

Course Content and Outcome Guide for AQS 232

Course Number: AQS 232

Course Title: Reproduction and Nutrition of Aquatic Animals

Credit Hours: 4

Lecture Hours: 30

Lecture/Lab Hours: 20

Lab Hours: 0

Course Description

Presents the reproductive strategies of fishes and invertebrates in a controlled environment and the manipulation of environmental and physiological parameters that initiate reproduction. Provides the fundamentals of nutrition as well as the nutritional requirements of selected aquatic animals throughout their life history. Presents industry standards for food handling and HACCP requirements.

Intended Outcomes for Course

1. Identify common reproductive strategies of selected fishes and invertebrates.
2. Construct an environmental protocol to induce gamete maturation in commonly cultured fishes and invertebrates.
3. Apply rearing techniques for the care of offspring of commonly cultured fishes and invertebrates.
4. Formulate a suitable dietary and feeding program for aquatic animals.

Course Activities and Design

The format for this course is a combination of lecture, reading, visits to professional institutions, and laboratory experience. All aspects of the course are aimed to so that students learn methods to rear aquatic animals through the early life stages as well as produce food and properly feed captive aquatic animals. Laboratory instruction will be based at the OCCC Central Campus Aquarium Science building.

Outcome Assessment Strategies

- Laboratory activities allow students the opportunity to produce artificial fish food, culture and evaluate live prey and employ these techniques for rearing larval and adult fish or other aquatic organisms.
- Term projects are team-based activities that allow students to think critically, develop nutritional and reproductive based hypotheses and gain experience feeding and reproducing live organisms.
- Scheduled quizzes periodically evaluate student knowledge and understanding of fish nutrition and reproductive biology.
- Midterm exam evaluates student knowledge and comprehension of macronutrients, micronutrients, selected anti-nutrients and adventitious toxins as well as methods of diet manufacture and feeding techniques.

- Final comprehensive exam evaluates student knowledge of the reproductive biology/ecology and behavior of aquatic organisms as well as basic reproductive techniques.

Course Content (Themes, Concepts, Issues and Skills)

Themes

- Energetics and macronutrients.
- Micronutrients.
- Additional feed components and anti-nutrients.
- Digestive processes.
- Feed production and feeding.
- Reproductive strategies of fish and aquatic animals.
- Mate selection.
- Reproductive biology.
- Captive spawning techniques.

Concepts

- Protein, lipids and carbohydrates and their function in aquatic animals.
- The role of vitamins and trace metals in living organisms. Deficiencies and requirements are discussed.
- Binders, stimulants and coloring agents and their function in formulated diets.
- Fundamentals of digestion: Ingestion, digestion, absorption and elimination are governed by behavior as well as physical and biochemical processes.
- Production and function of pelletized and extruded feeds, agglomerated particles, flake food and other particulate diets.
- Reproductive strategies of fish and aquatic animals.
- Mate selection and mating systems and their importance for developing captive breeding techniques.
- Physiological processes governing reproduction in aquatic animals are governed by environmental and behavioral cues.
- Direct and indirect methods for inducing spawning in aquatic animals.

Issues

- Economic and practical concerns of diet selection/formulation.
- Impact of overfeeding on animal health and system effluent.
- Environmental aspects of feeding captive fish, special emphasis on food fish industry.
- Challenges associated with captive reproductive techniques and environmental considerations of wild-harvest.

Skills

- Calculation of food conversion ratio (FCR).
- Read and understand feed ingredients on food packaging and data sheets.

- Formulate and produce gel diet.
- Culture techniques for live prey (Rotifers and Artemia).
- Culture and feeding techniques for larval fish or other aquatic organisms.
- Strip spawning methods for fish.