



जम्मू केन्द्रीय विश्वविद्यालय  
Central University of Jammu

राया-सुचानी (बगला), जिला: सांबा-181143, जम्मू (जम्मू और कश्मीर), भारत  
Rahya-Suchani (Bagla), District- Samba, 181143, Jammu (Jammu and Kashmir), India

Course Title: Aquatic Biology

Credit: 4 (L-3, T-0, P-1)

Course Code:

Contact Hrs/Week: (L-3, T-0, P-2)

**Course Outcome (CO):** This course explores freshwater and marine ecosystems, their biodiversity, structure, ecological functions, and the impacts of pollution on aquatic life.

**Course Learning Outcome (CLO):** students will be able to:

1. Identify major taxonomic groups of aquatic animals and describe their key morphological and ecological traits.
2. Discuss the adaptations of aquatic animals to their habitats, including osmoregulation, thermoregulation, and locomotion.
3. Analyse migration, navigation, feeding behaviours, and communication mechanisms in aquatic species.
4. Evaluate the consequences of anthropogenic activities, such as pollution and overfishing, on aquatic ecosystems and propose solutions.
5. Understand and advocate for the conservation of aquatic biodiversity and sustainable use of aquatic resources.

**Unit I**

Overview of Freshwater (ponds, lakes, rivers, wetlands) and Marine (oceans, seas, estuaries) ecosystems.

**Unit II**

Invertebrates: Sponges, cnidarians, molluscs, crustaceans. Vertebrates: Fishes, amphibians, reptiles, mammals

**Unit III**

Osmoregulation and thermoregulation, Reproductive strategies in aquatic environments, Filter feeders, predators, scavengers. Adaptations to buoyancy, locomotion, and respiration.

**Unit IV**

Mechanisms and ecological significance of Migration and Navigation in Salmon, sea turtles, whales, Communication in Aquatic Animals- Visual, chemical, and acoustic communication

**Unit V**

Types of Aquatic Pollution: Chemical, biological, thermal, and plastic pollution. Bioaccumulation and Biomagnification of aquatic pollution with its impact on Behaviour, physiology, and reproduction in aquatic organisms. Policies, restoration practices, and global efforts in mitigation and management of aquatic pollution

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Page 19 | 32



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**Lab Component:**

1. Study of the topography of a lake.
2. Physico-Chemical and biological analysis of a lake.
3. Physico-Chemical analysis of water - O<sub>2</sub>, CO<sub>2</sub>, BOD, COD. Biological- Zooplanktons Identification and population density of Zooplanktons of a lake.
4. Determination of Turbidity / transparency, Dissolved Oxygen, Free Carbon dioxide, Alkalinity (carbonates & bicarbonates) in water collected from a nearby lake / water body.
5. Instruments used in limnology (Secchi disc, van Dorn bottle, conductivity meter, Turbidity meter) and their significance

**Suggested Readings:**

1. Goldman, C. (1994) Limnology (2nd edition).
2. Ananthakrishnan, T.N. (1989) Bioresources Ecology (3rd edition).
3. Odum, E.P. and Barrett, G.W. (2004) Fundamentals of Ecology (5th edition).
4. Pawlowski, L. (1980) Physicochemical Methods for water and Wastewater Treatment.
5. Wetzel, R. (2001) Limnology (3rd edition) Elsevier.
6. Trivedi, R.K. and Goyal, P.K. (1986) Chemical and biological methods for water pollution studies.

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