Fish Diseases in Conservation Biology and Aquaculture

Course Number:  FW/MB 491/591
Term Offered:  Spring
Credits:       3
Instructor name:  Jerri Bartholomew
Instructor email:  jerribartholomew@oregonstate.edu
Instructor phone:  7-1834
Instructor office or meeting location:  Nash 228
Website:  http://microbiology.science.oregonstate.edu/content/dr-jerri-bartholomew

Course Description

Prerequisites:  9 credits of upper division fisheries or biology

Course Content:  In this course we’ll cover a broad array of diseases of marine and freshwater fishes, covering important pathogen groups (viruses, bacteria, parasites, fungi), host/parasite relationships and disease ecology. Diseases important to aquaculture and ornamental industries as well as wild fish populations and conservation programs will be included. The course includes a comprehensive overview of important pathogen groups, host responses to infection (including the role of immune and stress responses), diseases of importance to various aquaculture species, diseases in natural populations, epidemiology and treatments. Guest lectures will cover selected current topics of regional interest, emerging diseases, the effects of climate change and group presentations.

This is a Hybrid Course

This is a hybrid class and incorporates a range of course materials (microlectures, videos, literature, web pages) and an assortment of activities and assignments. Half of the traditional class time is replaced with these online activities.

Class time is for:

1)  Expanding on the online material to include newer and more advanced information
2)  Overviewing major concepts, minor points, and how they fit together
3)  Group discussions
4)  Guest speakers

Online activities include:

1)  Pre-lecture quizzes so the instructor knows which topics to concentrate on
2)  Videos and lectures that provide examples of key concepts
3)  Study guides
4)  Peer review of group assignments

This table compares the allocation of time in a hybrid course compared to a traditional 3 credit course

<table>
<thead>
<tr>
<th></th>
<th>HYBRID</th>
<th>Traditional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class meetings per week</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Classroom minutes per week</td>
<td>80 minutes</td>
<td>150 minutes</td>
</tr>
<tr>
<td>Required online activity per week</td>
<td>60-120 minutes</td>
<td>0-20 minutes</td>
</tr>
<tr>
<td>Recommended study time per week*</td>
<td>6-9 hours</td>
<td>6-9 hours</td>
</tr>
<tr>
<td>Total time per week</td>
<td>9-12 hours</td>
<td>9-12 hours</td>
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</table>

* This is in addition to the class meetings and required online activities. It may include reading text and articles, preparing for exams and reading quizzes, preparing and completing assignments.
Communication

Please post all course-related questions in the Q&A Discussion forum so that the whole class may benefit from our conversation. Please email me for matters of a personal nature. I will reply to course-related questions and email within 24-48 hours.

I encourage you to ask any questions you may have about the course schedule or content, no matter how basic — others may have the same question; but please check the Announcements, General Discussion Forum and read the syllabus first!

In addition to the General Discussion Board, there will be specific Discussion Board conversations developed around particular topics, for which you will receive directions with that week’s course material.

Learning Resources


Canvas

This course will use an online portal where you will interact with your classmates and with your instructor. Within the course Canvas site you will access the learning materials, such as the syllabus, class discussions, assignments, projects, and quizzes.

The syllabus and schedule will be updated on Canvas; it is the student's responsibility to check for updated assignments. The instructor reserves the right to modify the course content, schedule of assignments, and/or evaluation procedures when necessary

Measurable Student Learning Outcomes

Undergraduate student learning outcomes:

By the end of this course, students will be able to

1. Describe the different types of pathogens that affect fish in culture and in the wild.
2. Outline important similarities and differences in the pathology, epidemiology, and control and treatment for different pathogens and pathogen groups.
3. Interpret and explain fundamental concepts in host-parasite interactions and disease ecology.
4. Assess a current biological problem and recommend an approach for solving the problem.
5. Communicate scientific concepts and analytical arguments clearly and concisely both verbally and in writing.

Graduate student learning outcomes:

In addition to the above learning outcomes for undergraduate students, by the end of this course, graduate students will be able to

1. Synthesize concepts and demonstrate an understanding of disease interactions at the ecosystem level.
2. Manage group activities and play a leadership role.
# Evaluation of Student Performance

**Undergraduate students**

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 mid-term exam (weeks 1-5 inclusive)</td>
<td>100</td>
</tr>
<tr>
<td>1 final exam (cumulative, but focus on weeks 6-10)</td>
<td>100</td>
</tr>
<tr>
<td>Small group exercise</td>
<td>150</td>
</tr>
<tr>
<td>Contributing to online and classroom discussion</td>
<td>60</td>
</tr>
<tr>
<td>Online quizzes and survey</td>
<td>90</td>
</tr>
<tr>
<td><strong>Total possible points for 491</strong></td>
<td><strong>500</strong></td>
</tr>
</tbody>
</table>

**Graduate students**

Graduate students taking the course as 591 will be graded separately and the final exam will be oral. In addition to the above requirements, you will be required to act as leaders of small group exercises. You will also be required to participate in 2 discussions (in class and online) sometime during the term.

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group exercise leadership</td>
<td>50</td>
</tr>
<tr>
<td>Leading discussions</td>
<td>50</td>
</tr>
<tr>
<td><strong>Total possible points for 591</strong></td>
<td><strong>600</strong></td>
</tr>
</tbody>
</table>

**Point Distribution**

- A = 90 - 100%
- B = 80 - 89%
- C = 70 - 79%
- D = 60 - 69%
- F = 0 - 59%

I will endeavor to grade assignments within one week.

## Course Policies

**Attendance**

Attend class (on time) and stay the entire class period. *One class miss is allowed.* More than one class miss or failure to stay the entire class period will result in a decrease in grade. If you miss class, you are **must still turn in the homework**.

**Classroom etiquette & conduct**

Classroom etiquette, like marketing, is governed by 4 Ps: *Be prompt, be professional, be prepared, be polite.*

Behavior in class should be professional at all times. Effective learning occurs only when people treat each other with dignity and respect. This includes fellow classmates as well as the instructor and any guest lecturers. To ensure a classroom environment conducive to learning, the following rules are to be observed:

- Students are expected to be on time and stay for the duration of the class. Leaving class should only be done in an emergency, and if you do so, do it discreetly.
- Laptops/tablets should only be used for note taking or to assist in course work, otherwise they should be put away.
- Cell phones, mobile devices, PDAs, etc. should be silenced and put away during class.
- No headphones.
- Unless working in a group setting, side conversations should be kept to a minimum.

**Online Netiquette & Participation:**
• Discussion Board conversations are public messages, and all writings in this area are viewable by the entire class. Communication intended for the instructor only should be emailed directly to the instructor.

• Posting personal contact information is discouraged (e.g. telephone numbers, address, personal website address).

• All your online communications need to be composed with fairness, honesty and tact. Spelling and grammar are very important in an online course. What you put into an online course reflects your level of professionalism. Here are several references that discuss this: Writing online: http://www.uiowa.edu/~writingc/writers/handouts/Netiquette.shtml; Netiquette: http://www.albion.com/netiquette/corerules.html

• The Discussion Board is your space to interact with your colleagues related to current topics or responses to your colleague’s statements. It is expected that each student will participate in a mature and respectful fashion.

• Participate actively in the discussions - complete the readings and think about the issues.

• Pay close attention to what your classmates write in their online comments. Ask clarifying questions when appropriate. These questions are meant to probe and shed new light, not to minimize or devalue comments.

• Think through and reread your comments before you post them.

• Assume the best of others in the class and expect the best from them.

• Value the diversity of the class. Recognize and value the experiences, abilities, and knowledge each person brings to class.

• Disagree with ideas, but do not make personal attacks. Do not demean or embarrass others. Do not make sexist, racist, homophobic, or victim-blaming comments at all.

• Be open to be challenged or confronted on your ideas or prejudices.

Discussion Participation
Students are expected to participate in all graded discussions. The schedule for posting discussion comments is in the course schedule.

Makeup Exams (and/or Quizzes)
Makeup exams will be given only for missed exams excused in advance by the instructor or for documented medical excuses or documented other emergencies. Excused absences will not be given for airline reservations, routine illness (colds, flu, stomach aches), or other common ailments. Excused absences will generally not be given after the absence has occurred, except under very unusual circumstances. Make up exams will have written essays and/or oral components.

Online Exam (and/or Quiz) Time Limits
Exams in this class are timed; if you exceed the time limit on an online exam, you will be assessed a penalty of 10% for every five-minute interval beyond the time limit.

Incomplete
Incomplete (I) grades will be granted only in emergency cases (usually only for a death in the family, major illness or injury, or birth of your child), and if the student has turned in 80% of the points possible (in other words, usually everything but the final paper or final exam). If you are having any difficulty that might prevent you completing the coursework, please don’t wait until the end of the term; let me know right away.

Students with Documented Disabilities: Accommodations are collaborative efforts between students, faculty and Disability Access Services (DAS) with accommodations approved through DAS are
responsible for contacting the faculty member in charge of the course prior to or during the first week of the term to discuss accommodations. Students who believe they are eligible for accommodations but who have not yet obtained approval through DAS should contact DAS immediately at 541-737-4098.

**Statement Regarding Religious Accommodation:** As instructors we are required to provide reasonable accommodations for sincerely held religious beliefs. It is incumbent on you to make us aware of the request as soon as possible prior to the need for the accommodation. See the [Religious Accommodation of Students Policy](#).

**Expectations for Student Conduct:** Student conduct is governed by the university’s policies; see [Student Conduct and Community Standards](#).

**Academic Integrity:** Students are expected to comply with all regulations pertaining to academic honesty. For further information, see [Academic or Scholarly Dishonesty](#), or contact the office of Student Conduct and Community Standards (SCCS) at 541-737-3656.

**OAR 576-015-0020 (2) Academic or Scholarly Dishonesty:**

a) Academic or Scholarly Dishonesty is defined as an act of deception in which a Student seeks to claim credit for the work or effort of another person, or uses unauthorized materials or fabricated information in any academic work or research, either through the Student's own efforts or the efforts of another.

b) It includes:

(i) **CHEATING** - use or attempted use of unauthorized materials, information or study aids, or an act of deceit by which a Student attempts to misrepresent mastery of academic effort or information. This includes but is not limited to unauthorized copying or collaboration on a test or assignment, using prohibited materials and texts, any misuse of an electronic device, or using any deceptive means to gain academic credit.

(ii) **FABRICATION** - falsification or invention of any information including but not limited to falsifying research, inventing or exaggerating data, or listing incorrect or fictitious references.

(iii) **ASSISTING** - helping another commit an act of academic dishonesty. This includes but is not limited to paying or bribing someone to acquire a test or assignment, changing someone's grades or academic records, taking a test/doing an assignment for someone else by any means, including misuse of an electronic device. It is a violation of Oregon state law to create and offer to sell part or all of an educational assignment to another person (ORS 165.114).

(iv) **TAMPERING** - altering or interfering with evaluation instruments or documents.

(v) **PLAGIARISM** - representing the words or ideas of another person or presenting someone else's words, ideas, artistry or data as one's own, or using one's own previously submitted work. Plagiarism includes but is not limited to copying another person's work (including unpublished material) without appropriate referencing, presenting someone else's opinions and theories as one's own, or working jointly on a project and then submitting it as one's own.
c) Academic Dishonesty cases are handled initially by the academic units, following the process outlined in the University's Academic Dishonesty Report Form, and will also be referred to SCCS for action under these rules.

**Student Evaluation of Teaching**
Course evaluation results are extremely important and are used to help me improve this course and the learning experience of future students. For information about the OSU electronic Student Evaluation of Teaching (eSET), see [Student Information](#) and [FAQs](#). Course evaluation results are not made available to instructors until after grades are posted.
<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Online Learning Activities</th>
<th>Classroom Learning Activities</th>
<th>Due Dates</th>
</tr>
</thead>
</table>
| 1 April 2 | Introduction, disease transmission, host-pathogen relationship | Prezi: Overview of course | Discussion of course expectations and additional topic background | All assignments due 4/4, 5 pm  
Quiz 1 (Online)  
Assignment 1 Disease Transmission |
|        |       | Microlecture: Basics of the host-pathogen relationship | Group exercises on disease transmission | |
|        |       | Prezi: Disease transmission | | |
| 2 April 9 | Bacterial pathogens - provide list of pathogens Immunology | Microlecture: bacterial pathogens  
Bacterial pathogens video  
Immunology review paper | Group discussion: characteristics of bacterial pathogens  
How the host fights back – Brian Dolan, immunologist | All assignments due 4/11, 5 pm  
Quiz 2 (O)  
Assignment 2 Describe a bacterial pathogen  
Assignment 3 Population-Level Characteristic of Disease |
| 3 April 16 | Viral pathogens - provide list of pathogens | Microlecture: viral pathogens  
Viral pathogens video | Group discussion: characteristics of viral pathogens  
ODFW: Melissa White on IHNV epidemiology | All assignments due 4/18, 5 pm  
Quiz 3 (O)  
Assignment 2 Describe a viral pathogen |
| 4 April 23 | Protozoan parasites - provide list of pathogens Treating diseases in hatcheries | Microlecture: protozoan parasites  
Protozoan pathogens video  
Prezi: Group projects | Discuss Group Projects  
Treating diseases – ODFW – Sarah Bjork, Carolyn Richards | All assignments due 4/25, 5 pm  
Quiz 4 (O)  
Assignment 4 Describe a protozoan pathogen |
| 5 April 30 | Myxozoan and Metazoan parasites - provide list of pathogens | Myxozoan pathogens microlecture  
Other metazoan parasites microlecture | Fungal pathogens lecture  
Group discussion: characteristics of protozoan, myxozoan | All assignments due 5/2, 5 pm  
Quiz 5 (O)  
Describe a myxozoan or |
<table>
<thead>
<tr>
<th>Date</th>
<th>Group Project Assignment</th>
<th>Midterm Review</th>
<th>Metazoan Parasites</th>
<th>Midterm Review</th>
<th>Metazoan Pathogen</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Midterm</td>
<td>Myxozoan disease in wild populations</td>
<td>Midterm Review</td>
<td>Myxozoan disease in Yellowstone Park – Julie Alexander</td>
<td>Group project assignment 1</td>
</tr>
<tr>
<td></td>
<td>Myxozoan disease in Yellowstone Park – Julie Alexander</td>
<td>Midterm</td>
<td>Myxozoan disease in Yellowstone Park – Julie Alexander</td>
<td>All assignments due 5/9, 5 pm</td>
<td>Midterm(O)</td>
</tr>
<tr>
<td>7</td>
<td>Disease in warmwater aquaculture</td>
<td>Warmwater aquaculture lecture</td>
<td>Group discussion of how disease differs between coldwater and warmwater aquaculture</td>
<td>All assignments due 5/16, 5 pm</td>
<td>Quiz 6</td>
</tr>
<tr>
<td></td>
<td>Warmwater aquaculture lecture</td>
<td>Group discussion of how disease differs between coldwater and warmwater aquaculture</td>
<td>Guest lecture – Carl Schreck – Stress, prespawn mortality</td>
<td>All assignments due 5/16, 5 pm</td>
<td>Group project assignment 2</td>
</tr>
<tr>
<td>8</td>
<td>Disease in the marine fish</td>
<td>Disease in wild marine fish microlecture</td>
<td>Discussion on hatchery-wild interactions</td>
<td>All assignments due 5/23, 5 pm</td>
<td>Quiz 7</td>
</tr>
<tr>
<td></td>
<td>Disease in wild marine fish microlecture</td>
<td>Discussion on hatchery-wild interactions</td>
<td>Disease in netpens – Mike Kent</td>
<td>All assignments due 5/23, 5 pm</td>
<td>Group project assignment 3</td>
</tr>
<tr>
<td>9</td>
<td>Climate change and invasive species</td>
<td>Invasive species Microlecture</td>
<td>CC lecture</td>
<td>All assignments due 5/30, 5 pm</td>
<td>Quiz 8</td>
</tr>
<tr>
<td></td>
<td>Invasive species Microlecture</td>
<td>CC lecture</td>
<td>Discussion on the variables that will affect disease under changing climate</td>
<td>All assignments due 5/30, 5 pm</td>
<td>Group project assignment 5</td>
</tr>
<tr>
<td>10</td>
<td>Group presentation</td>
<td>Group presentations</td>
<td>Course survey</td>
<td>Group project assignment 5</td>
<td></td>
</tr>
<tr>
<td>Finals</td>
<td>Group presentation</td>
<td>Group presentations</td>
<td>Course survey</td>
<td>Group project assignment 5</td>
<td></td>
</tr>
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</table>