MB 385: Emerging Infectious Disease and Epidemics 2016
3 credits, WIC course

Lectures: Tuesdays/Thursdays, 12:00-1:20, 3121 Cordley.
Instructor: Dr. Kate Field
354 Nash Hall; 737-1837; kate.field@oregonstate.edu
Teaching Assistant: TBA
Office Hours: Wednesday 1 pm, Thursday 10 am, or (best) email for an appointment
Prerequisites: BI 211, 212 and 213, or equivalent.

WIC: This class is a Writing Intensive Curriculum (WIC) course and satisfies the requirement for a WIC course in BI and BHS majors. You are responsible for checking with your adviser to see if this class will satisfy the WIC requirement in your major.

Introduction:

The rate of disease emergence has increased rapidly within the last 50 years. Some of these diseases, like SARS, AIDS, and West Nile virus infection, appear to be new to humans. Others, such as malaria and tuberculosis, have emerged as new threats because they have developed drug-resistant forms, or changed their range or incidence. As the recent Ebola and Zika outbreaks demonstrate, Emerging and reemerging infectious diseases (EIDs) greatly concern the scientific, medical, and public health communities and the general public, are inextricably linked to national and global politics, and arouse controversy, fear, superstition, and blame.

The goal of this course is to understand EIDs and be able to make a realistic evaluation of their threat. The first half of the class will cover the germ theory of infectious diseases, history of humans and human diseases, what makes a microbe a pathogen, how pathogens evolve and from where, and the immune system. We will look at examples of historic plagues and pandemics to understand the factors that led to their emergence. During the second half of the class, we will cover specific EIDs, addressing emergence due to alterations in the pathogen (microbial adaptation and evolution), alterations in the environment (deforestation, changing land use, climate change), and alterations in the host population (demographics, behavior, immune status, technology and industry, war and poverty, international travel and transportation). We will also have guest lectures on EIDs. We will end by comparing the emergence of diseases in history with their emergence today.

This class will also learn about and practice forms of writing important to scientists and health professionals, including scientific research papers, press releases, case studies, and grant proposals. Each student will choose an EID of interest, and base three of the writing assignments on the chosen disease.


Other readings will be on Canvas, or handed out in class. Also, the scientific journal Emerging Infectious Disease, published by the Center for Disease Control, is available online (http://wwwnc.cdc.gov/eid/) and has a great deal of current information. Finally, I will put study questions on Canvas after each class.

Grammar/writing help: online quizzes: http://grammar.ccc.commnet.edu/grammar/quiz_list.htm. Quizzes available on common grammar problems. If you make a specific error a lot, and it affects your paper grade, I may assign you some of these quizzes and allow you to correct the paper.
Learning Outcomes: At the end of this course, you will be able to:

1. Explain the germ theory of disease and the discovery of infectious agents.
2. Understand the scientific method, including acquisition and integration of knowledge through observation and experimentation, the use of evidence, controls, and hypothesis testing. Propose and critically evaluate research or experiments.
3. Discuss, with specific examples, important factors causing the emergence of diseases.
4. Defend with evidence your evaluation of the threats they pose.
5. Locate and critically assess sources of scientific information, and differentiate among primary and secondary sources.
6. Read and analyze scientific papers and case reports, and identify the structures of these two forms of scientific communication.
7. Demonstrate competence in several genres of writing useful to health-related professions, using logical, connected thoughts and supporting them with evidence.

OSU WIC Learning Outcomes:
8. Develop and articulate content knowledge and critical thinking in the discipline through frequent practice of informal and formal writing.
9. Demonstrate knowledge/understanding of audience expectations, genres, and conventions appropriate to communicating in the discipline.
10. Demonstrate the ability to compose a document of at least 2000 words through multiple aspects of writing, including brainstorming, drafting, using sources appropriately, and revising comprehensively after receiving feedback on a draft.

Assessment of Learning Outcomes: Learning outcomes will be assessed via in-class and homework assignments, writing projects, a midterm and final exam (multiple-choice and short-answer questions). The graduate teaching assistant will help grade the papers. Grading rubrics will be provided.

Homework Assignments:
1. Pre-Class and Post-Class Writing Survey Self-Reflection (3 pts each) 6
2. List of references 3
3. Visit and utilize the Writing Center for one draft 3
4. Hand in a complete first draft of each paper: 3 pts each 12
5. Paper 1: Write a press release based on a historic paper 9
6. Paper 2: Case Report 9
7. Paper 3: Contemporary issues/Controversy paper 9
8. Paper 4: Grant proposal prospectus 9

In-class assignments (2 pts each) 12
- Press release
- Read a scientific paper
- Library assignment
- Case report
- Assess the validity of a web site
- Peer review of grant prospectus

Random in-class writing: 8
Midterm 10
Final Exam 10

Total 100
94.0 and above: A  
90.0 to 93.9: A–  
87.0 to 89.9: B+  
84.0 to 86.9: B  
80.0 to 83.9: B–  
77.0 to 79.9: C+  
74.0 to 76.9: C  
70.0 to 73.9: C–  
67.0 to 69.9: D+  
64.0 to 66.9: D  
60.0 to 63.9: D–

**Description of Assignments and Papers:** Students will choose an Emerging/ Reemerging Disease in which they are interested, and base all assignments except for the first paper on their chosen disease. Assignments have suggested page lengths; longer is not necessarily better. Page length does not count references (required). References must be formatted exactly the way references are formatted in *either* the journal Emerging Infectious Diseases, or another science journal you choose (*list what journal you are using for format*). Detailed assignments will be handed out in class and posted on Canvas.

1. **Pre-Class Writing Survey Self-Reflection and Post-class Writing Survey Self Reflection.** The purpose of these assignments is to allow you to assess and reflect on your writing ability in genres related to biosciences and health sciences, your confidence, and your experience at the beginning and end of the course. Data collected in the two Surveys will be used in a research study entitled “An Inventory of Science Writing Skills to Assess Improvements After Students take a Microbiology/ Biological Health Sciences WIC course”, being conducted by course instructor Field. If you give your consent at the beginning of the surveys, we will be able to use results of your surveys in the study. If you do not give your consent, we will not use the results in the study, but you must still take the survey to get the points for the assignment. Choosing not to participate in the research will not affect your grades, class standing, or relationship with any instructor. These assignments are not graded; you will receive full points for completing the surveys, whether or not you give your consent for us to use your surveys.

2. **List of References:** Prepare a list of 6 references pertaining to your chosen disease, using the reference format of the journal *Emerging Infectious Disease* (NOT just a web citation). At least three of the references must be primary sources, research articles from scientific journals.

3. **Writing Center:** For at least one of the first drafts (your choice), visit the Writing Center and utilize the services of a writing assistant. *Bring a copy of the assignment*, along with your draft, for the writing assistant to read; otherwise s/he will not be able to help you. Hand in the signed slip documenting your visit along with your paper. Hint: to get the most benefit, do this in time to get some real help (not the day before it’s due), and do it for one of the early assignments.

4. **Hand in a complete first draft of each paper:** You must turn in a first draft of each paper. It must follow the assignment, be complete, and show effort. It is worth 3 points *as long as it is complete*. We will make comments on it and return it to you; your final draft will be due one week after you get it back. See schedule for due dates. Please hand in your first draft again stapled to the back of your final draft.

5. **Paper 1:** *Write a press release based on a historic paper.* Students will be divided into groups in class, and each group will be given a short historic paper (from the 1800’s or early 1900’s) to read. The assignment is to turn the historic paper into a press release. After in-class discussion within your group, each student will be responsible for completing the assignment individually at home and handing it in. 1-2 *double-spaced pages*.

6. **Paper 2:** *Case study:* Look up material about patients with your chosen disease, and, following a case study format (provided), prepare a case study of an imaginary patient. 1-2 *double-spaced pages*.

7. **Paper 3:** *Contemporary issues paper:* Identify a controversial issue concerning your chosen disease, or use one of the suggestions provided, to write a well-reasoned paper presenting the controversy, taking a position, and providing evidence to support your position. 2-3 *double-spaced pages*.

8. **Paper 4:** *Grant proposal prospectus:* Identify a problem or need related to your chosen Emerging Infectious Disease, and write a prospectus for a grant proposal, based on this problem or need. Your prospectus will include: Proposal Summary, Problem Statement, Project Objectives, Project Methods/ Design and Evaluation, and Outcomes/Impact. 2 *single-spaced pages*.

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**Canvas**
- Visit the Writing Center and utilize the services of a writing assistant.
- Bring your assignment and draft to the Writing Center.
- Hand in the signed slip documenting your visit along with your paper.

**Hints:**
- To get the most benefit, visit the Writing Center in time to get some real help (not the day before it’s due).
- Visit the Writing Center for one of the early assignments.

**Writing Survey Self Reflection**
- Complete the surveys at the beginning and end of the course.
- Data collected will be used in a research study.

**References**
- Prepare a list of 6 references pertaining to your chosen disease.
- Use the reference format of the journal *Emerging Infectious Disease*.
- At least three of the references must be primary sources.

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**Assignments**
- Pre-Class Writing Survey Self-Reflection:
- Post-class Writing Survey Self Reflection:
- List of References:
- Writing Center visit:
- First drafts:
- Hand in a complete first draft of each paper:
- Paper 1:
- Paper 2:
- Paper 3:
- Paper 4:
In-class Expectations: Students are expected to attend class and participate in all discussion and assignments. During class, students may not use cell phones or send text messages. Students may not use computers for any other purpose than to take notes for this class or work on in-class assignments. Students may not do work for other classes in this class.

Academic Integrity: The following is a condensed version of the Student Conduct Code on Academic Dishonesty. For the entire text, see:
http://studentlife.oregonstate.edu/sites/studentlife.oregonstate.edu/files/student_conduct_code_1.pdf

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. It includes:
(A) 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.
(B) FABRICATION - falsification or invention of any information including but not limited to falsifying research, inventing or exaggerating data, or listing incorrect or fictitious references.
(C) ASSISTING - helping another commit an act of academic dishonesty.
(D) TAMPERING - altering or interfering with evaluation instruments or documents.
(E) 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.

IF YOU HAVE A QUESTION ABOUT USE OF SOURCES, HOW TO CITE, OR ANYTHING ELSE, CONSULT THE INSTRUCTOR. The instructor and TA will check written assignments for plagiarism.

Student behavior:
People must treat each other with dignity and respect in order for scholarship to thrive. Expectations for Student Conduct:
http://studentlife.oregonstate.edu/sites/studentlife.oregonstate.edu/files/student_conduct_code_1.pdf

Students with Disabilities:
Accommodations for students with disabilities are determined and approved by Disability Access Services (DAS). If you, as a student, believe you are eligible for accommodations but have not obtained approval please contact DAS immediately at 541-737-4098 or at http://ds.oregonstate.edu. DAS notifies students and faculty members of approved academic accommodations and coordinates implementation of those accommodations. While not required, students and faculty members are encouraged to discuss details of the implementation of individual accommodations.
Some Examples of Emerging or Reemerging Infectious Diseases or Disease Agents

AIDS/ HIV
Babesiosis
Chikungunya fever
Crimean–Congo hemorrhagic fever
Cryptosporidiosis
Cyclosporiasis
Dengue Fever
Drug-resistant Malaria
Drug-resistant *Streptococcus pneumoniae*
*E. coli* O157:H7
Ebola Hemorrhagic Fever
Ehrlichiosis
H1N1 Influenza
H5N1 Avian Influenza
Hantavirus (both Old World renal syndrome viruses, and New World Hanta Pulmonary Syndrome viruses)
Hendra virus
Hepatitis C
Lassa Fever
Legionnaire’s Disease
Lyme Disease
Marburg Hemorrhagic Fever
Nipah virus
Omsk hemorrhagic fever
Prion diseases: V-Creutzfeld-Jakob Disease (vCJD, “mad cow disease” in humans), transmissible spongiform encephalopathy (in deer and relatives), and other transmissible spongiform encephalopathies
Rift Valley Fever
SARS
TB: Multidrug Resistant Tuberculosis (MDR-TB), Extremely Drug Resistant tuberculosis (XDR-TB)
Typhoid Fever
Vancomycin-resistant enterococci
Vancomycin-resistant *Staphylococcus aureus*
Venezuelan hemorrhagic fever (or Argentinian, or Bolivian, or Brazilian)
West Nile Virus
Zika virus

Diseases of the homeless: typical diseases of poverty, war, and living in unsanitary conditions, which are “reemergent” from the point of view of western society (example: Trench Fever, typhoid)

Diseases that were formerly well controlled by vaccines, but are reemerging in places where the vaccination rate has fallen due to political change or anti-vaccination movements (examples: Pertussis, measles, diphtheria)

Diseases that were formerly well controlled by antibiotics, but may reemerge due to the evolution of drug resistance (tuberculosis, plague?)
<table>
<thead>
<tr>
<th>DATE</th>
<th>ASSIGNMENT DUE</th>
<th>IN CLASS</th>
<th>HAND OUT</th>
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<tbody>
<tr>
<td>Week 1 Tues March 29</td>
<td>Due: Writing Survey. Reading: Textbook Executive Summary pp. 1-7. Read the Press Release assignment and handouts.</td>
<td>Introduction to class. Requirements. What should we know to assess the threat from emerging infectious disease? Science: hypotheses, predictions, tests.</td>
<td>Syllabus Press release assignment</td>
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<tr>
<td>Thurs March 31</td>
<td>Paper Due: Turn a historic paper into a press release (first draft)</td>
<td>Germ theory of disease. Re-writing a historic paper as a press release: in-class discussion/assignment.</td>
<td>Historic papers</td>
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<tr>
<td>Thurs April 7</td>
<td>Reading TBA</td>
<td>Evolution of disease 1: Human history, zoonoses, and crowd diseases. Examples.</td>
<td>Press release drafts returned. Handouts on mechanisms</td>
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<tr>
<td>Week 3 Tues April 12</td>
<td>Reading TBA</td>
<td>Evolution of disease 2: Mechanisms: how do pathogens become pathogens?</td>
<td>Handouts on immune response</td>
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<td>Thurs April 14</td>
<td>Paper Due: Turn a historic paper into a press release (final). Read handouts</td>
<td>Evolution of disease 3: The immune response. Coevolution of pathogen and host.</td>
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<tr>
<td>Week 4 Tues Apr 19</td>
<td>Hand in Library Assignment at the end of class.</td>
<td>Library Tutorial. Class meets in library. In-class library assignment.</td>
<td>Library assignment.</td>
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<td>Thurs Apr 21</td>
<td>EID References Due Read handouts. Reading TBA</td>
<td>Evolution of disease 4: Past emergence of epidemic diseases. Example: Plague. The case report: in class assignment</td>
<td>Case report examples</td>
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<td>ASSIGNMENT DUE</td>
<td>IN CLASS</td>
<td>HAND OUT</td>
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<td>Week 5</td>
<td>Paper due: EID Case report (draft)</td>
<td>Plague continued. Review for midterm.</td>
<td>Cholera handouts</td>
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<td>Tues April 26</td>
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<td>Thurs April 28</td>
<td>MIDTERM</td>
<td></td>
<td>Return Case Report drafts Handouts</td>
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<td>Tues May 3</td>
<td>Reading TBA</td>
<td>Past emergence of epidemic diseases. Example: Cholera</td>
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<td>Thurs May 5</td>
<td>Reading TBA</td>
<td>Review Midterm answers. How to assess whether a website is reliable</td>
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<td>Tues May 10</td>
<td>Reading TBA</td>
<td>Introduction to viruses Viral hemorrhagic fevers</td>
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<tr>
<td>Thurs May 12</td>
<td>Paper due: EID Controversy (draft)</td>
<td>Viral Hemorrhagic fevers cont’d</td>
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<td>Tues May 17</td>
<td>Reading TBA</td>
<td>Viral Hemorrhagic fevers cont’d</td>
<td>Return controversy drafts</td>
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<td>Thurs May 19</td>
<td>Reading TBA</td>
<td>Antibiotic resistance: Guest Lecture by Kyle Asfahl</td>
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<td>Tues May 24</td>
<td>Paper due: Final Draft of EID Controversy Paper</td>
<td>SARS and MERS</td>
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<td>Thurs May 26</td>
<td>Reading TBA</td>
<td>Prions and other weird infectious agents</td>
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<td>Tues May 31</td>
<td>Paper Due: EID Grant Proposal Prospectus draft</td>
<td>Climate change and EID. In class: peer review of grant prospectuses</td>
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<tr>
<td>Thurs June 2</td>
<td>In Class: the Index Case</td>
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<td>Return Grant Proposal Prospectus draft</td>
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