

Course Code	Course Name	Credits
26ZY105	AI-BASED AQUACULTURE MANAGEMENT	04

Course Objectives

- To understand the applications of artificial intelligence in aquaculture.
- To study smart aquaculture systems and automated monitoring.
- To develop knowledge on AI-based fish feeding and health management.
- To understand data analytics and IoT applications in aquaculture.
- To enhance skills in sustainable and precision aquaculture management.

Learning Outcomes

- Explain the role of AI in aquaculture management.
- Identify smart tools and technologies used in aquaculture.
- Demonstrate knowledge of automated monitoring systems.
- Analyze aquaculture data using AI techniques.
- Apply AI technologies for sustainable fish farming.

Unit 1 - Introduction to AI in Aquaculture (12 Hrs.)

Concept and scope of artificial intelligence; applications of AI in fisheries and aquaculture; smart aquaculture systems; digital transformation in aquaculture.

Unit 2 - Sensors and IoT in Aquaculture (12 Hrs.)

Water quality sensors; IoT devices for monitoring aquaculture systems; automated data collection; remote sensing technologies; cloud-based aquaculture management.

Unit 3 - AI-Based Feeding and Growth Monitoring (12 Hrs.)

Automated feeding systems; machine learning in feed optimization; growth monitoring using computer vision; fish behaviour analysis; predictive analytics in aquaculture.

Unit 4 - Fish Health and Disease Prediction (12 Hrs.)

AI tools for disease diagnosis; image-based disease detection; predictive models for disease outbreaks; biosecurity and health management; smart alert systems.

Unit 5 - Sustainable and Precision Aquaculture (12 Hrs.)

Precision aquaculture; environmental monitoring; AI-based decision support systems; economic and environmental benefits; future prospects and challenges of AI in aquaculture.

Reference Books:

1. Kumar, A. (2022). Artificial Intelligence in Aquaculture. Springer.
2. Balasubramanian, S. (2021). Smart Aquaculture Technologies. CRC Press.
3. Ross, I.G. (2020). Aquaculture and Fisheries Biotechnology. Wiley.
4. Pillay, T.V.R. (2019). Aquaculture Principles and Practices. Blackwell Publishing.
5. Mishra, J.K. (2023). IoT and AI Applications in Aquaculture. Elsevier.

Websites and eLearning Sources:

1. <https://www.fao.org/>
2. <https://www.aquaculturealliance.org/>
3. <https://www.iotevolutionworld.com/>

