

UZO-413 Applied Fisheries

Cr. (2)

Introduction:

Applied Fisheries is a multidisciplinary science, which draws on the disciplines of limnology, oceanography, freshwater biology, marine biology, conservation, ecology, population dynamics, economics and management to attempt to provide an integrated picture of fisheries. This course highlights the history of aquaculture and its significance. It elaborates the construction and management of the aquaculture facilities.

Course Objectives:

The course aims to:

- Impart knowledge about history, needs and importance of fisheries and Aquaculture.
- Describe the cultureable fish species around the globe and Pakistan.
- Provide knowledge about estimation of the soil & water quality for pond construction.
- Elaborate the basics of fish culture and aquaculture facilities.
- Explain the identification and control of various fish diseases and their enemies.

Course Learning Outcomes:

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

- Acquire knowledge about history, needs and importance of fisheries and aquaculture.
- Discuss various fish species characteristics and understand their culture requirements.
- Estimate the soil & water quality for pond construction.
- Understand basics of pond fish culture and other advanced culture practices.
- Identify various fish diseases and their enemies.

Course Contents:

1. **Introduction of Aquaculture in Pakistan:** Definition, History of Aquaculture, Aquaculture: A global perspective, Status of Aquaculture in Pakistan
2. **Construction and Management of Aquaculture Facility:** Selection of Site, Climate, Vegetation, Fish pond, Watershed pond, Excavated Ponds, Design, Pond Preparation for Stocking, Polyculture Concepts, Cage Culture in Inland Waters of Pakistan, Site Selection, shape and size, Types of Fish Culture Systems, Integrated Aquaculture
3. **Soil & Water Quality:** Physical and Chemical Quality of Soil, Physical and Chemical Characteristics of Water, Aeration, Algae Management, Aquatic Plants, Integrated Pest Management
4. **Fish Hatchery Management:** Selection of Site, Water Quality, Layout Plan of Hatchery, Types of Ponds at the Hatchery, The Hatchery Proper
5. **Natural food and feeding:** Phytoplanktons, Zooplanktons, Crustaceans (cladocera), Arthropods larvae, Annelids, Molluscs
6. **Artificial feed and feeding:** Of plant origin, of animal origin, Feed for Salmonids, Feed for Cyprinids, Feed pelleting, Adaptation of fish on pelleted feed
7. **Breeding and cultivation of Salmonids** (rainbow trout and brown trout): Natural breeding, Artificial breeding, Induced spawning, Hormonal induced spawning
8. **Breeding and cultivation of Cyprinids** (major carps and Chinese carps): Natural breeding, Artificial breeding, Induced spawning, Hormonal induced spawning
9. **Fish diseases and their control:** Viral disease, Bacterial diseases, Fungal diseases, Parasitic (protozoan, helminths, crustaceans, leeches, Argulus)
10. **Fish enemies and their control:** Insects, Voracious fish, Amphibians, Reptiles, Birds, Mammals
11. **Pond Fertilization and its significance:** Varieties of organic and inorganic fertilizers. Doses of fertilizers and its uses.
12. **Common Freshwater aquatic weeds and their control:** Biological, Chemical, Mechanical
13. **Fish harvesting and marketing:** Netting, Transportation, Maintenance of flesh quality and price control.

Teaching-Learning Strategies

Teaching will be a combination of class lectures, class discussions, and group work. Short videos /films will be shown on occasion.

Assignments

The sessional work will be a combination of written assignments, class quizzes, presentation, and class participation/attendance.

Assessments and Examination

Sessional Work: 25 marks

Midterm Exam: 35 marks

Final term Exam: 40 marks

Books Recommended:

1. Fitzsimmons, K., Janjua, R.S.N. and Ashraf, M., 2015. **Aquaculture Handbook Fish Farming and Nutrition in Pakistan**, Feeding Pakistan, SoyPak Health Through Nature.
2. Huet, M., 1986. **Text Book of Fish Culture: Breeding and Cultivation** Fishing News Books Ltd, England
3. Moyle, P.B. and Joseph, J.C. 2004. **Fisheries: An Introduction to Ichthyology**, Pearson Education Ltd., London
4. Parker R. O., 2004. **Aquaculture Science** (4thed.). Delmar Learning, London.
5. Kestin, 2001. **Farmed Fish Quality** Multiline Books
6. Ruth, 2000. **Freshwater Aquaculture** Multiline Books
7. Bromage, 1995. **Broodstock Management and Egg and Larval Quality** Pak Book Corp.
8. Woo, 1995. **Fish Diseases and Disorder: Protozoan and Metazoan Infections** Pak Book Corp.

UZO-414 Applied Fisheries (Lab.)

Cr. (1)

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Course Learning Outcomes:

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- Acquire knowledge about history, needs and importance of fisheries and aquaculture.
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- Understand basics of pond fish culture and other advanced culture practices.
- Identify various fish diseases and their enemies.

Course Contents:

Morphological identification of important culturable fish species; Study of gut contents of culturable fish species; Diagnosis of important bacterial diseases in cyprinids; Study of important parasites of fish; Stripping of mature fish and artificial fertilization of eggs and sperms; Study of early developmental stages; Visit to various fish seed hatcheries during fish breeding season

Teaching-Learning Strategies

Teaching will be a combination of class lectures, class discussions, and group work. Short videos /films will be shown on occasion.

Assignments

The sessional work will be a combination of written assignments, class quizzes, presentation, and class participation/attendance.

Assessments and Examination

Sessional Work:	25 marks
Midterm Exam:	35 marks
Final term Exam:	40 marks

Books Recommended:

1. Prof. Dr. Kevin Fitzsimmons, Dr. R.S.N. Janjua and Prof. Dr. M. Ashraf, 2015. **Aquaculture Handbook Fish Farming and Nutrition in Pakistan**, Feeding Pakistan, SoyPak Health Through Nature.
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