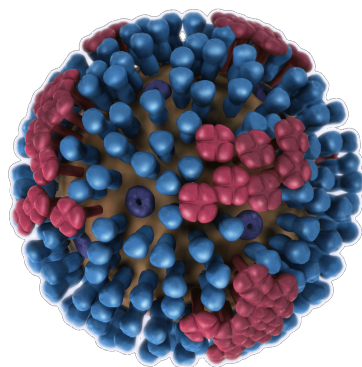


VIROLOGY
MCB438
SYLLABUS



TuTh from 2-3:20pm; Armory 134

INSTRUCTOR:

Christopher Brooke, Ph.D.

Office: Burrill Hall 390A

Phone: 217-265-0991

Email: cbrooke@illinois.edu

Office hours: Tuesdays 1pm-2pm, or by appointment (48 hrs notice required)

Course website: <https://canvas.illinois.edu/courses/62119>

Course credit = 3.0 hours

ABOUT ME:

I run a research group that studies how RNA viruses replicate, evolve, and cause disease. We explore how heterogeneity and collective interactions within virus and host cell populations influence influenza virus infection outcomes. We also study how the unique structure of the influenza virus genome influences how the virus evolves.

COURSE DESCRIPTION:

Viruses are everywhere. They are intimately involved in the lives of all major life forms on earth and impose enormous public health and economic burdens upon human society. This course will focus on the common fundamental biological concepts that underlie and connect the replication strategies of diverse virus families and will examine host interactions between viruses and the host influence infection outcome. Group discussion of primary literature will be used to illustrate experimental approaches for exploring fundamental questions in virology.

STUDENT LEARNING OUTCOMES:

1. Explain the general challenges and processes involved in viral infection and replication
2. Compare the strategies used by diverse viral families to overcome common challenges.
3. Compare the factors that influence whether viral exposure results in infection, disease, recovery or death.
4. Describe the fundamental concepts that explain viral persistence, pathogenesis, and emergence.
5. Critically read primary scientific literature and evaluate experimental data and design.

TEXTBOOK:

Required: Assorted articles that will be provided as PDFs

Optional: selections from *Principles of Virology*. (2020, 5th edition, ASM press)

PREREQUISITES: MCB 300 and 354; or consent of instructor

EVALUATION:

The following breakdown of scoring for the course applies to both undergraduate and graduate students.

Exams: There will be three exams, including the final exam, each of which will be worth 100 points and will in total contribute 70% of the final grade (Exam I = 20% of final grade, Exams II and III 25% of final grade each). These exams will be a mix of short answer and multiple-choice questions, and will cover material from the lectures, required readings, and the papers discussed in class. The final exam will cover the new material from the last third of the course. All exams will require that students be familiar with all the concepts introduced up to that point in the course.

Make-up exams will be given **ONLY** in cases where there is a sufficient, documented reason (*e.g.*, doctor's note for significant illness/injury) as detailed in the University Student Code of Conduct (<https://studentcode.illinois.edu/article1/part5/1-501/>), and must be taken within two weeks of the original exam date. Proximity to exams or assignments in other courses is **not** sufficient to qualify for a make-up exam

Participation in paper discussions: There will be 6 in-class discussion sessions where we will discuss primary research papers in depth. The class will be broken into 6 groups, each group will be responsible for presenting one of the papers to the rest of the class and leading discussion. Presenting groups must:

- 1) Provide relevant background information.
- 2) Explain the overarching question of the paper
- 3) Present and explain the individual figures, with a focus on the specific questions asked by the authors, the experimental method(s) they used to answer the question, key controls, and what conclusion the authors arrived at and why.
- 4) Convey the main or "take-home" conclusion of the study
- 5) Highlight one thing they especially liked and one thing they especially didn't like about the paper
- 6) Address and engage the class in discussion of the three discussion questions provided

Doing all of this within 1 class period will be a challenge so groups will have to be well prepared and organized in advance so as not to run over time. Individuals within a group will be graded on quality of individual participation as well as overall group effort. Evaluation of the presentation will contribute 20% of the final grade.

Participation and Attendance: Attendance is not mandatory for every class meeting but is expected.

Quizzes: Grades from 5 of 6 online quizzes will contribute the remaining 10% of the final grade (Lowest quiz grade will be dropped). Quizzes are closed book/notes (based on honor system), will consist of short answer and/or multiple-choice questions, and will be taken online via Canvas LMS. Quiz access will open 24 hours prior to the indicated class period and access will close at the beginning of the indicated class period, so the quiz will be available for 24 hours. Once started, you will have 10 minutes to complete the quiz.

Extra credit: There will be no extra credit opportunities.

Challenging an Exam Grade: You will have one week after an exam is handed back to the class to challenge the grading of the exam. To challenge a grade, you must return the exam to me with (on a separate sheet of paper) a clearly written explanation of your reason for challenging the

grade (specifically state which questions you want me to regrade), and I will seriously consider it. Except for score calculation errors, I will NOT re-grade questions that do not have a written explanation/justification attached. All requests must be made in writing within one week of being returned - no exceptions. Use a different color pen (not blue or black) for marking on your returned exams if you think that you might be requesting a regrade.

Total grade breakdown:

Exam I:	20
Exam II:	25
Exam III:	25
Quizzes:	10
Paper discussion presentation:	20
TOTAL	100

Grading Scale: This course uses the 100-point grading scale shown below:

NUMERICAL GRADE		LETTER GRADE
98.00 – 100.00	→	A+
92.00 – 97.99	→	A
90.00 – 91.99	→	A-
88.00 – 89.99	→	B+
82.00 – 87.99	→	B
80.00 – 81.99	→	B-
78.00 – 79.99	→	C+
72.00 – 77.99	→	C
70.00 – 71.99	→	C-
68.00 – 69.99	→	D+
62.00 – 67.99	→	D
60.00 – 61.99	→	D-
below 60	→	F

Academic Integrity Statement: University of Illinois academic integrity policies apply and can be found here: <https://studentcode.illinois.edu/article1/part5/1-501/>

Disability accommodations: To ensure that disability-related concerns are properly addressed from the beginning, students with disabilities who require assistance to participate in this class are asked to see me as soon as possible. Campus disability resources and educational services (DRES) can be found [here](#).

COVID/infection policies: All University COVID policies apply. If you suspect you may be COVID+ or infected with virus please do not attend in person class, send the instructor a message about how to catch up on anything you miss. If the instructor is sick, class meetings will occur synchronously via zoom.

APPROXIMATE LECTURE SCHEDULE:

Week 1:

(8/26): Class intro / What is a virus? / Viral structures I

(8/28): Life cycle overview

Week 2:

(9/2): Entry/attachment
(9/4): Genome replication

Week 3:

(9/9): **PAPER DISCUSSION (Group 1)**
(9/11): Protein translation; **QUIZ 1**

Week 4:

(9/16): Assembly/egress
(9/18): Routes of infection/transmission; **QUIZ 2**

Week 5:

(9/23): **PAPER DISCUSSION (Group 2) REVIEW**
(9/25): **EXAM I**

Week 6:

(9/30): Pathogenesis overview
(10/2): Innate defenses / Priming

Week 7:

(10/7): **PAPER DISCUSSION (Group 3)**
(10/9): T cells / antigen recognition

Week 8:

(10/14): B cells / antibody; **QUIZ 3**
(10/16): Pathogenesis part 2 and vaccines

Week 9:

(10/21): **PAPER DISCUSSION (Group 4)**
(10/23): Vaccines-continued and drugs; **QUIZ 4** and **REVIEW**

Week 10:

(10/28): **EXAM II**
(10/30): **NO CLASS**

Week 11:

(11/4): Viral evolution part 1
(11/6): Viral evolution part 2

Week 12:

(11/11): Viral genomics
(11/13): **PAPER DISCUSSION (Group 5)**

Week 13:

(11/18): Cross-species transmission/emergence; **QUIZ 5**
(11/20): Pandemics

Week 14:

(11/25): **NO CLASS (fall break)**

(11/27): ***NO CLASS (fall break)***

Week 15:

(12/2): Viruses within our genomes

(12/4): ***PAPER DISCUSSION (Group 6)***

Week 16:

(12/9): Where do viruses come from? **QUIZ 6** and **REVIEW**