dynamics, economics and management to attempt to provide an integrated picture of fisheries from practical point of view. Students will engage in field surveys to collect and analyze data on fish populations and aquatic environments.

Learning Outcomes

On the completion of the course, the students will:

1. Acquire knowledge about history, needs and importance of fisheries and aquaculture.
2. Discuss various fish species characteristics and understand their culture requirements.
3. Estimate the water quality for pond construction.
4. Hands on experience of pond fish culture and other advanced culture practices.
5. Identify various fish diseases and their enemies.

	Course Content	**Assignments/Readings**
Week 1	Unit-I: Fish morphology 1.1 Study of external morphology of fish.	Assignment on Illustration and description of the location, structure, and function of each type of fin.
Week 2	1.2 Study of internal anatomy of fish	Overview on functions and location of internal organs of fish.
Week 3	1.3 Dissection of fish	Short assignment to identify and examine internal organs such as the heart, liver, stomach, intestines, and reproductive organs, with descriptions of their functions.
Week 4	Unit-II: Fish Identification 2.1 Important Fish Species 2.1.1 Methods of fish Identification	Practical: Identification of Important Fish Species Short quiz
Week 5	2.2 Culturable fish species of Pakistan 2.2.1 Indian major carps 2.2.2 Chinese major carps	Research on the economic importance of Indian major carps and Chinese major carps in the aquaculture industry of Pakistan, including their market demand and profitability.
Week 6	Unit III: Study of gut contents of culturable fish species.	Research the significance of gut content analysis in fisheries science and aquaculture.
Week 7	Unit IV: Diagnosis of important bacterial diseases in cyprinids	Microscopic Examination of Bacterial Pathogens
Week 8	Unit V: Study of important parasites of fish	Microscopic Examination of fish parasites
Week 9	Unit VI: Study of early developmental stages of fish egg	Discussion on the importance of understanding early developmental stages for aquaculture, conservation, and research.
Week 10	Unit VII: Induced spawning of fish 7.1 Carps	Discussion on the concept of induced spawning, its importance in aquaculture, and the basic

	7.2 Catfishes	principles involved.
Week 11	Unit VIII: Water quality parameter analysis 8.1. Physical analysis 8.2 Chemical analysis	Collection, interpretation, and analyzing of data from water quality measurements to assess the overall condition of the aquatic environment.
Week 12	Unit IX: Study of fish farm 9.1 Visit to fish farm	Detailed report on visit to fish farm. Short quiz.
Week 13	Unit X: Study of fish hatchery and its components	Discussion on the importance and role of fish hatcheries in a country's economy.
Week 14	10.1 Visit of fish hatchery and report writing	Detailed report on visit to fish hatchery. Short quiz.
Week 15	Unit XI: Feasibility report for construction of fish farm.	Report to evaluate the feasibility of constructing a fish farm, including site selection, infrastructure requirements, financial analysis, and operational considerations.
Week 16	Unit XII: Study of zooplanktons and phytoplankton	Research on the importance of zooplankton and phytoplankton in aquatic ecosystems, including their roles in the food web, their identification, and their impact on water quality.

Textbooks and Reading Material

1. Kestin. Farmed Fish Quality (2001). Multiline Books.
2. Ruth. Freshwater Aquaculture (2000). Multiline Books.
3. Bromage. Broodstock Management and Egg & Larval Quality (1995). Pak Book Corp.
4. Woo. Fish Diseases and Disorder: Protozoan and Metazoan Infections (1995). Pak Book Corp.
5. Brenabe. Aquaculture, Vol. I &II (1992). Fishing News Books Ltd, England.
6. C. Maseke. Fish Aquaculture (1987). Pergamon Press, Oxford.
7. M. Huet. Text Book of Fish Culture: Breeding and Cultivation (1986). Fishing News Books Ltd, England.

Teaching Learning Strategies

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

Assignments: Types and Number with Calendar

1. Discussion: Week 9,10 & 13
2. Report: Week 12,14 & 15
3. Quiz: 4, 12, & 14
4. Field visits: Week 12 & 14

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.