

Course Number: FISH-7640
Course Title: Fish Nutrition
Credit Hours: 3 semester hours
Prerequisites: None

Instructor: D. Allen Davis, Ph.D.

Schedule: Summer 10 week term
Class room: Swingle Hall 303
Time: MWF: 1000AM - 1050AM

Course Description: This class will emphasize the fundamental and applied aspects of aquatic animal nutrition. Emphasis will be placed on: factor effecting feed utilization, nutrient ingestion/digestion, nutrient metabolism as it relates to maintenance, growth, and reproduction. Nutritional requirements, feed formulation and feeding practices will be discussed for a variety of marine and freshwater species of commercial interest. Class lectures and test times are subject to change.

Objective: Provide the student with a working knowledge of aquatic animal nutrition so that informed decisions can be made when dealing with nutrition and feeding of aquatic animals.

Justification for Graduate Credit: This course is progressively more advanced in academic content than undergraduate programs, requires a basic understanding of biochemistry, fish physiology and ecology.

University Policy and hand book can be found at: <http://www.auburn.edu/tigercub/>

Tentative course outline and supporting materials:

http://www.ag.auburn.edu/~davisda/classes/lectures_fish_nutrition.html

Conference access:

<https://connect.auburn.edu/davisda/>

Schedule

Week 1: Introduction

- a) Definitions
- b) Deficiency symptoms
- c) Feeding behavior and fish culture
- d) Concept of feeding fish
- e) Biotic and abiotic factors and there effects on feed utilization

Week 2: Introduction to enzymes

- Digestive systems
- a) General morphology
 - b) Digestive enzymes
 - c) Nutrient absorption
 - d) Factors affecting digestibility

e) Measures of digestibility

Week 3-9: Nutrients:

Energy

- a) Energy requirements and budgets
- b) Measures of dietary energy

Test I

Carbohydrates

- a) Structure
- b) Glycolysis/gluconeogenesis

Protein

- a) Structure
- b) Metabolism
- c) A. A. Requirements
- d) Protein sources

Lipids:

- a) Nomenclature
- b) E.F.A Dietary Requirements
- c) B-oxidation

Test II

Vitamins:

- a) Classification
- b) Absorption/metabolism
- c) Fat soluble vitamins
- d) Water soluble vitamins

Minerals:

- a) Dietary requirements
- b) Interactions with other nutrients

Week 10:

Non-nutrient diet components

Feed evaluation

Ration formulation

Feed processing

Feed management/Open

Test III

Final Examination

Course Evaluation: Students will primarily be grade based on their performance on the tests which will incorporate both lecture and reading materials. Class participation will also be included as students are expected to participate in discussions of the class material.

Final grade for the course will be based on the following.

Exams (3)	25% each
Participation	5%
Final	20%

Criteria A (>90%); B (<90%, > 80%); C (< 80%).

FISH

- Halver, J. E and R. W. Hardy 2002. Fish Nutrition Third Edition. Academic Press, New York, NY.
- Cowey, C. B., A. M. Mackie and J. G. Bell. Editors. 1985. Nutrition and Feeding in Fish. Academic Press Inc. Orlando, Florida.
- Halver, J. E. The vitamin required for cultured salmonids. *Comparative Biochemistry and Physiology*. 73B:43-50.
- Kaushik, S. J. 1986. Environmental effects on feed utilization. *Fish Physiology and Biochemistry* 2:131-140.
- Ketola, G. H. 1982. Amino acid nutrition of fishes: requirements and supplementation of diets. *Comparative Biochemistry and Physiology*. 73B:17-24.
- Luquet, P. and T. Watanabe. 1986. Interaction "nutrition-reproduction" in fish. *Fish Physiology and Biochemistry* 2:121-129.
- National Research Council. 1977. Nutrient Requirements of Warmwater Fishes. National Academy of Sciences, Washington, DC.
- National Research Council. 1981. Nutrient Requirements of Coldwater Fishes. National Academy Press, Washington, DC.
- National Research Council. 1983. Nutrient Requirements of Warmwater Fishes and Shellfishes. National Academy Press, Washington, DC.
- Pfeffer, E. 1982. Utilization of dietary protein by salmonid fish. *Comparative Biochemistry and Physiology*. 73B:51-57.
- Robinson, E. H. and R. P. Wilson. 1985. Nutrition and feeding. Pages 323-404 in C. S. Tucker, editor. Channel Catfish Culture. Elsevier Scientific Publishers B. V., Amsterdam.
- Webster C.D. and C.E. Lim. 2002. Nutrient requirements and feeding of finfish for aquaculture. CAB International, New York, NY

CRUSTACEA

- Bliss, D. E. Editor-in-Chief. 1983. The Biology of the Crustacea. Internal Anatomy and Physiological Regulation. Academic Press. New York, NY.
- Conkilin, D. E. Nutrition. In The Biology and Management of Lobsters, Vol I. Academic Press Inc.
- Kanazawa, A. 1984. Nutrition of penaeid prawns and shrimp. Proceedings of the first international conference of penaeid prawns/shrimp. Iloilo City, Philippines pp122-130.
- New, M. E. 1976. A review of dietary studies with shrimp and prawns. *Aquaculture*. 9:101-144.
- Pruder, C. G., C. Landgon and D. Conklin. Editors. Proceedings of the Second International Conference on Aquaculture Nutrition: Biochemical and Physiological Approaches to Shellfish Nutrition. World Mariculture Society. Special Publication No. 2. Louisiana State University, Baton Rouge, Louisiana.

MICROENCAPSULATION

- Jones, D. A., D. L. Holland and S. Jaborie. 1984. Current status of microencapsulated diets for aquaculture. *Applied Biochemistry and Biotechnology*. 10:275-288.

DIGESTION

- Vonk, H. J. and J. R. H. Western. 1984. Comparative biochemistry and physiology of enzymatic digestion. Academic Press, New York, New York. 495pp.