

Virology: Biol. 841
Course Syllabus – Spring 2023

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Office hours: MWF 1:30 pm – 2:30 pm or by appointment

Course Description

An in-depth discussion of the principles of modern virology. Major topics of discussion will include: virus replication strategies, virus structure, virus infection and disease, and host resistance to disease. A course in genetics and a course in cell biology or biochemistry is strongly recommended. Offered online, Spring only.

Course Objectives

1. Understand how the virus is able to infect a host, including the steps involved in the infectious cycle including attachment, entry, replication, and exit from the cell.
2. Be able to describe the structure of a virus and the differences that exist between viruses.
3. Know different barriers to infection and the mechanisms viruses employ to get through these barriers.
4. Have a general understanding of how viruses interact with the immune system, mechanisms of pathogenesis and the basis of vaccines.

Textbook

Principles of Virology, 5th edition.

Vol I: Molecular Biology

Vol II: Pathogenesis and Control

Flint J, Racaniello V, Rall G, Skalka AM,

ASM Press, 2020

Computer and Software:

Access to a computer with internet access, Microsoft PowerPoint. Software can be purchased through UNK bookstore at a discount. We will have video presentations that require the use of a webcam. These can be found through Walmart or Amazon starting around \$10.

Communication

The best way to reach me is through email. I will respond to email fairly quickly and if you need to talk to me please email me and we can set up a time to talk further. You should frequently check your UNK email and Canvas for course assignments or announcements. Slides will be posted on Canvas but you will still be required to watch lectures as additional information provided during lectures will be pertinent.

Grading

Discussion (5-10pt)

90

2 Exams (30pts each)	60
Quizzes (10pts each)	120
Case Studies (10pts each)	30
Design a Virus (30pts)	30
Short Presentation (20pts)	20
Viral Presentations (30pts)	30
Total	380

Grades will be assigned using the Department of Biology standard grading scale: follows: A (93-100%), A- (90-92%), B+ (88-89%), B (83-87%), B- (80-82%), C+ (78-79%), C (73-77%), C- (70-72%), D+ (68-69%), D (63-67%), D- (60-62%), and F (below 60%).

Discussion

I will post papers on Canvas on Monday and you will have until Friday for your first post and until the following Monday for your second post. To receive full credit, students must have **two significant contributions** weekly for each paper we discuss and **one comment** on each lecture discussion topic. Your responses must contribute something new to the discussion and not simply agree or disagree to the previous response. References will be required to support your statement - at least one post each week must have a reference. Please be considerate of your classmates' responses, abusive comments or attacking other student's comments will not receive credit as comments should be constructive even if you strongly disagree with another student.

Exams

Exams will consist of a take home portion consisting of short answer or essay questions and worth 30 pts each. Students will be given one week to complete the exam, however there will still be lectures and other assignments at this time so please do not procrastinate. Exam dates are as follows:

Exam 1: March 27

Exam 2: May 15

Case Studies

For the case study assignments, students will work in groups, and each group is assigned the same case study. Everyone in the group needs to participate and students that do not contribute to their group will not receive credit for that assignment. The same guidelines for discussion also apply to participation with the case studies.

Case Study 1: Feb 17, 20

Case Study 2: April 7, 10

Case Study 3: April 14, 17

Disease Presentation

We will not have the time to cover individual viruses in detail in this class, to cover individual viruses of interest, students will be assigned a virus the week of Jan 23rd. Students will create a PowerPoint presentation. PowerPoint presentations will be due

February 27th at 11:59pm CST. I will post the presentations over two weeks. Same guidelines apply as stated above in the discussion section when commenting on these presentations, you need to have 3 questions or comments on different posts by Friday of each week. If it is your week to present, you are also responsible for frequently logging into the discussion board and responding to comments as well as commenting on one other presentation. Presentations should be concise as students are responsible for viewing multiple presentations. Approximately 10 – 15 minutes should suffice depending on the virus. Presentations significantly shorter or longer will not receive full credit (aim for 5-15 slides, avoid wordy slides, and be sure to use references).

Short Presentations

We will have questions that require further research to answer. Answer these questions with references and create a short presentation (4-7 min). You will post your video to the discussion board by **April 17th at 11:59pm CST.** You will be responsible for viewing and commenting on three presentations by April 21st. Final discussion on these topics will finish on April 24th.

Designing a Virus Project

Throughout the semester we will go through the different components of a virus (genome types, structure, attachment and entry, replication, release from host cell). This assignment is designed to integrate with what you learn each week and apply it to a semester-long project. You will build a virtual virus and then build a physical form of your virus out of household items. You will want to design a human pathogen that has pandemic potential. Use references to justify why you are selecting the features that you are. For example, if you select dsRNA genome, you need to justify why you selected this genome. As for building your virus, you can use any material you want. Common materials might include push pins, yarn, pipe cleaners, wire, ribbon, used plastic containers, styrofoam shapes, etc. You may need to cut away part of the capsid to showcase the inside of your viral particle. Alternatively, you can take pictures at multiple steps in the process. This will be due by **May 8th at 11:59pm CST.** You will need to submit a photo and a 1-2 page (single spaced) report describing key aspects of your virus and why you selected those attributes for your virus and how they may contribute to the ability to cause a pandemic. I will award bonus points to the most creative design.

Key elements that you need to include or discuss in your report include:

Virus name, genome type, shape, capsid, enveloped or non-enveloped, replication strategy, reservoirs, transmission, tissue tropism, incubation period, symptoms associated with the virus, R0 value, mortality rate

Late Work/Student Attendance Policy

Unless there are extenuating circumstances, for each day late, 10% of the grade will be taken off. If an assignment is over 7 days late, you will receive no credit for it. If a

student is absent or anticipates an absence for either class mode, the student's primary responsibility is to directly contact the primary instructor, and the student should consult with them accordingly. Participation in official University activities, serious health concerns, personal emergencies, and religious observances are valid reasons for absence from classes. Students are responsible for informing their instructors prior to their absence(s) from class and for completing assignments missed during their absence(s). No adverse or prejudicial effects shall result to any student with a documented, excused absence.

Academic Integrity Policy

All students at the University of Nebraska at Kearney are expected to conduct their academic affairs in an honest and responsible manner. Any student found guilty of dishonesty in academic work shall be subject to disciplinary actions. Acts of academic dishonesty include, but are not limited to:

- plagiarism, i.e., the intentional appropriation of the work, be it ideas or phrasing of words, of another without crediting the source.
- cheating, i.e., unauthorized collaboration or use of external information during examinations;
- assisting fellow students in committing an act of cheating;
- falsely obtaining, distributing, using or receiving test materials or academic research materials;
- submitting examinations, themes, reports, drawings, laboratory notes, research papers or other work as one's own when such work has been prepared by another person or copied from another person (by placing his/her own name on a paper, the student is certifying that it is his/her own work);
- improperly altering and/or inducing another to improperly alter any academic record.

Additionally, graduate students are more likely to assume roles as active scholars. With these roles come added responsibilities for academic honesty. For such individuals academic honesty requires an active pursuit of truth, not just an avoidance of falsehood. This pursuit includes but is not limited to:

- providing a full and a complete representation of any scholarly findings, be it experimental data or information retrieved from archives;
- taking care that the resources of the University (e.g., library materials, computer, or laboratory equipment) are used for their intended academic purposes and that they are used in a manner that minimizes the likelihood of damage or unnecessary wear;
- assuring that one's co-workers are given due credit for their contributions to any scholarly endeavor;
- respecting a diversity of opinion and defending one's colleagues as well as one's own academic freedom;

- respecting the rights of other students who may come under the tutelage of the graduate student and being fair and impartial in grading and other forms of evaluation; and
- seeking permission from an instructor when submitting work that has been used in other courses.

Withdraw (W) and Incomplete (I)

In unusual circumstances beyond the student's control, an incomplete (I) may be issued. The (I) is issued as a final grade with the student having 12 months to complete the necessary work. If the coursework is not completed in this time the (I) will be converted to a failing grade (F) on the student's transcript. Students may withdraw from the course before 12 weeks have been completed and a (W) will appear on the transcript. Students are responsible for filling out the necessary paperwork to complete this process. Instructors are not able to withdraw students. If the student drops the class, the (W) will not contribute to the student's overall GPA.

Student Accommodations

Students with Disabilities

It is the policy of the University of Nebraska at Kearney to provide flexible and individualized reasonable accommodation to students with documented disabilities. To receive accommodation services for a disability, students must be registered with the UNK Disabilities Services for Students (DSS) office, 175 Memorial Student Affairs Building, 308-865-8214 or by email unkdso@unk.edu

UNK Statement of Diversity & Inclusion:

UNK stands in solidarity and unity with our students of color, our Latinx and international students, our LGBTQIA+ students and students from other marginalized groups in opposition to racism and prejudice in any form, wherever it may exist. It is the job of institutions of higher education, indeed their duty, to provide a haven for the safe and meaningful exchange of ideas and to support peaceful disagreement and discussion. In our classes, we strive to maintain a positive learning environment based upon open communication and mutual respect. UNK does not discriminate on the basis of race, color, national origin, age, religion, sex, gender, sexual orientation, disability or political affiliation. Respect for the diversity of our backgrounds and varied life experiences is essential to learning from our similarities as well as our differences. The following link provides resources and other information regarding

D&I: <https://www.unk.edu/about/equity-access-diversity.php>

Students Who are Pregnant

It is the policy of the University of Nebraska at Kearney to provide flexible and individualized reasonable accommodation to students who are pregnant. To receive accommodation services due to pregnancy, students must contact the Student Health office at 308.865.8218. The following links provide information for students and faculty regarding pregnancy rights. <https://thepregnantscholar.org/title-ix-basics/>

<https://nwlc.org/resource/faq-pregnant-and-parenting-college-graduate-students-rights/>

Reporting Student Sexual Harassment, Sexual Violence or Sexual Assault

Reporting allegations of rape, domestic violence, dating violence, sexual assault, sexual harassment, and stalking enables the University to promptly provide support to the impacted student(s), and to take appropriate action to prevent a recurrence of such sexual misconduct and protect the campus community. Confidentiality will be respected to the greatest degree possible. Any student who believes she or he may be the victim of sexual misconduct is encouraged to report to one or more of the following resources:

Local Domestic Violence, Sexual Assault Advocacy Agency 308-237-2599

Campus Police (or Security) 308-865-8911

Title IX Coordinator 308-865-8655

Retaliation against the student making the report, whether by students or University employees, will not be tolerated.

Veterans Services

UNK works diligently to support UNK's military community by providing military and veteran students and families with resources and services to help them succeed. Veterans Services assists with the GI Bill process and acts as a liaison between the student and the Veterans Administration. If you need assistance or would like more information, please contact Lori Weed Skarka at 308-865-8520 or unkveterans@unk.edu.

Copyright Law and Compliance

The materials on the course website are only for the use of students enrolled in this course for purposes associated with this course and may not be retained or further disseminated. The materials on this course website may be protected by copyright, and any further use of this material may be in violation of federal copyright law.

Preparation for class	Dates	Schedule	Assignment
Vol 1. Ch 1	Jan 23	Introduction	Disc.
Vol 1. Ch 2	Jan 31	Infectious Cycle	Disc., Quiz
Vol 1. Ch 3	Feb 7	Genome	Disc., Quiz
Vol 1. Ch 4	Feb 14	Structure	Case Study, Quiz
Vol 1. Ch 5	Feb 21	Attachment and Entry	Disc., Quiz
Vol 1. Ch 6, 7, 8	Feb 28	RNA synthesis	Disc., Quiz
Vol 1. Ch 9	Mar 7	DNA Replication	Disc., Quiz, Presentations
Vol 1. Ch 10, 11	Mar 14	Spring Break	
	Mar 21	Exam 1 Due March 27	Quiz
Vol 1. Ch 13	Mar 28	Processing, Protein Synthesis	Disc., Presentations
Vol 2. Ch 2, 3, 4	Apr 4	Assembly, Exit, Maturation	Case Study, Quiz
Vol 2. Ch 8	Apr 11	Barriers, Immune System	Case Study Quiz
Vol 2. Ch 5,10,11	Apr 18	Vaccines	Short Presentations, Quiz
	Apr 25	Pathogenesis, Evolution	Quiz
	May 2	Designing a Virus	Quiz

	May 9	Exam 2 Due May 15	
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