

### Course Objectives

The objectives of the course are:-

1. To elaborate the interaction of fish and aquatic environment
2. To describe the effects of biotic and abiotic factors on fish
3. To impart knowledge regarding fish population dynamics

### COURSE LEARNING OUTCOMES:

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

- **ACQUIRE** the knowledge of fish population and its interaction with environment
- **UNDERSTAND** basic knowledge of freshwater and marine water ecosystems, their relationship to the physical, chemical, and biological factors of environment
- **SOLVE** the various ecological problems of fishes
- **DEVELOP** critical thinking, written, oral communication, and professional skills as they relate to ecological Course Contents: within the context of fish biology and management

### Course Contents:

- **The Environment, Organisms and Relationships**
  - a) Introduction
  - b) Properties of water
  - c) Diversity of fishes
  - d) Relationship
- **Effects of Abiotic Environmental Identities on Distribution**
  - a) Introduction
  - b) Effects of abiotic identities

- c) Abiotic factors and the distribution of fishes in rivers and lakes
- d) Abiotic factors and the distribution of fishes in estuaries
- e) Abiotic factors and the distribution of fishes in littoral and sub-littoral marine waters.
- f) Effect of abiotic factors on the distribution of open-sea species.
- g) Adaptations of fish to abiotic environmental factors
- **Biotic Factors and the Structure of Fish Communities**
  - a) Introduction
  - b) Classification of the interactions
  - c) Role of biotic factors and community structure
  - d) Biotic interactions and community structure in rivers and lakes
  - e) Biotic interactions and community structure in the sea
  - f) Competition and predation in freshwater communities
- **Migration, Territoriality and Shoaling in Fishes**
  - a) Introduction
  - b) Swimming capacity and energy costs
  - c) Patterns and site attachment and social interactions
  - d) Migration and colonization in fishes
  - e) Over-wintering migrations
  - f) Movement of water and modes of fish movements.
  - g) Diadromy
  - h) Homing
  - i) Implications for exploitation
- **Feeding and Growth**
  - a) Introduction
  - b) Feeding ecology in freshwater environments
  - c) Feeding ecology in estuaries
  - d) Ecology of feeding of marine fishes
  - e) Detection and selection of food
  - f) Ecomorphology of feeding
  - g) Trophic categories of fishes
  - h) Utilization of food
  - i) Rate of food consumption
  - j) Growth
- **Life-Histories and Population Dynamics**
  - a) Introduction
  - b) Life-history traits and the concept of trade-offs
  - c) Breeding pattern of fishes
  - d) Population characteristics
  - e) Dynamics of fish populations
  - f) Production
- **Applied Ecology of Fishes**
  - a) Introduction
  - b) A classification of problems in applied ecology
  - c) Applied fish ecology of rivers
  - d) Applied ecology of lacustrine fishes
  - e) Applied fish ecology in the sea

### **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

## Text and Reference books:

1. Fish Ecology. R.J. Wootton, Blackie Academic & professional an imprint of Chapman & Hall, London, Weinheim. New York- Tokyo. Melbourne. Madras First edition 1992. Reprinted 1996
2. Fisheries Ecology. Tony J. Pitcher, The AVI publishing company inc. Westport, Connecticut 1982.
3. Ecology of Teleost Fishes. Robert J. Wootton. Chapman & Hall London. New York, Tokyo, Melbourne. Madras. First edition 1990, reprinted with revisions 1991.
4. Environmental Biology of Fishes. Malcolm Jobling. Tokyo, Melbourne. Madras. First edition 1995.
5. Ecology and Conservation of Fishes. Harold M. Tyus, CRC Press, Taylor and Francis Group, USA, 2011.
6. Shammi, Q.J. and Bhatnagar, S. 2002. Applied Fisheries, Agro bios, India.
7. Ali, S.S. 1999. Fresh Water Fisher Biology. Naseem Book Depot, Hyderabad.

## UZO-464 Fish Ecology (Lab)

Cr. (1)

### Course Objectives

The objectives of the course are:-

1. To elaborate the interaction of fish and aquatic environment
2. To describe the effects of biotic and abiotic factors on fish
3. To impart knowledge regarding water quality parameters
4. To learn about fish collection and preservation

### COURSE LEARNING OUTCOMES:

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

- **ACQUIRE** the knowledge of fish population and its interaction with environment
- **UNDERSTAND** basic knowledge of freshwater and marine water ecosystems, their relationship to the physical, chemical, and biological factors of environment
- **SOLVE** the various ecological problems of fishes
- **DEVELOP** critical thinking, written, oral communication, and professional skills as they relate to ecological Course Contents: within the context of fish biology and management

### Course contents

- Collection, identification and preservation of fishes
- Water sampling and water preservation techniques for physico-chemical and biological analyses
- Estimation of physical characteristics of water viz. temperature, density, light penetration and turbidity
- Estimation of chemical characteristics of water viz. dissolved oxygen, carbon dioxide, pH, total alkalinity, total hardness, bicarbonates, chlorides, calcium, magnesium, salinity
- Collection, preservation and study of fauna and flora of various water bodies
- Visit to various fish farms and report writing

### 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