Syllabus
MAR 554 - DISEASES OF AQUATIC ORGANISMS
(3 credits)
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Office Hours TBA or by appointment

COURSE DESCRIPTION
Host-pathogen associations are recognized as one of the most important selective forces shaping evolutionary tracks on earth. This course is designed to expose students to fundamental and current issues pertaining to host/pathogen interactions in marine environment. By the end of this course, students should have a basic understanding of disease processes in aquatic organisms; knowledge of the tools used for disease diagnosis; and an appreciation of disease management tools available today. This course will emphasize the role of the environment as an important player in infectious and non-infectious diseases. The specific subjects that will be covered are listed on the last page.

COURSE LEARNING OBJECTIVES
● Expand knowledge about natural processes to provide students with additional skills, beyond the skills they learned in their Versatility courses, needed to apply scientific concepts to the in depth study of the natural world
● Gather and assess scientific information and understand the value and application of scientific data, concepts, and models to evaluate factors dictating the occurrence and spread of disease epizootics
● Understand the methods scientists use to explore symbiotic associations in animals including observation, experimentation and evaluation of evidence
● Make informed decisions on contemporary issues pertaining to factors affecting disease spread and local adaptations affecting host-pathogen interactions
● Evaluate causes and consequences of variability in biological interactions
● Assess management options for mitigation and prophylaxis of infectious and non-infectious diseases of marine animals

These objectives will be attained through participation in lectures, reading assigned course material and completing written assignments. The assimilation of the information will be assessed through class discussions and performance on three examinations.

READINGS
There is no applicable textbook (course relatively broad) but reading material will be posted online (Blackboard), distributed in class, or made available on reserve in the library. Readings include but are not limited to:

Diseases of Fish, 2001. R.B. Moeller
Fish Disease Diagnosis and Treatment, 1996. E.J. Noga (selected chapters).

CLASS AND ASSIGNMENTS
Weekly classes will involve two 80 min lectures. Two assignments will be also requested. During the **first assignment**, students will be asked to submit a research proposal to ARFA (the Allam's Research Funding Agency) on a hot topic in the field of Aquatic Animal Health. The proposal will follow standard research formats, including the following (or similar) sections:

1-Background and Rationale  
2- Objectives and Research Hypotheses  
3- Experimental Plan  
4- Expected Outcome and Significance  

Beside a written proposal, the students will give an oral presentation to support their suggestions.

**Second assignment:** MAR554 students will also be given a list of Recent (within the last few years) Science/Nature articles related to aquatic animal disease of which they will choose one to do a critique on. Overall, students must provide critical evaluation of each subject matter and identify areas where additional scientific knowledge could or should be generated by research. With respect to the critique, the critical evaluation should rely on other recent peer-reviewed literature, both cited and not by the authors of the paper, to evaluate the strengths and weaknesses of the assigned paper.

**ATTENDANCE AND ASSIGNMENTS DEADLINES**
For the benefit of all, students are expected to attend all lectures and lab sessions. A signature sheet will be circulated at the beginning of each lecture. Assignment deadlines are also enforced and any unjustified delay will result in grade penalties.

**UNIVERSITY POLICIES:**
- Academic Progress & Standing Policy  
- Academic Integrity  
- Minimal Instructional and Student Responsibilities  
- Student Educational Records and Family Educational Rights and Privacy Act (FERPA)  
- Student Participation in University-Sponsored Activities  
- Equivalent Opportunity/Religious Absences  
- Disability support services (DSS)  
  [http://studentaffairs.stonybrook.edu/dss/tips_howto.shtml](http://studentaffairs.stonybrook.edu/dss/tips_howto.shtml)
EXAMS AND GRADING

Assessment breakdown:
Exam 1: 20%
Exam 2: 20%
Exam 3: 20%
Research Proposal 20%
Critique 15%
Oral presentation 5%

Grade Lowest Cutoff
A 93
A- 90
B+ 87
B 83
B- 80
C+ 77
C 73
C- 70
SUBJECTS COVERED

Class orientation, Introduction to disease, Basic disease terminology
The disease triad (Host/Pathogen/Environment)
Introduction to pathogenic agents
Introduction to Epidemiology
Diagnostic tools (microscopy, immuno-detection and DNA/RNA techniques)
Invertebrate defense system
Vertebrate immunity
Diseases of bivalve mollusks

Exam 1
Bivalve case studies: bacterial diseases
Bivalve case studies: protozoan parasites
Lab 1: Bivalve necropsy and innate immunity
Viral pathogens of finfish and crustaceans
Lab 2: Diagnostic of marine diseases
Bacterial pathogens of finfish and crustaceans (Paper Critique is due)
Protozoan and Myxozoan parasites of finfish and crustaceans

Exam 2
Metazoan Parasites of finfish and crustaceans
Tumors and cancers of aquatic organisms (Initial report due)
Coral diseases
Introduction to marine mammal and turtle biology
Diseases of marine mammals and turtles
Advances in aquatic animal disease (vaccination, probiotics, selective breeding, genetic engineering)
Aquatic diseases and public health (Research Proposal is due)
Aquatic diseases and exotic species

Exam 3
Students presentations

There will be no final cumulative exam.