

**Prefix and number:** VET\_PATH 571-03

**Title:** Modeling Infectious Disease

**Credit hours:** 1

**Prerequisites:** Algebra, VET\_PATH 571-01 & -02

**Current semester and year:** Spring 2018

**Meeting schedule:**

**Time:** MWF 4:10-5 PM, March 26 – April 27

**Place:** Bustad Hall Room 404

**Instructor and Course Coordinator:**

Dr. Eric Lofgren

Eric.Lofgren@wsu.edu

Office: Allen Center 311

Office hours by appointment

**Module Description:** This module will introduce the graduate student to the basics of modeling infectious disease dynamics using mathematical and computational models. The student will be able to read and compose models base up of differential equations, critique modeling papers, and implement basic models using the R programming language. Examples from medical and veterinary literature will be discussed.

**Required Textbook:** There is no required textbook for this module. Potential sources for those interested in a deeper treatment of topics will be provided during lectures.

**Other textbooks and resources:**

- *Modeling Infectious Diseases in Humans and Animals* by Keeling & Rohani
- *Systems Science and Population Health*, edited by El-Sayed and Galea

**Course Website:** In lieu of Blackboard, material for the course will be available on Github at <https://github.com/epimodels/ModelingID>.

**Description of required assignments:** Each problem set is worth 15 points for a total of 30 points, with an additional one-page review of a modeling paper worth 20 points. The remaining 50 points will be based on class participation. Each student may solve the problem set on her or his own, or may work in groups.

**Policy on late assignments:** Assignments that are submitted after the beginning of class on Monday will receive one-half of the total graded points (i.e. a maximum of 5 points).

**Grading policy:**

96-100 points: A

90-95 points: A-

86-89 points: B+

80-85 points: B

76-79 points: B-

70-75 points: C

< 70 points: F

**Assigning Incompletes:** University policy (Acad. Reg. #90) states that Incompletes may only be awarded if: "the student is unable to complete their work on time due to circumstances beyond their control".

**Attendance policy:** There is no formal attendance policy, however 50% of your class grade is based on participation – by extension it is impossible to pass the class without attending and actively participating.

**WSU Reasonable Accommodation Statement:**

Students with Disabilities: Reasonable accommodations are available for students with a documented disability. If you have a disability and need accommodations to fully participate in this class, please either visit or call the Access Center to schedule an appointment with an Access Advisor. All accommodations MUST be approved through the Access Center. For more information contact a Disability Specialist on your home campus. Pullman or WSU Online: 509-335-3417, Washington Building 217; <http://accesscenter.wsu.edu>, [Access.Center@wsu.edu](mailto:Access.Center@wsu.edu). All students requesting reasonable accommodation must meet with the instructor prior to or during the first week of the course to review all proposed accommodations in relation to course content and requirements. Exceptions to this timeframe will be granted only upon a showing of good cause.

**WSU Academic Integrity Statement:** Academic integrity is the cornerstone of higher education. As such, all members of the university community share responsibility for maintaining and promoting the principles of integrity in all activities, including academic integrity and honest scholarship. Academic integrity will be strongly enforced in this course. Students who violate WSU's Academic Integrity Policy (identified in Washington Administrative Code (WAC) 504-26-010(3) and -404) will fail the course, will not have the option to withdraw from the course pending an appeal, and will be reported to the Office of Student Conduct.

Cheating includes, but is not limited to, plagiarism and unauthorized collaboration as defined in the Standards of Conduct for Students, WAC 504-26-010(3). You need to read and understand

all of the definitions of cheating: <http://app.leg.wa.gov/WAC/default.aspx?cite=504-26-010>. If you have any questions about what is and is not allowed in this course, you should ask course instructors before proceeding. If you wish to appeal a faculty member's decision relating to academic integrity, please use the form available at <https://conduct.wsu.edu/>.

**Classroom Safety Statement:** Classroom and campus safety are of paramount importance at Washington State University, and are the shared responsibility of the entire campus population. WSU urges students to follow the “Alert, Assess, Act,” protocol for all types of emergencies and the “Run, Hide, Fight” response for an active shooter incident. Remain ALERT (through direct observation or emergency notification), ASSESS your specific situation, and ACT in the most appropriate way to assure your own safety (and the safety of others if you are able). Please sign up for emergency alerts on your account at MyWSU. For more information on this subject, campus safety, and related topics, please view the FBI’s Run, Hide, Fight video and visit the WSU safety portal.

**Week-to-week course outline:**

| <b>Date</b> | <b>Day</b> | <b>Topic</b>                            | <b>Assignment Due</b> |
|-------------|------------|---|-----------------------|
| <b>3/26</b> | Mon        | NO CLASS*                               | None                  |
| <b>3/28</b> | Wed        | NO CLASS                                |                       |
| <b>3/30</b> | Fri        | NO CLASS                                |                       |
| <b>4/2</b>  | Mon        | NO CLASS                                |                       |
| <b>4/4</b>  | Wed        | NO CLASS                                |                       |
| <b>4/6</b>  | Fri        | NO CLASS                                |                       |
| <b>4/9</b>  | Mon        | Why Model?                              |                       |
| <b>4/11</b> | Wed        | Deterministic Compartmental Models      |                       |
| <b>4/13</b> | Fri        | Deterministic Compartmental Models in R |                       |
| <b>4/16</b> | Mon        | Stochastic Compartmental Models         | PS1                   |
| <b>4/18</b> | Wed        | NO CLASS                                |                       |
| <b>4/20</b> | Fri        | NO CLASS                                |                       |
| <b>4/23</b> | Mon        | Stochastic Compartmental Models in R    | Paper Review          |
| <b>4/25</b> | Wed        | Network Models                          |                       |
| <b>4/27</b> | Fri        | Agent Based Models                      | PS2                   |