Virology
MCB 5505
Syllabus subject to change

Course Description: This course is for graduate students and is designed to introduce you to the field of virology. We will cover the components of viruses, their replication strategies, and the human diseases caused by common and emerging pathogens. Additional topics include viruses of other organisms, including plants and microbes. This course will also cover the importance of viruses in maintenance of human health (e.g. the virome, gut homeostasis), how viruses can be manipulated by scientists for the treatment of disease, and economic and environmental impacts of viruses.

Course Goals: Upon completion of this course you should have a solid knowledge of the basic characteristics of viruses, including the mechanisms of infection and replication for each type of viral genome. You should also be able to name pathogens belonging to each viral genome category and be able to describe the disease, infection, and transmission characteristics of these pathogens.

Instructor:
Dr. Sarah Doore
Assistant Professor
Dept. of Microbiology and Cell Science
Phone: 352-846-0953
Email: messaging through Canvas is preferred; send accommodation letters to sdoore@ufl.edu

Office Hours: Office hours are available by appointment only. When emailing to request an appointment, provide **three** potential days/times for the meeting and your instructor will select one. Meetings can be held in person or via phone or Zoom.

Communication: Questions should be submitted to TAs or the FAQ board of the Canvas page prior to emailing your instructor with a question. Instructor typically responds to email within 48hrs.

Prerequisites: Microbiology, Genetics, Biochemistry or Molecular Biology course

Teaching Assistants: Names and email addresses can be found on the course Canvas page.

Required Textbook: Principles of Virology: Volume I, 5th edition. Authors: S. Jane Flint, Vincent R. Racaniello, Glenn F. Rall, Anna Marie Skalka, Lynn W. Enquist; ISBN 978-1-683-67284-5 (print) or 978-1-683-67360-6 (electronic).

There is a copy of the textbook for *in-library use* through Course Reserves at the UF Marston Science Library. Check ares at https://ares.uflib.ufl.edu/ares/ares.dll for more information.

Students are allowed to use previous editions of the required text. However, it is the student's responsibility to find the corresponding text sections in older editions. Chapter and page designations are only guaranteed for the edition noted above. If you are interested in a thorough accessory textbook, Fields Virology is a wonderful resource. Fields Virology is NOT required. Print versions are quite expensive, but this text is available through the UF library online system. More details about the system are listed below and can be found on the course website.

Course Structure: As an online course, there will be a collection of modules which contain lectures, videos, podcasts and written materials to be viewed by the student to facilitate learning of basic principles of virology. Students will be assessed through weekly quizzes, assignments, discussion board posts and examinations. All quizzes, assignments and discussion posts are designed to serve as a review of key material and focus your study for the larger examinations.

Grading: Below is the breakdown for how the different course components are weighted. Beneath the tables are explanations about each component.

MCB 5505	
Quizzes	7.6%
Exams (x3, 18.13% each)	54.4%
Class assignment #1	9.1%
Class assignment #2	6.3%
Class assignment #3	6.3%
Discussion posts (x2, 2.7% each)	5.4%
Graduate assignments (x3, 3.63% each)	10.9%

Grading scale: The cutoffs for letter grades are as follows:

	Percentage		Percentage
A	93.0 – 100.0	C	72.0 – 75.99%
A-	89.0 – 92.99	C-	69.0 – 71.99
B+	86.0 – 88.99	D+	66.0 – 68.99
B	82.0 – 85.99	D	62.0 – 65.99
B-	79.0 – 81.99	D-	59.0 – 61.99
C+	76.0 – 78.99	E	58.99 and below

**Grade rounding will be done as outlined above.
**Canvas does not always calculate grades correctly. It is recommended that you calculate your own percentage to be sure you know your accurate grade.

Quizzes: There will be a short quiz assigned each week, with 10 days given to complete them. Any quizzes submitted after the posted due date will have points deducted from the final score for being late. Quizzes are due by 11:59pm EST of the assigned due date and the quizzes must be completed by that time. Please allow adequate time to take the quiz before 11:59 pm EST. Be aware that if a quiz is started before 11:59pm EST but not completed until after that time, it WILL be marked late. For each day the quiz is late, 10% will be deducted from the total score.

Quizzes are open book and open note and should be viewed as an opportunity to review the material and focus your study for the larger examinations. Quiz questions will not be used on the exams, but the same material will be covered.

Syllabus Quiz: Important information about the course is found in the syllabus and it is required that each student read the syllabus to find answers to commonly asked questions and information about various aspects of the class. Therefore, a **mandatory syllabus quiz** must be taken and passed with an 80% before access to the first module will be granted.

Examinations: There will be three mandatory exams in this course. There will also be a cumulative final given during exam week. The final is optional and the score from the final may be used to replace a lower grade from one of the previous exams. If all four exams are taken by the student, the highest three scores will be used to calculate the final grade. Therefore, if you do poorly on an exam during the semester, you can improve your grade by doing better on the final exam. Exams will be open for a 72-hour window and must be taken within that time period. Make-up of missed exams will follow UF policy. Further information regarding make-up exams, assignments and other work can be found at: https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx.

Exam Policy: All exams are proctored online by Honorlock. Instructions for scheduling your proctored exam may be found on the homepage of the course and are also provided on the Canvas Orientation Modules.

Assignments: At the beginning of the semester each student will choose one virus that they will use to complete specific assignments over the course of the semester. It is suggested that students pick well characterized or heavily studied viruses as this will make the task of finding information about them significantly easier. All assignments are individual projects used to expand your knowledge base of a particular virus. Completed assignments will be uploaded as documents to Canvas. These are NOT group assignments and students are expected to write their reports individually. The Turn-It-In feature on Canvas automatically compares all assignment submissions and checks for plagiarism of both published material and submitted assignments. Plagiarism of outside material or other students is not tolerated.

Graduate writing assignments: Throughout the semester, honors and graduate students will be assigned peer-reviewed papers to read and analyze. There are provided guidelines for how analysis of the papers should be completed. During the semester, students will submit 1-2 page reports on the topics covered. These reports will be submitted through Canvas.

Discussion Board Posts: All students are expected to participate in their group's discussion board assignments. Posts are graded on a pass/fail basis and should be a minimum of 5 sentences. A 5-10 sentence response is typical. Each student must post in the discussion before they will be allowed to see responses from other students. "Ghost posts" (i.e. posting one word or a period so other student responses can be viewed) will receive an automatic failing grade. Specifics about the parameters for responses will be provided with each assignment prior to opening the post.

Student Groups: Depending on the size of this course, the class will be divided into groups of approximately 10 students, with each group assigned to a specific TA. The purpose of these groups is to aid in timely answering of questions regarding assignments and course content. For questions regarding the course material, please contact your TA for clarification or explanation. If you question cannot be answered, then the TA will forward it to the instructor. TAs can also clarify due dates or assignment descriptions. TAs can NOT grant deadline extensions or alter grades. These requests must be placed to the instructor directly.

In addition, student groups will also be used for Discussion Post assignments. Keep in mind that these are NOT group assignments, but rather a way of better facilitating discussion through smaller groups. These groups will remain the same throughout the semester.

Readings: Each week "required" and "suggested" or "optional" portions of the textbook will be assigned. Required readings will be portions of the textbook that are important for you to know, but are not thoroughly covered in lectures. Exam questions will be taken from these sections. Suggested readings will reiterate what is covered in lectures and are provided to help further your understanding of the material covered.

Extra Credit Assignments: There will be no extra credit assignments given in this course.

Due Dates: All assignments are due by 11:59 pm EST on the specified due date. Any assignment submitted after 11:59 pm EST on the due date will be marked as late, even if the assignment was started (e.g. a quiz) prior to the final submission time. Canvas documents submission times based on the time zone in which the University resides and time stamps assignment submission accordingly. Therefore, students who reside outside EST will need to ensure their assignments are submitted by 11:59 pm EST and **NOT** their local time. **For each day an assignment or quiz is late, 10% will be deducted from the total score**.

Library access: The university library has access to most medical and scientific journals as well as a variety of virology and microbiology textbooks in electronic format. UF students can access these resources through the UF UF libraries website: http://library.health.ufl.edu. However, the student must be on the UF network (on campus or through the UF VPN remotely) to do this. Instructions for accessing the UF VPN will be provided on the course canvas page.

Week - Date	Topic	Assignments
Week 1 August 22	Virology basics: • What are viruses • History of virus discovery • Virus classification • Overview of replication	Syllabus and intro quiz – course content will not unlock unless this is taken and passed with a score of at least 80% Week 1 Quiz assigned
Week 2 August 29	Viral replication: • Overview of the Baltimore Scheme • General strategies of genome replication • Infection cycles • Mechanisms of evolution	Week 1 Quiz **due** Week 2 Quiz assigned Class assignment #1: Virus species write-up assigned
Week 3 September 5	Mechanisms of attachment and entry: • Binding to host receptors • Mechanism of direct genome entry • Mechanism of receptor-mediated endocytosis • Mechanism of membrane fusion	Week 2 Quiz **due** Week 3 Quiz assigned Graduate assignment #1 assigned

Week 4
September 12
	ss(+)RNA viruses:
	• Infection cycle and replication strategies of picorna- and alphaviruses
	• Epidemiology and disease of:
	  ○ Norovirus
	  ○ Zika
	  ○ Coronavirus
	  ○ Dengue
		Week 3 Quiz **due**
		
		Week 4 Quiz assigned
		Discussion board #1 assigned

Week 5 September 19	Group VI reverse transcribing ssRNA viruses and integration: • Infection cycle and replication strategies of HIV and lentiviruses • Epidemiology and disease of HIV • Endogenous retroviruses	Week 4 Quiz **due** Week 5 Quiz assigned Graduate assignment #2 assigned Exam 1 Review Session

Week 6
September 26
	ss(-)RNA viruses:
	• Infection cycle and replication strategies of vesicular stomatitis virus and influenza
	• Epidemiology and disease of:
	  ○ Influenza
	  ○ Rabies
	  ○ Mumps
	  ○ Ebola
		EXAM #1 WINDOW: SEP 29 – OCT 1
		
		Week 5 Quiz **due**
		Graduate assignment #1 **due**
		
		Week 6 Quiz assigned
		Class assignment #2: A Tale of Two Pandemics assigned

Week 7
October 3
	dsRNA and ssDNA viruses:
	• Infection cycle and replication strategies of reo-, circo-, and parvoviruses
	• Epidemiology and disease of:
	  ○ Rotavirus
	  ○ Fifth disease
		Week 6 Quiz **due**
		Graduate assignment #2 **due**
		
		Week 7 Quiz assigned

Week 8
October 10
	Group VII reverse transcribing dsDNA viruses
	• Infection cycle and replication strategies of hepadna- and caulimoviruses
	• Epidemiology and disease of:
	  ○ Hepatitis C virus
	  ○ Cauliflower mosaic virus
		Week 7 Quiz **due**
		Class assignment #2: A Tale of Two Pandemics **due**
		
		Week 8 Quiz assigned
		Graduate assignment #3 assigned

Week 9
October 17
	dsDNA viruses:
	• Infection cycle and replication of pox, herpes, adenovirus, and tailed bacteriophage
	• Epidemiology and disease of:
	  ○ Poxviruses
	  ○ Herpesviruses
	  ○ Adenovirus
		Week 8 Quiz **due**
		
		Week 9 Quiz assigned
		
		Exam 2 Review Session

Week 10 October 24	Oncogenic viruses and tumor virology • Overview of cancer and tumors • Infection cycle and replication of oncogenic viruses • Mechanisms of transformation and characteristics of cancer cells	**EXAM #2 WINDOW: OCT 27 – OCT 29** Week 9 Quiz **due** Graduate assignment #3 **due** Week 10 Quiz assigned

Week 11
October 31
	Vaccines and antivirals
	• Overview of vaccines and vaccine types
	• Specific vaccines for:
	  ○ MMR
	  ○ Influenza
	  ○ HPV
	  ○ SARS-CoV-2
	• Research and development of antivirals
	• Specific antivirals for:
	  ○ Influenza
	  ○ Herpes
	  ○ HIV
	  ○ SARS-CoV-2
		Week 10 Quiz **due**
		
		Week 11 Quiz assigned
		Class assignment #3 assigned

Week 12
November 7
	Virus therapy and oncolytic viruses
	• Overview of viruses used for:
	  ○ gene therapy
	  ○ phage therapy
	  ○ viral vectors
	  ○ oncolytic therapy
	• Mechanisms of treatment
	• Current areas of research and future directions
		Week 11 Quiz **due**
		Class assignment #1: Virus Species Write-up **due**
		
		Week 12 Quiz assigned
		Discussion post #2 assigned

Week 13 November 14	Viruses of microbes • Bacterial viruses • Giant viruses • Archaeal viruses • Extremophile viruses	Week 12 Quiz **due** Week 13 Quiz assigned

Week 14 November 21	Bacteriophages and the virome • Ecology and horizontal gene transfer mediated by dsDNA phages • Auxiliary metabolic genes • Effect of phages on biogeochemical nutrient cycling • ssDNA viruses in the microbiome and implications for human health	Week 13 Quiz **due** Discussion post #2 **due** Week 14 Quiz <u>assigned</u> Exam 3 review session
Week 15 November 28	Make-up week Exam 3	**EXAM #3 WINDOW: DEC 1 – DEC 3** Week 14 Quiz **due**
Exam Week December 12	Final exam - optional	**FINAL EXAM WINDOW: TBA**