**BISC 417: Evolution and Medicine**  
*Spring 2018*  
Bishop 108

**INSTRUCTOR**

Dr. Beckie Symula: Shoemaker 202; Office hours Th. 10-11am or by appointment.

**REQUIRED COURSE MATERIALS**


**COURSE REQUIREMENTS**

Prerequisites: BISC160, BISC162, BISC336 (Genetics).

**COURSE GOALS**

Learning Objectives: At the end of the semester, students will be able to:

1. Describe the fundamental principles of evolution.
2. Discriminate among evolutionary forces.
3. Explain the significance of genetic variation in humans, vectors and disease causing agents.
4. Explain how evolution influences humans.
5. Explain how evolution influences human diseases.
6. Apply principles of evolution to current literature on diseases.
7. Apply the concept of biodiversity to medicine and disease.

**COURSE GRADES**

<table>
<thead>
<tr>
<th>Grading</th>
<th>Percent</th>
<th>Date</th>
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<tbody>
<tr>
<td>Exam 1</td>
<td>20</td>
<td>Feb. 28 (Wed.)</td>
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<tr>
<td>Exam 2</td>
<td>20</td>
<td>Apr. 4 (Wed.)</td>
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<tr>
<td>Participation</td>
<td>15</td>
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<tr>
<td>Assignments</td>
<td>15</td>
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<tr>
<td>Final</td>
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<td>Total</td>
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**Attendance and Participation:** Your regular attendance is expected and will contribute to participation. 15% of your grade will come from participation. This means actively participating in class discussions and activities.

**Assignments:** Assignments will account for 15% of your grade. Each of you will work in a group of four and present a paper from the primary literature. Groups will present summaries of a paper and lead a discussion with the class. Before presenting the paper, groups will meet with each other and with me to help you set up the presentation. PowerPoint is not required, but I’m happy to help you build a presentation in PowerPoint. If you are not presenting the paper, you are expected to write one question that you have about the paper and one question regarding a follow-up experiment or closely related topic in Evolution and Medicine.

**Exams:** There will be 2 regular semester exams and a final exam, for a semester total of 70% of the grade. Exams will have multiple choice, short answer and essay questions.

- Exam 1: 40 points
- Exam 2: 40 points
- Final exam: 60 points
LECTURE TOPICS:

Week 1: What is Evolutionary Medicine? Gluckman et al. 2011 and Nesse & Stearns 2008 (Ch 1)

Week 2: Foundations of evolution: Variation, Molecular variation. Futuyma Ch 9, Gluckman et al. Ch. 3


Week 4: What are humans? (Phylogeny) Gregory, 2008

Week 5: What are humans? (Phylogeography) / **Exam 1 (February 27)**/Human disease Schraiffer and Akey, 2015

Week 6: Mismatch, Constraint and Tradeoff Lloyd et al. 2011

Week 7: Human Life History TBA

Week 8: Human Diet TBA

Week 9: Pathogen Intro TBA

Week 10: **Exam 2 (Apr 4)**/Pathogen Evolution TBA

Week 11: Pathogen Evolution TBA

Week 12: Geographic patterns in pathogens TBA

Week 13: Infectious disease coevolution TBA

Week 14: Virulence and transmissibility TBA

Any readings outside of the required text will be provided to you on Blackboard.

RESEARCH PAPER READINGS (Have these read and prepared by the Friday of each week.):

Jan 26 Week 1 Topic Evolution and Public Health Reference (PDF will be provided on Blackboard.)

Feb 2 Week 2 No paper.


Mar 2 Week 6 Human tradeoff example. Kuzawa et al. 2014, PNAS, 111:13010-13015

Mar 9 Week 7 No paper.

Mar 23 Week 8 No paper (Presentations start Monday)

Spring Break


Apr 2 Week 10 Student group paper (Insecticide resistance and pathogen variation) Chang et al. 2016, Parasites and Vectors, 9,228.

Apr 9 Week 11 Student group paper (Disease reservoirs) LeBreton et al. 2014, 3: e7.

Apr 16 Week 12 Student group paper (Antibiotic resistance) Tyerman et al. 2013, BMC Evolutionary Biology, 13: 22.


Apr 30 Week 14 No paper.

Final exam: Wednesday, May 9, 2018 12-3pm

COURSE POLICIES

Cell Phone/Electronics Policy: Use of cell phones, including texting, is prohibited. Please turn them off during class. You may use laptops etc. for note taking and reading course papers.

Academic Misconduct: In this course, academic misconduct applies to exams and assignments. I do not tolerate any means of Academic Misconduct and will follow the University policy on generating sanctions in any identified event of misconduct.