Course Content and Outcome Guide for AQS 220

Course Number: AQS 220
Course Title: Biology of Captive Invertebrates
Credit Hours: 4
Lecture Hours: 30
Lecture/Lab Hours: 20
Lab Hours: 0

Course Description
Presents the life history and captive care requirements of aquatic invertebrates commonly cultured and kept in the aquatic animal industry.

Intended Outcomes for Course

1. Recognize and identify internal and external features of commonly kept and cultured aquatic invertebrates.
2. Discuss the important physiologic characteristics of aquatic invertebrates including reproduction, locomotion, and osmoregulation.
3. Describe the natural life history of commonly kept and cultured aquatic invertebrates.
4. Identify the husbandry requirements for selected aquatic invertebrates.
5. Design a culture system suitable for selected aquatic invertebrates.

Course Activities and Design
The course consists of lectures, laboratory exercises, student presentations, group discussion, reading, writing assignments, independent research, and field trips. Laboratory instruction will be based at the OCCC central campus Aquarium Science building.

Outcome Assessment Strategies

- Laboratory exercises with introduction to diversity, species identification, internal and external anatomy, specimen handling, specimen collection, and behavioral observations.
- Scheduled exams to evaluate knowledge of material presented in lecture, labs, and assigned reading.
- Discussion and synthesis of primary scientific literature relevant to the biology of captive invertebrates.
- Development, completion, and oral presentation of individual research projects on the culture and/or care of captive invertebrates.

Course Content (Themes, Concepts, Issues and Skills)

Themes

- Overview and history of commonly kept and cultured aquatic invertebrates
- Taxonomy of commonly kept and cultured aquatic invertebrates
- Anatomy of major phyla of aquatic invertebrates.

- Physiological characteristics of commonly kept and cultured aquatic invertebrates.
- Natural history of selected aquatic invertebrates.
- Habitat and husbandry requirements of commonly kept and cultured aquatic invertebrates.

Concepts

- Exploration of aquatic invertebrates and their uses over time in public aquariums, home aquaria, and aquaculture businesses.
- Investigation of current techniques and technologies used in culturing selected aquatic invertebrates.
- Exploration of the impact of captive controlled environments on the behavior and physiology of selected aquatic invertebrates.
- Considerations and requirements for the husbandry of selected aquatic invertebrates such as water quality, nutrition, life support, species selection and compatibility, and health management.
- Identification and relationships in taxonomy of commonly kept and cultured aquatic invertebrates to include cnidarians, mollusks, echinoderms, arthropods and holothuroids.
- Identification of internal and external anatomy of aquatic invertebrates such as cnidarians, mollusks, echinoderms, arthropods and holothuroids.
- Investigation of physiological characteristics of aquatic invertebrates including locomotion, osmoregulation and reproduction.
- Exploration of the natural history of selected invertebrates including corals, bivalves, snails, shrimp, crabs, cephalopods, jellies, urchins, sea stars, etc.
- Considerations for the establishment of habitats and aquarium system requirements for commonly kept and cultured aquatic invertebrates.

Issues

- Osmoregulation in aquatic environments.
- Effect of temperature and salinity on oxygen availability in water.
- Metabolic rates and oxygen consumption.
- Trade-offs between reproductive strategy and reproductive effort.
- Dietary requirements of aquatic invertebrates.
- Immune function and responses in aquatic invertebrates.
- Aggression and competitive interactions in captive environments.

Skills

- Identify proper aquarium systems for maintaining and culturing aquatic invertebrates.
- Identify husbandry requirements for commonly kept aquatic invertebrates.
- Describe taxonomy of commonly kept and cultured aquatic invertebrates.
- Identify freshwater and marine invertebrates using a dichotomous key.
- Dissect and identify major anatomical features of selected aquatic invertebrates.

- Relate physiological characteristics of selected aquatic invertebrates, such as, locomotion, osmoregulation, and reproduction to the captive controlled environment.
- Collect, transport, and introduce selected aquatic invertebrates to a captive controlled environment.
- Describe the natural history and habitat requirements of selected aquatic invertebrates.