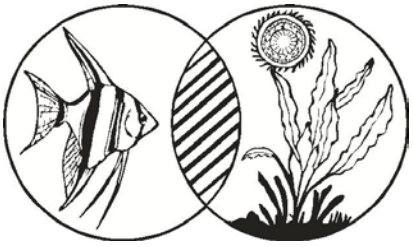
# Diseases of Warm Water Fish



Graduate Students: FAS 5225C (3 credits)
Veterinary Students: VEM 5374 (3 credits)

Diseases of Warm Water Fish is designed to provide instruction in the methodology of diagnosis, treatment and management of parasitic, bacterial, viral, nutritional, and environmental diseases of warm water food fish and aquarium species. This course is open to graduate and veterinary students, veterinarians, fisheries biologists, aquaculturists, and professional aquarists. The course is designed to provide basic instruction in fish biology and general husbandry, aquatic systems and water quality management, identification and interpretation of infectious agents impacting fish health, development of responsible and effective treatment plans, and consideration of biosecurity, quarantine and regulatory issues relevant to fish health.

**Course Coordinators:**

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**Dr. Francis-Floyd will be available via e-learning web mail, M-F 8 am to 5 pm. She will also be available during discussion sections, and by appointment. She will make every effort to respond to your emails within 24-48 hours.**

**Course Faculty:**

*Dr. Elizabeth Arnett-Chinn* – Naples Zoo at Caribbean Gardens
*Dr. Stephen Cassle* - U.S. Army Veterinary Corps
*Dr. Tonya Clauss* – Georgia Aquarium
*Ms. Debbi Crain* – Gottesman Aquarium (Israel)
*Dr. Claire Erlacher-Reid* – Sea World of California
*Dr. Mark Flint* – University of Florida and Florida Aquarium's Center for Conservation
*Ms. Theresa Floyd-Rump* – Brammer Bio (Alachua, Florida)
*Dr. Ruth Francis-Floyd* – University of Florida
*Dr. Kathleen Hartman* – USDA-APHIS
*Dr. Jeff Hill* – Tropical Aquaculture Lab, University of Florida
*Dr. Kathy Heym* – Florida Aquarium
*Mr. Jim Kinsler* – Sea World of Florida
*Mr. Blayk Michaels* – Bass Pro Shops
*Dr. Ed Noga* – Southeastern Aquatechnologies
*Dr. Denise Petty* – North Florida Aquatic Veterinary Services
*Dr. Nicole Stacy* – University of Florida
*Dr. Andy Stamper* – Disney Animal Programs
*Dr. Natalie Steckler* – University of Florida
*Mr. Craig Watson* – Tropical Aquaculture Laboratory, University of Florida
*Dr. James Wellehan* – University of Florida
*Dr. Roy Yanong* – Tropical Aquaculture Laboratory, University of Florida

**Course Goal:**

The goal of this class is to introduce students to basic concepts of fish health management including diagnosis of common infectious and non-infectious diseases, strategies for control of infectious disease and preventive health care for captive fish populations. Students will also be expected to develop a basic understanding of zoonotic diseases common in aquarium and cultured fish. Students will be expected to have a fundamental understanding of fish husbandry, disease prevention, be able to interpret findings of infectious disease, be familiar with regulated diseases of fish, understand principles of biosecurity, and quarantine, and appropriate treatment management, including regulations pertaining to use of drugs and chemicals by the time they complete the class. The on-line course will focus on delivery of didactic information using recorded lectures, discussion sections, assigned readings and projects

**Course Objectives:**

1. Students will be introduced to common families of warm water fish, and will be expected to understand their importance to the aquaculture and aquarium industries. Further, they should have an appreciation for diseases that may be of concern within specific families of fish.
2. Students will be expected to have a basic understanding of fish biology and physiology. They will be expected to understand how disease may alter normal physiologic processes.
3. Students will be expected to know normal anatomy for common families of fish. This may include radiologic interpretation of key anatomical characteristics.

4. Students will learn basic diagnostic techniques for common fish diseases. They should be familiar with routine tissue biopsy and basic microbial culture techniques, and be able to identify common parasites of warm water fish.
5. Students will be expected to know anatomic locations used for blood collection in common fish families.
6. Students will be expected to be familiar with important infectious agents that cause disease in fish. These will include parasitic, bacterial, viral and fungal agents. Students will be expected to know clinical signs associated with specific diseases and understand what steps will be required to confirm a diagnosis.
7. Students will learn the principles of basic water quality management for aquaculture and become familiar with the key components of aquatic system design. They should be able to interpret data provided from water quality tests. They should be able to identify and develop management recommendations for common environmental diseases.
8. Students will be expected to be able to construct a problem list in which they define multiple factors contributing to a fish disease outbreak. They should be able to rank these factors in terms of the threat they pose to the affected population.
9. Students will be expected to understand regulations that pertain to use of drugs and chemicals to treat fish disease in the United States. They should be familiar with resources that provide current information in this rapidly changing area. They should understand proper use of drugs and chemicals and be able to develop appropriate treatment protocols for management of simple fish disease scenarios.
10. Students will become familiar with regulations that pertain to infectious diseases of fish including species of concern, screening techniques, and required reporting.
11. Students will learn basic principles of biosecurity and quarantine, and be able to apply these in the design or assessment of protocols for fish holding facilities.
12. Students will develop a basic understanding of zoonotic diseases of concern for aquarium and cultured warm water fish. They will also understand basic principles of personal protection.

**Subjects to be Covered:**

- Fish Biology, Anatomy and Physiology
- Freshwater and Marine Systems Design
- Water Quality Analysis and Interpretation
- Common Environmental Diseases of Warm Water Fish
- Diagnostic Procedures
- External Biopsy Techniques
- Necropsy Procedures
- Sterile and Microbial Techniques
- Treatment Protocols and Strategies
- Drug and Chemical Regulations for Fish
- Biosecurity and Quarantine Procedures
- Regulated Diseases
- Fish Parasitology, Identification of Common Parasites, Understanding Common Parasitic Diseases
- Introduction to Bacterial, Viral and Mycotic Diseases of Fish

- Managing Mycobacterium
- Preventive Medicine and Disease Control Strategies
- Common Zoonotic Diseases of Concern and Management Strategies
- Development of Fish Health Management Programs

**Grading:** http://www.registrar.ufl.edu/catalog/policies/regulationgrades.html
The course has been divided into six modules. There will be required homework and discussion sections for students along the way. There will be a quiz at the end of each module, and a final comprehensive exam at the end of the course. Grading will be based on homework (20%); participation in discussion sections (10%), quizzes (30%) and a comprehensive final exam (30%). A group project will be assigned to you early in the course. Participation is mandatory and represents 10% of your final grade. Assignments that are turned in late are deducted 10% per day for the first three days, 50% for being a week late, and will not be accepted beyond that point. With that said a lot of students travel and work during the summer. Arrangements for late submission without penalty are routinely offered, but must be negotiated on a case-by-case basis with Dr. Francis-Floyd.

89.5% or higher = A
85.5 – 89% = B+
79.5 – 85% = B
75.5 – 79% = C+
69.5 – 75% = C
65.5 – 69% = D+
59.5 – 65% = D
< 59.5% = E

**E-Learning and Course Materials:**
Lecture and course materials will be available on the course E-learning web site. To access the site, go to https://lss.at.ufl.edu/, click on the "e-Learning Login" on the left side and log in with your Gatorlink username and password. All students must have access to Dr. Noga's text, listed below. Some of the homework exercises may be difficult or impossible to complete without this text. Most of you will likely want to retain this book as part of your personal library. Dr. Roberts book is also strongly recommended.

**Required Texts:**
- *Fish Disease: Diagnosis and Treatment*, ***Second Edition****. By E.J. Noga, 2010. Wiley- Blackwell, Ames Iowa.

*Please note that students will not be able to complete required assignments without access to Dr. Noga's text.

**Recommended Texts:**
- *Fundamentals of Ornamental Fish Health*, H.E. Roberts (Editor), 2010, Wiley-Blackwell, Ames, IA.
- *Merck Veterinary Manual, Eleventh Edition*, S.E. Aiello (Editor-In-Chief), 2016, Merck & Company Inc, Pp 1743-1814.

- *Zoo and Wildlife Medicine, Current Therapy, Seventh Edition*, by E. Miller and M.E. Fowler (Eds), 2012, Elsevier. Pp 170-209.

**Supplemental Texts:**

- *Bacterial Diseases of Fish*, by Inglis, Roberts and Bromages (Eds). 1993. Blackwell.
- *BSAVA Manual of Ornamental Fish, Second Editio*n, by Wildgoose (Ed), 2002, Wiley (for British Small Animal Veterinary Association).
- *Fish Diseases and Disorders, Volume 1: Protozoan and Metazoan Infections*, by Woo (Ed), 1995, CAB International.
- *Fish Diseases and Disorders, Volume 2: Non-Infectious Diseases*, by Leatherland and Woo (Eds), 1998, CAB International.
- *Fish Diseases and Disorders, Volume 3: Viral, Bacterial, and Fungal Infections*, by Woo and Bruno (Eds), 1999, CAB International.
- *Fish Medicine*, by Stoskopf (Ed), 1993, Saunders.
- *Health Management and Principal Microbial Diseases of Cultured Fishes*, by J.A. Plumb, 1999, Iowa State University Press.

**Policies:**

*Honesty Policy:*
All students registered at the University of Florida have agreed to comply with the following statement: "I understand that the University of Florida expects its students to be honest in all their academic work. I agree to adhere to this commitment to academic honesty and understand that my failure to comply with this commitment may result in disciplinary action up to and including expulsion from the University." In addition, on all work submitted for credit the following pledge is either required or implied: "On my honor I have neither given nor received unauthorized aid in doing this assignment." To review the student honor code please visit: http://www.dso.ufl.edu/judicial/honorcodes/honorcode.php.

*Student Evaluation of Instruction:*
Evaluations are performed electronically at the end of the course. To evaluate the instructors, visit the UF Evaluation site at: https://evaluations.ufl.edu/evals/. We know these are tedious to complete, but because of their importance we ask you to take them seriously. Many aspects of the course have been adapted based upon prior student's comment and we find all feedback to be helpful.

*Students with disabilities* requesting accommodations should first register with the Disability Resource Center (352-392-8565, www.dso.ufl.edu/drc/) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

*Policy Related to Make-Up Exams or Other Work:*
Because of the applied nature of this class, regular student participation is expected, implying that make-up quizzes and exams are not normally administered.