

*BIOL 5408 - Virology-4 credits*  
*Texas A&M University-San Antonio*  
*Department of Life Sciences*  
*Spring XXXX Syllabus*

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Class Meeting Times and Location(s)

Lecture: T/TR 9.30-10:45 am

Lab: Varied according to the graduate student schedule. At least 3 hrs. a week

Learning objectives

As a graduate class the students will attend and participate in the lectures in person. Through attending the lectures the students will

1. Describe the basic structures and replication strategies of the major classes of human viral pathogens.
2. Recognize the variety and diversity of viruses that impact humans, plants, and animals in good, and bad ways.
3. Investigate methods to detect, differentiate, and characterize viruses and apply their use in silico and in the laboratory.
4. Explore new types of antivirals as well as novel approaches to vaccines. They will discuss and debate issues associated with treatment and prevention including vaccine hesitancy.
5. Explore and analyze the political, social, economic, and biological factors that impact outbreaks and spread of viral diseases.
6. Demonstrate familiarity with the specialized vocabularies and fundamental concepts of the various disciplines involved in the epidemiological analysis of viral disease outbreaks.
7. Show an appreciation of how different academic disciplines can supplement and reinforce one another in the study of virology.

As a graduate class, the students will attend research lab weekly with the professor to get training in applied bacteriology techniques and safety to be used in the Thursday lab sessions with the undergraduate section. In addition, the graduate students will serve as TAs for the lecture and lab section and provide the following:

- Weekly reflections on the course. Identify areas of perceived difficulty and identify misconceptions and concepts that need to be reinforced.
- Work with an assigned group of roughly 8 students weekly on a set of research topics.
- Identify and collect at least 10 research articles on the research topic chosen by the students. Generate an annotated bibliography of readings to be covered with an assigned group of students on

hypothes.is. The tool allows for group annotations and comments. The graduate students will monitor and encourage engagement with the readings.

- Monitor and support students' weekly postings on Benchling and provide guidance using a rubric to ensure that the students understand and complete their weekly assignments.
- Generate a midpoint and endpoint report on their perception of the course and how the students are progressing toward their goals.

#### Graduate student grading

1. Weekly reflections 10% on Benchling
2. Annotated bibliography 20%
3. Development of a CURE module for the laboratory course 10%
4. Monitoring and supporting students on Benchling 20%
5. Midpoint and endpoint report 20%
6. Completing all lab training and procedures for the research lab 10%

The following is the syllabus for the undergraduate section of the course. Policies and guidelines apply to both undergraduates and graduates in the course.

### **Required Textbook**

- Principles of Virology, Fifth Edition. Authors: Flint, Rall, Racaniello, Hatziioannou, Skalka (Wiley Publishing) - you will need both volumes.
- You'll need to bring a computer with you to lecture and lab classes. If you don't have one, we can provide you with a loaner for the lab.
- Additional Materials: Peer-reviewed journal articles, activities, and case studies.

### **Course Description:**

This is a basic introductory virology course. The emphasis will be on host-virus interactions at the molecular and cellular level and will include standard virological laboratory assays utilized. The major focus will be animal viruses, but we will be covering bacteriophages and a few plant viruses as well. Additionally, we will be covering the development of antiviral therapies and the utilization of viral vectors for gene therapy and vaccines. The lab portion will be a course-based undergraduate research experience aimed at studying the transmission of viruses in aerosols and what interventions may be used to prevent transmission.

### **Lecture Learning outcomes:**

8. Describe the basic structures and replication strategies of the major classes of human viral pathogens.
9. Recognize the variety and diversity of viruses that impact humans, plants, and animals in good, and bad ways.
10. Investigate methods to detect, differentiate, and characterize viruses and apply their use in silico and in the laboratory.
11. Explore new types of antivirals as well as novel approaches to vaccines. They will discuss and debate issues associated with treatment and prevention including vaccine hesitancy.
12. Explore and analyze the political, social, economic, and biological factors that impact outbreaks and spread of viral diseases.
13. Demonstrate familiarity with the specialized vocabularies and fundamental concepts of the various disciplines involved in the epidemiological analysis of viral disease outbreaks.
14. Show an appreciation of how different academic disciplines can supplement and reinforce one another in the study of virology.

### **Lab learning outcomes:**

1. Students will understand how transduction can result in the transfer of antibiotic resistance.
2. Students will understand the action of CRISPR and how it can modify the host's genome.
3. Students will recognize the variation in plaque morphology and what it can indicate.
4. Students will be able to compare and contrast viral structure
5. Students will recognize the importance of host specificity in viral transmission.

## **Course Content**

Lecture, Lab, Student ePortfolios and Projects, and Class Participation:

### **4 Quizzes and a Bonus Cumulative Final – (60% of Course Grade)**

- Exams will cover material presented in lectures including subject matter from the textbook and any additional journal articles discussed during the class.

### **Lab Reports and Project- (20% of Course Grade)**

- Students will be responsible for maintaining an online lab notebook after each meeting, this means you should have an entry for each class session with the date, even if you miss class. A poster will be generated as a final product describing an experimental design to test for the transmission of viruses in classroom settings.
- We use Benchling for this.

### **Student ePortfolios (10% of Course Grade)**

- Students will generate an ePortfolio for a virus that is chosen by the student. A series of prompts will be provided and the ePortfolio generated as a Google site. I will also invite you to participate in Microbios de San Antonio for extra credit - I'll tell you more in class  
[https://forms.office.com/pages/responsepage.aspx?id=40iOkfGy0SINXsgYX\\_JBuO1QX4H4KIDnYW23MxedWBUOFBPMzQxNEI5VVA5S0FYTDJLMDk2MFVYV4u](https://forms.office.com/pages/responsepage.aspx?id=40iOkfGy0SINXsgYX_JBuO1QX4H4KIDnYW23MxedWBUOFBPMzQxNEI5VVA5S0FYTDJLMDk2MFVYV4u)

### **Class Participation and Attendance (10% of Course Grade)**

- As this class is in person students must be present during lecture times and participate in the discussions and activities online. This is your opportunity to ask questions and engage with your fellow students. I will randomly call on students throughout the lecture to ensure they are engaged and participating.

## **ATTENDANCE POLICY:**

**Lecture Attendance:** 10% of students' grade stems from participation in our class setting. I take formal attendance, I will call on students randomly based on the class roster during lectures as part of the participation grade, therefore, attendance is highly recommended.

**Lab Attendance:** Lab Attendance is mandatory. There will not be any makeup opportunities for any missed labs. You must be in your lab seat within 10 mins of the lab starting. After that, I close the door and you cannot enter.

**Exam Day Attendance:** Mandatory (see make-up policy)

## **MAKE UP POLICIES:**

**Exams:**

- You may make up an exam only if
  - you contact me within one day of the scheduled exam
  - your absence is one approved by TAMUSA policies (illness, death in the family, other immediate family emergencies). Documentation will be required.
  - You will then be responsible for taking the exam before the next lecture period.

**ePortfolios:**

- You will be generating a Google site ePortfolio for a chosen virus.

**Grading**

Exams	60%
Lab Reports	20%
Student ePortfolios	10% + 5% extra credit for a creative work
Class Participation (1 min papers, 3-2-1, KWL)	<u>10%</u>
	100%

**Final Grade:**

- A = 90-100%
- B = 80-89%
- C = 70-79%
- D = 60-69%
- F = below 60%

**IMPORTANT POLICIES AND RESOURCES**

Academic Accommodations for Individuals with Disabilities: Texas A&M University-San Antonio is committed to providing all students with reasonable access to learning opportunities and accommodations in accordance with The Americans with Disabilities Act, as amended, and Section 504 of the Rehabilitation Act. If you experience barriers to your education due to a disability or think you may have a disability, Disability Support Services is located in the Central Academic Building, Suite 210. You can also contact us via phone at (210) 784-1335, visit us <https://www.tamusa.edu/Disability-Support-Services/index.html> or email us at [dss@tamusa.edu](mailto:dss@tamusa.edu). Disabilities may include, but are not limited to, attentional, learning, mental health, sensory, physical, or chronic health conditions. All students are encouraged to discuss their disability-related needs with Disability Support Services and their instructors as soon as possible.

Academic Learning Center: The Academic Learning Center provides free course-based tutoring to all currently enrolled students at Texas A&M University-San Antonio. Students wishing to work with a tutor can make appointments through the Brainfuse online tutoring platform. Brainfuse can be accessed in the *Tools* section of Blackboard. You can contact the Academic Learning Center by emailing [tutoring@tamusa.edu](mailto:tutoring@tamusa.edu), calling (210) 784-1307, or visiting the Central Academic Building, room 202.

Counseling/Mental Health Resources: As a college student, there may be times when personal stressors interfere with your academic performance and negatively impact your daily functioning. If you are experiencing emotional difficulties or mental health concerns, support is available to you through the Student Counseling Center (SCC). To schedule an appointment, call 210-784-1331 or visit Madla 120.

All mental health services provided by the SCC are free and confidential (as the law allows). The Student Counseling Center provides brief individual and group therapy, crisis intervention, consultation, case management, and prevention services. For more information on SCC services visit [tamusa.edu/studentcounseling](https://tamusa.edu/studentcounseling)

*Crisis support is available 24/7 by calling the SCC at 210-784-1331 (after-hours select option '2').*

Additionally, the TELUS Student Support App provides a variety of mental health resources including support for in-the-moment distress, an anonymous peer-to-peer support network, mental health screenings, podcasts, and articles to improve your mental well-being.

Emergency Preparedness: JagE Alert is Texas A&M University-San Antonio's mass notification. In the event of an emergency, such as inclement weather, students, staff, and faculty, who are registered, will have the option to receive a text message, or email with instructions and updates. To register or update your information visit: <https://tamusa.bbcportal.com/>.

More information about the Emergency Operations Plan and the Emergency Action Plan can be found here: <https://www.tamusa.edu/about-us/emergency-management/>.

Download the SafeZone App (<https://safezoneapp.com/>) for emergencies or call (210) 784-1911. Non-Emergency (210) 784-1900.

Financial Aid and Verification of Attendance: According to the following federal regulation, 34 CFR 668.21: U.S. Department of Education (DoE) Title IV regulation, a student can only receive Title IV funds based on Title IV eligibility criteria which include class attendance. If Title IV funds are disbursed to ineligible students (including students who fail to begin attendance), the institution must return these funds to the U.S. DoE within 30 days of becoming aware that the student will not or has not begun attendance. Faculty will provide the Office of Financial Aid with an electronic notification if a student has not attended the first week of class. Any student receiving federal financial aid who does not attend the first week of class will have their aid terminated and returned to the DoE. Please note that any student who stops attending at any time during the semester may also need to return a portion of their federal aid.

Writing, Language, and Digital Composing Center: The Writing, Language, and Digital Composing Center supports graduate and undergraduate students in all three colleges as well as faculty and staff. Tutors work with students to develop reading skills, prepare oral presentations, and plan, draft, and revise their written assignments. Our language tutors support students enrolled in Spanish courses and students composing in Spanish for any assignment. Our digital studio tutors support students working on digital projects such as ePortfolios, class presentations, or other digital multimedia projects. Students can schedule appointments

through JagWire under the Student Services tab. Click on “Writing, Language, and Digital Composing Center” to make your appointment. The Center offers face-to-face, synchronous online, and asynchronous digital appointments. More information about what services we offer, how to make an appointment, and how to access your appointment can be found on our website at <https://www.tamusa.edu/academics/>.

Meeting Basic Needs: Any student who has difficulty affording groceries or accessing sufficient food to eat every day or who lacks a safe and stable place to live, and believes this may affect their performance in the course, is urged to submit a CARE referral (<https://www.tamusa.edu/university-policies/Student-Rights-and-Responsibilities/file-a-report.html>) for support. Furthermore, please notify the professor if you are comfortable in doing so. This will enable them to direct you to available resources.

Military Affairs: Veterans and active-duty military personnel are welcome and encouraged to visit the Office of Military Affairs for any questions involving federal or state VA Education Benefits. Visit the Patriots’ Casa building, room 202, or contact the Office of Military Affairs with any questions at [military.va@tamusa.edu](mailto:military.va@tamusa.edu) or (210)784-1397.

Religious Observances: Texas A&M University-San Antonio recognizes the diversity of faiths represented among the campus community and protects the rights of students, faculty, and staff to observe religious holidays according to their traditions. Under the policy, students are provided an opportunity to make up any examination, study, or coursework requirements that may be missed due to a religious observance provided they notify their instructors before the end of the second week of classes for regular session classes.

The Six-Drop Rule: Students are subject to the requirements of Senate Bill (SB) 1231 passed by the Texas Legislature in 2007. SB 1231 limits students to a maximum of six (6) non-punitive course drops (i.e., courses a student chooses to drop) during their undergraduate careers. A non-punitive drop does not affect the student’s GPA. However, course drops that exceed the maximum allowed by SB 1231 will be treated as “F” grades and will impact the student’s GPA.

Statement of Harassment and Discrimination: Texas A&M University-San Antonio is committed to the fundamental principles of academic freedom, equal opportunity, and human dignity. To fulfill its multiple missions as an institution of higher learning, A&M-San Antonio encourages a climate that values and nurtures collegiality and the uniqueness of the individual within our state, nation, and world. All decisions and actions involving students and employees should be based on applicable law and individual merit. Texas A&M University-San Antonio, in accordance with applicable federal and state law, prohibits discrimination, including harassment, on the basis of race, color, sex, religion, national origin, age, disability, genetic information, veteran status, sexual orientation, gender identity, gender expression, or pregnancy/parenting status. Individuals who believe they have experienced harassment or discrimination prohibited by this statement are encouraged to contact the appropriate offices within their respective units.

Texas A&M University-San Antonio faculty are committed to providing a safe learning environment for all students and for the university as a whole. If you have experienced any form of sex- or gender-based discrimination or harassment, including sexual assault, sexual harassment, domestic or dating violence, or stalking, know that help and support are available. A&M-San Antonio’s Title IX Coordinator can support those

impacted by such conduct in navigating campus life, accessing health and counseling services, providing academic and housing accommodations, and more. The university strongly encourages all students to report any such incidents to the Title IX Coordinator. Please be aware that all A&M-San Antonio employees (other than those designated as confidential resources such as counselors and trained victim advocates) are required to report information about such discrimination and harassment to the university. This means that if you tell a faculty member about a situation of sexual harassment, sexual violence, or other related misconduct, the faculty member must share that information with the university's Title IX Coordinator ([titleix@tamusa.edu](mailto:titleix@tamusa.edu), 210-784-2061, CAB 439K). If you wish to speak to a confidential employee who does not have this reporting requirement, you can contact the Student Counseling Center at (210) 784-1331 or visit them in Madla 120.

Pregnant/Parenting Students: Texas A&M-San Antonio does not require a pregnant or parenting student, solely because of that status or issues related to that status, to (1) take a leave of absence or withdraw from their degree or certificate program; (2) limit the student's studies; (3) participate in an alternative program; (4) change the student's major, degree, or certificate program; or (5) refrain from joining or cease participating in any course, activity, or program at the University. The university will provide such reasonable accommodations to pregnant students as would be provided to a student with a temporary medical condition that is related to the health and safety of the student and the student's unborn child. These could include maintaining a safe distance from substances, areas, and activities known to be hazardous to pregnant individuals and their unborn child; excused absences because of illness or medical appointments; modified due dates for assignments; rescheduled tests/exams; taking a leave of absence; and being provided access to instructional materials and video recordings of lectures for excused absences, if these would be provided to any other student with an excused absence. Pregnant/parenting students are encouraged to contact the Title IX Coordinator with any questions or concerns related to their status ([titleix@tamusa.edu](mailto:titleix@tamusa.edu); 210-784-2061; CAB 439K).

Texas A&M-San Antonio has also designated the Title IX Coordinator as the liaison officer for current or incoming students who are the parent or guardian of a child younger than 18 years of age. The Title IX Coordinator can provide students with information regarding support services and other resources.

Students' Rights and Responsibilities: The following statement of students' rights and responsibilities is intended to reflect the philosophical base upon which University Student Rules are built. This philosophy acknowledges the existence of both rights and responsibilities, which is inherent to an individual not only as a student at Texas A&M University-San Antonio but also as a citizen of this country.

### *Students' Rights*

1. A student shall have the right to participate in a free exchange of ideas, and there shall be no University rule or administrative rule that in any way abridges the rights of freedom of speech, expression, petition, and peaceful assembly as set forth in the U.S. Constitution.
2. Each student shall have the right to participate in all areas and activities of the University, free from any form of discrimination, including harassment, on the basis of race, color, national or ethnic origin,



religion, sex, disability, age, sexual orientation, gender identity, gender expression, and pregnancy/parenting or veteran status in accordance with applicable federal and state laws.

3. A student has the right to personal privacy except as otherwise provided by law, and this will be observed by students and University authorities alike.
4. Each student subject to disciplinary action arising from violations of university student rules shall be assured a fundamentally fair process.

### *Students' Responsibilities*

1. A student has the responsibility to respect the rights and property of others, including other students, the faculty, and the administration.
2. A student has the responsibility to be fully acquainted with the published University Student Rules found in the Student Handbook, [Student Code of Conduct](#), on our website, and University Catalog, and to comply with them, as well as with federal, state, and local laws.
3. A student has the responsibility to recognize that student actions reflect upon the individuals involved and upon the entire University community.
4. A student has the responsibility to recognize the University's obligation to provide a safe environment for learning.
5. A student has the responsibility to check their university email for any updates or official university notifications.

We expect that students will behave in a manner that is dignified, respectful, and courteous to all people, regardless of sex, ethnic/racial origin, religious background, sexual orientation, or disability. Conduct that infringes on the rights of another individual will not be tolerated.

Students are expected to exhibit a high level of honesty and integrity in their pursuit of higher education. Students engaging in an act that violates the standards of academic integrity will find themselves facing academic and/or disciplinary sanctions. Academic misconduct is any act, or attempt, which gives an unfair advantage to the student. Additionally, any behavior specifically prohibited by a faculty member in the course syllabus or class discussion may be considered as academic misconduct. For more information on academic misconduct policies and procedures please review the Student Code of Conduct

(<https://www.tamusa.edu/university-policies/student-rights-and-responsibilities/documents/Student-Handbook-2022-23.pdf>) or visit the resources available in the OSRR website

(<https://www.tamusa.edu/university-policies/student-rights-and-responsibilities/academic-integrity.html>).

### Option 3 – Broader Use of Generative AI Permitted Within Guidelines

Use of artificial intelligence (AI) tools, including ChatGPT, is permitted in this course for students who wish to use them. To adhere to our scholarly values, students must cite any AI-generated material that informed their work (this includes in-text citations and/or use of quotations, and in your reference list). Using an AI tool to

generate content without proper attribution qualifies as academic dishonesty and violates Texas A&M-San Antonio's standards of academic integrity.

Important Dates:

August 26	First day of class
September 2	Labor Day Holiday
November 11	Last day to drop with an automatic "W"
November 19	Last day to drop a course or withdraw from the University
November 27	Study Day – No classes
November 28-30	Thanksgiving Holiday – No classes
December 5	Last day of classes
December 6	Study Day – No classes
December 7-13	Final exams

*The complete academic calendar is available online: <https://www.tamusa.edu/academics/academic-calendar/index.html>.*

**Tentative Course Schedule:**

<b>Wk</b>	<b>Dates</b>	<b>Lecture Topics</b>	<b>Reading Assignments</b>
1	8/26 M 8/28 W	Introduction and Syllabus Chapter 1 - Foundations of Virology (Vol 1)	Ch 1 - Vol 1 Review questions
2	9/2 M 9/4 W	Labor Day - no class Chapter 2- The Infection Cycle (Vol 1)	Ch 2 - Vol 1 Review questions
3	9/9 M 9/11 W	Chapter 3- Genomes and Genetics (Vol 1) Chapter 3- Genomes and Genetics (Vol 1)	
4	9/16 M 9/18 W	Chapter 5- How Viruses Attach and Enter Cells (Vol 1) Chapter 5- How Viruses Attach and Enter Cells (Vol 1)	
5	9/23 M 9/25 W	<a href="#">Quiz 1</a> (I'll review the answers in lab) Chapter 6- Synthesis of RNA from RNA/DNA Templates (Vol 1)	
6	09/30 M 10/2 W	Chapter 6- Synthesis of RNA from RNA Templates (Vol 1) Chapter 7- Synthesis of RNA from DNA Templates (Vol 1)	
7	10/7 M 10/9 W	Chapter 8- Processing (Vol 1) Chapter 8- Processing (Vol 1)	
8	10/14 M 10/16 W	Chapter 12/13- Intracellular trafficking, Assembly, Release and Maturation (Vol 1) Chapter 12/13- Intracellular trafficking, Assembly, Release and Maturation (Vol 1)	
9	10/21 M 10/23 W	<a href="#">Quiz 2</a> (I'll review the answers in lab) Chapter 1- Infections of populations (Vol 2)	Case study 2
10	10/28 M 10/30 W	Chapter 7/8- Vaccines and Antiviral Drugs (Vol 2) Chapter 7/8- Vaccines and Antiviral Drugs (Vol 2)	
11	11/4 M 11/6 W	Chapter 9- Therapeutic Viruses (Vol 2) Chapter 9- Therapeutic Viruses (Vol 2)	
12	11/11 M 11/13 W	Chapter 10- Viral Evolution (Vol 2), <a href="#">Quiz 2</a> Review <a href="#">Quiz 3</a>	Case study 3
13	11/18 M 11/20 W	Chapter 10- Viral Evolution (Vol 2) Study Day - no class	
14	11/25 M 11/27W	Chapter 11- Emergence (Vol 2) Study day - no classes	

15	12/2 M 12/4 W	Quiz 4 Last day of class	
16	12/7-13	Finals Week	

Week	Dates	Lab Schedule	Reading materials
1	W 08/28	Lab Overview and Lab Exercise #1 – Safety in the lab - Benchling - Hypothesis - Community Agreement - BSL2 Training Video	
2	W 09/04	Transduction of an antibiotic-resistant gene lab 1	
3	W 09/11	Transduction of an antibiotic-resistant gene lab 2 Lecture on structure	
4	W 09/18	Online Lab Exercise #1 - Virus explorer <a href="https://www.biointeractive.org/classroom-resources/virus-explorer">https://www.biointeractive.org/classroom-resources/virus-explorer</a>	Read Chapter 4 (Vol 1) of the textbook
5	W 09/25*	Exploring phages: Host Specificity and Plaque Morphology I	
6	W 10/02	Exploring phages: Host Specificity and Plaque Morphology II	
7	W 10/09*	Online Lab Exercise #2 – Epidemiology of viruses <a href="https://www.biointeractive.org/classroom-resources/epidemiology-nipah-virus">https://www.biointeractive.org/classroom-resources/epidemiology-nipah-virus</a>  <i>*Davida will be in Europe*</i>	
8	W 10/16	Online Lab Exercise #3 – From birds to people <a href="https://www.biointeractive.org/classroom-resources/birds-people-west-nile-virus-story">https://www.biointeractive.org/classroom-resources/birds-people-west-nile-virus-story</a> <a href="https://www.biointeractive.org/classroom-resources/west-nile-virus-vectors-and-hosts-game">https://www.biointeractive.org/classroom-resources/west-nile-virus-vectors-and-hosts-game</a> ( <i>West Nile Virus</i> , 2010)	
9	W 10/23	Effect of Mutation on Plaque Morphology and Disease Progression	
10	W 11/30	Effect of Mutation on Plaque Morphology and Disease Progression	
11	W 11/06	CRISPR Lab I	
12	W 11/13	CRISPR Lab II	
13	W 11/20	Data Analysis and poster preparation - what have you learned from this class? How would you study your assigned virus?	
14	W 11/27	Poster and gallery walk presentation via Padlet or in person	
15	W 12/04	No lab	

Dec 07-13 finals week

