

assignments handed in for copying and plagiarism. If I catch you cheating on a test or assignment I will give you a zero for it, we will have to pay a visit to Dr. Engle, and you probably won't pass my course.

Course objectives: The emphasis in this class is to learn how investigate a fish kill and make rational decisions about what to do about it. There are at least 75 bacterial pathogens of fish, dozens of fungi, hundreds of known viruses, thousands of parasites, uncountable toxins and physiological problems, and 6.023×10^{23} different combinations of the above. In addition, there are 35,000 different kinds of fish, they live in a bewildering variety of habitats manmade and natural, and they move all over the world on their own and in airplanes. If we started now and spent just 5 minutes on each significant fish disease, it would take us years of class to go through them all. By the time we were done there would be 200 new diseases... And of course, that still wouldn't make you any good as a fish pathologist. To be a good fish pathologist, you have to be a detective. Imagine that you are Sherlock Holmes and that every fish case is a mystery to be solved. Instead of fingerprints and footprints, you have lesions and livers, instead of magnifying glasses there are cultures, the list of suspects is huge, and the witness never talk... In order to be a good fish pathologist, you have to look for the clues (water quality, weather, fish species, mortality, and external lesions), know how to use detective equipment (microscopes, tissue culture, histology, PCR, microbiology), be able to come up with a list of suspects (fish diseases that match the clues), and interrogate the witnesses (fish never talk, you have to question the people involved!). That is what we will emphasize this semester, being a fish disease Sherlock Holmes.



We will also need to talk about the politics of fish disease. This is something I never learned about in school, but that is an integral part of fish health.

Specifically, students will need to...

- 1) Know what questions to ask
- 2) Know what samples to collect and how to collect them
- 3) Know how to analyze the samples using microbiology, tissue culture, histopathology, and PCR
- 4) Know how to approach the big mysteries using bioassays and logic
- 5) Know the general clinical signs of diseases caused by broad groups of pathogens
- 6) Know all about assorted diseases of major impact
- 7) Know what to do about disease when it occurs (aquaculture and natural fisheries!)

Course Description: We'll start out talking about sample collection and diagnostic techniques (bacteriology, virology, molecular biology, histology and other 'bologies' that we may need). Then talk about broad groups of pathogens, then move on to talking about common pathogens of particular species of aquatic animals (catfish diseases, wild fish diseases, shrimp diseases). In lab, we will start out learning techniques, then you'll need to spend the rest of the semester using them (See "LAB").

Text: There are good books on fish parasites. There are good books on fish viruses. There are good books on fish bacteria. There are books on fish histopathology. There are books on water quality. There are books on algae. There are books on fin fish, There are books on shrimp. There are book on non-infectious diseases. There are books about tumors. There are books about immunology. There are books about physiology. There are **no** books with **everything** and that is what you need. So, we'll just get along with long handouts (via the Internet) and consult the books when we need to. Best of all, I have at

least a 1000 digital pictures of fish diseases and they will all be available to you on the local network. Many of these pictures are mine, the rest were donated to me by prominent fish pathologists (I've scanned a LOT of slides!).

Attendance: If you aren't sick or working on research business that can't be done at any other time, you'd best be in class. Missing lecture is serious, missing lab is really really bad. If you miss a test it will be made up *only if the absence is an "excused" one according to official UAPB policy or approved by me in advance*. Tests due to unexcused absences will not be made up and will receive an F. Class starts at 8 am. I'm not too thrilled about that either, but we will start at 8 am and I won't be happy if you come in late.

Grading: A=90-100%; B=80-89.9%; C=70-79.9%, D=60-69.9%, F=0-59.9%

No grades will be dropped (except for those due to excused absences as outlined above).

Points	Test 1	125
	Test 2	125
	Final	200
	Diagnostic case study reports	450
	Lab Reports	<u>100</u>
Total		1,000



Tests: Will emphasize problem solving. I describe the case, you figure out what is wrong and what to do about it. There will be some visual elements on the tests (recognizing parasites or lesions).

Case studies: During the semester you will be required to do three complete case studies. You will have to find sick fish, figure out what is wrong (the complete work up!!!), then present it to the class and turn it in to me in digital format. There are some examples of studies done by previous students that can be found along with the digital picture collection. Some are "A" reports, others are not. The big problem is to find sick fish with **interesting** diseases. They can come from UAPB, fish farms, the wild, the mail, or the pet store. For one of your three case reports, you may make your own sick fish. You will diagnose the disease, describe the case history, recommend treatment, and where appropriate, look at outcome. You will need to make sure that you document everything and take lots of pictures. I will look very favorably on cool pictures to add to the class database. This work is the real meat of this class. Remember, these report are almost HALF of your grade!

Lab Reports: Nothing formal here. This will usually just be work sheets. There will be some take home fish treatment problems too.

Personal Data Form: I am handing out a form for you to fill in. It will help me to get in touch with you if I need to. It will let me know where I can reach you if something goes wrong with your lab work. It will help me to invite you on fish disease cases.

Fish Pathology

Schedule 2002

1/14	Solving The Puzzle	
1/16	Internal Anatomy	
1/18	Necropsy Methods	Lab: Fish Anatomy/Necropsy
1/21	Holiday Martin Luther King's Birthday	
1/23	Intro To Bacteria	
1/25	Identification Of Bacteria	Lab: Identification Of Bacteria
1/28	Parasites 1	
1/30	Parasites 2	
2/1	Parasites	Lab: Identification Of Parasites
2/4	Intro To Viruses	
2/6	Tissue Culture Methods	
2/8	Finding A Virus – Molecular Techniques & Classic	Lab: Tissue Culture And Viruses
2/11	Osmoregulation And Immunity	
2/13	“Stress” The Real Story	
2/15	CFAR/ABOFGA Meeting In LR – Go!!	Lab: CFAR/ABOFGA Meeting
2/18	Test 1	
2/20	Go over test. Stress Quiz	
2/22	Histology Methods. Parasite Quiz	Lab: Histology
2/25	Hematology and Serology	
2/27	Water Quality And Fish Health	
3/1	Water Quality And Fish Health 2	Lab Hematology

- 3/4 Treatment Regulations
- 3/6 Treatment Of Parasite Infestations
- 3/8 Treatment Of Bacterial diseases (vaccines) Lab: Look at histo slides
- 3/11 Treatment Of Bacterial diseases (vaccines)
- 3/13 Class cancelled due to SRAC meeting
- 3/15 Important Diseases Of Catfish
Lab: Vaccination
- 3/18 Vacation (Uninhibited Research Period)
- 3/20 Vacation (No Classes To Interrupt Your Studies)
- 3/22 Vacation (Perfect Opportunity For That Big Experiment) Lab: On Your Own
- 3/25 Catfish Diseases Continued
- 3/27 Intro To Toxicology
- 3/29 Toxicology 2 including Tumors and carcinogens (not on test!) Lab: Antibody lab
- 4/2 Day 1 Of Biennial Fish Disease Diagnosticians
- 4/3 Day 2 Of Biennial Fish Disease Diagnosticians Conference (*Morning Only*)
- 4/5 Test 2 Lab: Case Studies
- 4/8 Important Diseases Of Cyprinids
- 4/10 Go over test & Important Diseases Of Salmonids
- 4/12 Important Diseases Of Salmonids Lab: Case Studies
- 4/15 Diseases Of Wild Marine Fish
- 4/17 Fish Diseases Of Wild Freshwater Fish
- 4/19 Molecular Diagnostics Lab: DNA lab part 1
- 4/22 Diseases Of Mollusks
- 4/24 Diseases Of Shrimp And Lobsters
- 4/26 Toxins revisited Lab: Molecular DNA Lab
- 4/29 Inspection And Certification
- 5/1 Case Reports
- 5/3 Case Reports Lab: Case reports
- 5/6 dead day

FINAL 5/7-10 Somewhere in there...

