

## **SYLLABUS – SPRING 2020**

### **Bioinformatics in molecular epidemiology of infectious diseases (3 credits)**

#### **PVS 4000**

Tue & Thu 2:00 – 3:15pm

Instructors: Dong-Hun Lee, DVM, Ph.D.

E-mail: [dong-hun.lee@uconn.edu](mailto:dong-hun.lee@uconn.edu) / Website: <https://dong-hun.patho.uconn.edu/>

#### **Course Description**

Molecular epidemiology is a discipline that uses molecular or genetic markers to trace the development of a disease in a population and to understand transmission, as well as the population structure and evolution of pathogens. A number of bioinformatics tools can be used to determine the sources of pathogens, route of transmission, and genes responsible for virulence and drug resistance. This field has grown rapidly in the past couple of decades with the advances in next-generation sequencing techniques. This course will emphasize the scientific basis of bioinformatics in infectious disease epidemiology and provides examples of the application of molecular biology, genome sequence analysis, and phylogenetic analysis to the study of infectious disease etiology and its public health application, including examples of viral diseases. Students will also have chance to conduct sequence analysis, participate in group discussions and critical review of journal articles relevant to molecular epidemiology. There will be assigned homework, in-class exam and oral presentation for chosen diseases.

#### **Course goals and learning objectives**

- 1) Basic concepts and terminologies in infectious disease epidemiology
- 2) Basic concepts and terminologies in bioinformatics
- 3) Epidemiological features of selected infectious diseases
- 4) Genome sequencing methods commonly used in molecular epidemiology
- 5) Hands-on, practical experiences in sequence analysis: database, alignment, phylogenetic analysis, visualization

#### **Prerequisites**

One course in Genetics: MCB 2400, 2410 or ANSC 3121.

## Course Outline

Date			Topic
week 1	1/21	Tuesday	Basics of Genomics and sequencing
	1/23	Thursday	Basics of Genomics and sequencing
week 2	1/28	Tuesday	Basics of Genomics and sequencing
	1/30	Thursday	Molecular Epidemiology of Infectious Disease
week 3	2/4	Tuesday	Molecular Epidemiology of Infectious Disease
	2/6	Thursday	Introductions to computers and operating systems (Lecture + exercises)
week 4	2/11	Tuesday	Introductions to computers and operating systems (Lecture + exercises)
	2/13	Thursday	Basics of Bioinformatics, Sequence analysis software (Lecture + exercises)
week 5	2/18	Tuesday	Basics of Bioinformatics, Sequence analysis software (Lecture + exercises)
	2/20	Thursday	Exam 1
week 6	2/25	Tuesday	Sequence analysis software (Lecture + exercises)
	2/27	Thursday	Database, BLAST, Sequence analysis software (Lecture + exercises)
week 7	3/3	Tuesday	Database, BLAST, Sequence analysis software (Lecture + exercises)
	3/5	Thursday	Data quality control (Lecture + exercises)
week 8	3/10	Tuesday	Data quality control (Lecture + exercises)
	3/12	Thursday	Genome assembly (Lecture + exercises)
week 9	Spring Recess		
week 10	3/24	Tuesday	Genome assembly (Lecture + exercises)
	3/26	Thursday	Genome assembly (Lecture + exercises)
week 11	3/31	Tuesday	Exam 2
	4/2	Thursday	Sequence alignment (Lecture + exercises)
week 12	4/7	Tuesday	Sequence alignment (Lecture + exercises)
	4/9	Thursday	Phylogenetic analysis (Lecture + exercises)
week 13	4/14	Tuesday	Phylogenetic analysis (Lecture + exercises)
	4/16	Thursday	Phylogenetic analysis (Lecture + exercises)
week 14	4/21	Tuesday	Phylogenetic analysis (Lecture + exercises)
	4/23	Thursday	Prediction of Glycosylation sites (Lecture + exercises)
week 15	4/28	Tuesday	Homology modeling of 3D protein structures (Exercises)
	4/30	Thursday	Exercises - Sequence analysis
week 16	5/5	Tuesday	Exam 3

## UConn Academic Calendar, Spring 2020

1st day of classes	Jan 21
Labor Day	N/A
10th Day of Classes	Feb 3
Registration opens for next semester	Mar 23
Break	15-Mar -21-Mar
Last Class	May 1
Final Exams	4-May - 9-May
Commencement	9-May & 10-May

### Assessment and Grading:

-Examination: There will be three examinations.

The final grade will be determined by the following components:

- Exam 1 ----- 30%
- Exam 2 ----- 30%
- Exam 3 ----- 30%
- Instructor Evaluations ----- 10%

### Grading Scale:

A	100 – 93
A-	92.9 – 90
B+	89.9 – 87
B	86.9 – 83
B-	82.9 – 80
C+	79.9 – 77
C	76.9 – 73
C-	72.9 – 70
D+	69.9 – 67
D	66.9 – 63
D-	62.9 – 60
F	59.9 - 0

## **Course policies:**

### Course Communication

I will post all class announcements, schedule/syllabus changes, readings, and teaching materials to Husky CT. It is your responsibility to check the website and your e-mail. If you miss a class, you are responsible for getting the notes from another student.

### Professional Behavior

You are expected to come to class prepared (i.e., readings & assignments completed) and to be attentive. This means the following behaviors are inappropriate: a) Talking while I am presenting material in class or while other students are participating in class discussions; b) Interrupting your fellow students and me by arriving late for class, using your cell phone or other device for communication. c) Doing outside work, reading non-class material, watching videos on your device, sleeping, etc.

### Student Behavior & Ethics

- Computers will be used during the class period only for purposes of course activities.
- No video/audio recordings are allowed under any circumstances.
- The University is committed to maintaining an environment free of discrimination or discriminatory harassment directed toward any person or group within its community – students, employees, or visitors. In accordance with federal and state law, the University prohibits discrimination and discriminatory harassment, as well as inappropriate Romantic relationships, and such behavior will be met with appropriate disciplinary action, up to and including dismissal from the University. (More information is available at <http://policy.uconn.edu/?p=2884>.) Office of Diversity and Equity 860-486-2943.
- Academic Misconduct in any form is in violation of the University of Connecticut Student Code and will not be tolerated. Depending on the act, a student could receive a grade of F on the test/assignment and/or an F for the course and could be suspended or expelled from the University. Please see the Student Code at <http://www.dosa.uconn.edu> (Judicial Affairs link) for more details and a full explanation of the Academic Misconduct policies.

### Student's Progress

You will be able to access your grades in the course via the Husky CT course website. Please Note: I reserve the right to retain, for pedagogical reasons, any student's test or assignment submitted by the student.

### Agreement to the Terms of the Syllabus

This syllabus should be considered a contract, whereby you agree to abide by the terms and requirements described herein.

*\*Syllabus (discussion materials, dates etc.) may change throughout the semester as necessary.*

*\*Students should frequently visit HuskyCT for updates.*

## **MISCELLANEOUS ITEMS:**

### Grade Appeal Procedure

I cannot open grading policies to negotiation with individual students. It would be unfair to

other students and would violate the contractual nature of the syllabus. However, if you feel you have been graded unfairly on a particular assignment, you may use the following procedure to voice your concerns:

1. Within ten days of receiving the grade, provide me with a written appeal. After ten days, I will consider the grade to be final.
2. Prepare a written statement detailing why you think the grade is unfair. Be sure to document your reasons and explain precisely why you believe the quality of your work merits a higher grade. Stating simply that you feel you “deserve” a higher grade because you worked hard is not sufficient grounds for an appeal.
3. Submit the written statement to me. I will consider your concerns and inform you of my decision.

### Special Accommodations

- The Center for Students with Disabilities (CSD) at UConn provides accommodations and services for qualified students with disabilities. If you have a documented disability for which you wish to request academic accommodations and have not contacted the CSD, please do so as soon as possible. The CSD is located in Wilbur Cross, Room 204 and can be reached at (860) 486-2020 or at [csd@uconn.edu](mailto:csd@uconn.edu). Detailed information regarding the accommodations process is also available on their website at [www.csd.uconn.edu](http://www.csd.uconn.edu).
- If you or other students are experiencing any distress or potentially compromised personal well-being or if you have a concern about threatening, harming or disruptive behavior PLEASE contact the Student Care Team <http://studentcareteam.uconn.edu/>
- UConn is committed to creating and maintaining a campus environment free from all forms of sexual harassment, sexual violence, relationship violence and stalking. There are a number of resources available to support and help anyone impacted. <http://titleix.uconn.edu/>

### Student Support Services

- Alcohol and Other Drug Services, 486-9431, <http://www.aod.uconn.edu>
- Career Services, 486-3013, <http://www.career.uconn.edu/>
- Student Health Services (Confidential) 860-486-4700 (24 Hours)
- Counseling and Mental Health Services (*Confidential*), 486-4705 (after hours: 486-3427). <http://cmhs.uconn.edu> (24 Hours)
- Dean of Students Office 486-3426, <http://www.dos.uconn.edu>
- University Writing Center <http://www.writingcenter.uconn.edu/>, Business Writing Center <http://www.business.uconn.edu/cms/p640>, Learning Resource Center (LRC) <http://lrc.uconn.edu/>.
- Sexual Assault: statement: Office of Diversity & Equity under the Sexual Assault Response Policy, <http://sexualviolence.uconn.edu/>
- UConn Police 860-486-4800 (24 Hours)