

Virology BIMM114

Winter 2024

Version 1 - Updated: 1/3/2024

Course Summary:

Viruses are responsible for numerous human illnesses and millions of deaths annually. Some of the most feared, widespread and devastating human diseases such as smallpox, influenza, dengue fever, measles and AIDS (Acquired immunodeficiency syndrome) are caused by viruses. More recently, viruses cause a number of new emerging diseases, including COVID-19, Ebola hemorrhagic fever and Zika virus infection. In addition, viruses infect animals, plants and insects of importance to humans, where they can have tremendous consequences for the world economy and environment. During this quarter, we will explore the complex biology of viruses, their life cycle and pathogenesis, how they evade the immune system and how they often disable or kill their host. We will cover the history of virology, general principles of viral infections, and specifics of viral families with emphasis on individual viruses that have changed human history, are currently major health burden and/or represent a serious threat for mankind.

Date/Time/Location: Tuesdays and Thursdays 2:00-3:20pm, York Hall, Room 2622

Instructor:

Matt Daugherty

Email: MDDaugherty@UCSD.edu (Please put BIMM114 in the subject line so I see your email)

Office hours: Tuesday 4:00pm-5:00pm, Pacific Hall 3501.

Prerequisites: BIMM100 (Molecular Biology), and its prerequisites.

Course website: Available on Canvas

Textbook:

The **required** textbook is *Fundamentals of Molecular Virology*, 2nd edition by Nicholas Acheson. Mandatory reading assignments, indicated on the schedule, are associated with every lecture. The reading assignments should be completed before the corresponding lecture. This will significantly contribute to your understanding of the lecture, even if you did not understand all the material the first time you read it. Do not be discouraged. It is normal for new understandings to develop over multiple exposures to any novel material. Research in psychology has shown that students who read before coming to lectures gain far more from the lecture than those who do not. Further reading material from outside sources will be posted on the Canvas website and announced in class.

Your digital course materials are provided by the UC San Diego Bookstore through Canvas and are free for the first two weeks of classes. After two weeks, your student account will be charged a special reduced price unless you opt out.

For any questions about billing please contact textbooks@ucsd.edu.

For any questions about using your eBook please reference [RedShelf Solve](#).

Lectures:

Lectures will provide information not contained in the reading and are important to get a perspective on the most important aspects of each topic that will be evaluated in the exams. Please note that the indicated schedule and readings may be modified somewhat during the quarter, and any changes will be announced in lecture. Lecture slides will be posted to the class website either before class or immediately afterwards. However, these notes are not intended to replace lecture, as there will likely be material presented in class that does not appear in the lecture slides. All lectures will be recorded and posted to Canvas as soon after the lecture as they become available. You will be responsible for information provided in lecture in addition to the material assigned in the text.

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In person and remote components:

Lectures and review sessions will be in person unless otherwise noted. Discussion sections will be remote (see below). Because this is a lecture class, minimizing distractions is important. Please have respect for your classmates and the instructor by silencing electronic devices, not talking, and minimizing other distracting activities in class. Lectures will be recorded and posted on Canvas the same day as the lecture.

We have fewer discussion sections this year. Because of that, every fourth class (see classes with asterisks next to the class number on the schedule below), I will ask you to watch a recorded lecture and we will spend class time going over questions and also discussing primary virology literature.

Three quizzes will be given on Canvas asynchronously at the end of week 2 (1/19), week 5 (2/9), and week 9 (3/8). Quizzes will be posted Friday evening and are due by Sunday at 11:59pm. A missed quiz will result in a zero.

Unless something drastic happens, the two midterm exams will be given in class in person on the dates listed below. Likewise, the final exam will be given in class in person as designated in the schedule of classes. A missed exam for which there is no documented extenuating circumstance will result in a zero.

Dr. Daugherty's office hours:

Tuesday 4:00pm-5:00pm, Pacific Hall 3501. I would be happy to talk with you about the class, virology in general, science and your studies. I will not have office hours the first week of class.

Email communication:

Please put BIMM114 in the subject and remember to include your first and last name in the body of the email. I will not respond to any questions regarding the content of the exams by email or answer lengthy questions on course material, or schedule a meeting with you or anything else that can be done in person before/after class or during office hours. I will address questions about the course material during office hours.

Instructional assistants:

This year's IA for this class will be:

IA	Email	Office hours	Location
Songlin Wu	sowu@ucsd.edu	Fridays, 1-2pm	Hammocks outside Bonner Hall

Note that there will be **no office hours for the first week of class**.

Discussion sections:

Discussion sections are a valuable part of this course and serve to clarify, emphasize and expand points that have been introduced in lecture. Songlin will craft each meeting to include opportunities for review, discussion, and expansion on particularly timely topics. They will occur each Wednesday from 11-11:50am. Zoom information for the discussion sections is found on Zoom link in Canvas.

Films:

There will be two films that will be required viewing in this course that need to be viewed on your own time. Links to these are posted in a "films/podcasts" folder on Canvas and say "required" next to them. There are also links to some additional films/podcasts provided purely for your own interest, but not required. Films will be available online, streaming from library reserves or directly from the producer's web site. When accessing films through UCSD library reserves, you *must* access the films from within the UCSD protected network, or use a VPN if you are off campus.

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Review sessions:

We will hold review sessions before exams. I will not prepare anything special for these, they are simply an opportunity for you to ask any remaining questions you have before the exam that you have not had answered in discussion section or office hours.

1st midterm review: Monday January 29, time and location TBD.

2nd midterm review: Wednesday February 21, time and location TBD.

Final exam review: Wednesday March 20, time and location TBD.

Quizzes, exams and grading:

Your performance in the course will be evaluated by three quizzes, two in-class midterm exams and the final exam.

Quizzes will be a mixture of multiple choice, true/false, and possibly some fill in the blank questions. They will be available through Canvas for a >48 hour time period, but you will only have 30 minutes to complete the quiz once you've started it. Quizzes will be open book and open note, and be a mixture of multiple choice, true/false, and fill in the blank questions. However, you may not consult other students or the internet (outside of your online textbook or material on the course website).

Midterms will be given during class time (see class schedule) and the final exam will be given during the regularly scheduled final exam time (see class schedule). These exams will be closed book and closed note and you obviously can not consult the internet or other students. The exams will be a combination of multiple choice, true/false, fill in the blank, and short answer questions.

There are no scheduled make-up quizzes or exams. Failure to take the quiz/exam will result in a zero. Extraordinary circumstances preventing you from taking an exam must be discussed >24 hours in advance with the Student Affairs Office (vcsa@ucsd.edu) and Professor Daugherty. If exceptions are made for these special circumstances, the make-up may be an ORAL or ESSAY exam given by Professor Daugherty.

Quizzes: Quizzes will be given at the end of weeks 2, 5, and 9. Quizzes will be posted on Canvas by Friday evening and need to be completed by Sunday at 11:59pm. You will have 30 min to complete the quiz once you begin it. Each quiz will be worth 3% of your grade. Everyone who completes all three quizzes will have 1% automatically added to their grade.

Midterm I: Given during class time on January 30. Worth 25% of your grade. Will cover all lecture and reading material assigned for lectures 1-6.

Midterm II: Given during class time on February 22. Worth 25% of your grade. Will predominantly cover lecture and reading material assigned for lectures 8-13, but materials from lectures 1-6 will need to be remembered for this exam.

Final: Given on **March 21 3:00pm – 6:00pm**. Location TBD. Worth 40% of your grade. Covering all lecture and reading material assigned the entire class with emphasis on material and reading assigned for lectures 15-20.

Extra credit: You will be able to earn up to 3% extra credit on your final grade by completing either of the extra credit assignments described below before the last day of class. Extra credit will be assigned as determined by Dr. Daugherty.

Option #1: Viruses In The News! To encourage you to apply your newfound virology knowledge to things you read/hear in the news, please identify an article from a credible popular news source about emerging viruses other than SARS-CoV-2 and email me a brief (1000-2000 words)

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summary of the article, **its relevance to the course**, and why you found it interesting or newsworthy. **Please do not use any AI tools to write this.** Please include either the link to the article or the full article in your summary, and email this to me as a PDF including 'BIMM 114 – Viruses in the News' in the subject line of the email. The article should be from sometime in 2023 or 2024. Please do not use primary scientific literature (see below) as I want stories that have been published in the popular press. Examples of credible popular news sources include (but are certainly not limited to): NPR, NY Times, National Geographic, and BBC, but does not include People magazine or some random thing you heard someone say on Twitter/X.

Option #2: This Article Is Not Yet Peer-Reviewed! An exciting trend in science right now is the rise of “pre-print” servers in which articles are released to the public but have not yet been peer-reviewed. This can be a fantastic way to get results out quickly (which was essential for the COVID-19 pandemic), but also results in results being released that may not be completely scientifically sound (which has been a problem during the COVID-19 pandemic). To encourage you to apply your newfound virology knowledge to the scientific literature, please identify an unpublished virology article from a pre-print server (either bioRxiv.org or medRxiv.org) and email me a brief (1000-2000 words) critique of the article, focusing on its importance, strengths, and weaknesses and **relevance to the class**. **Please do not use any AI tools to write this.** Please include either the link to the article or the full article in your summary, and email this to me as a PDF including 'BIMM 114 – This Article Is Not Yet Peer-Reviewed' in the subject line of the email. The article should be from sometime in 2023 or 2024 and should not be published in a peer-reviewed journal.

Grading policy:

For each exam, grading is normalized to the highest score in the class. No quizzes or exams will be 'dropped', so every one of them will count toward your final grade. For final grades, 60-70% will be a D, 70-80% will be a C, 80-90% will be a B and 90-100% will be an A. You are not competing with your fellow students ... it is you against the material. There is no shortage of high grades for those who do well. It is my hope that everyone will study hard enough to demonstrate sufficient knowledge of Virology to earn an A or B. If you have concern about your grade or performance on an exam you must address this with me within one week of the exam, no exceptions. **DO WORK THAT YOU WILL BE PROUD OF AND STAND BY YOUR PERFORMANCE.**

Regrading policy:

To submit a request for a regrade, you must:

1. Write an email specifying which specific problem should be looked at and fully describe why you think the problem was wrongly graded. I will consider no more than three “potential” errors per exam.
2. The regrade request must be delivered within one week after the graded exams are returned. If you submit an exam for a regrade, I may choose to regrade the entire exam. If I think the grading was too generous, for the sake of accuracy I reserve the right to *lower* your score.

Academic integrity:

Work on quizzes and exams must be solely your own. For quizzes given on Canvas, you may consult your textbook and your class notes but no other sources and you may not discuss with any other student. For midterms and the final exam, you can not consult any course material during the exam (i.e. they will be closed note and closed book). Cheating will not be tolerated and will result in an F in the course, as well as any additional disciplinary actions as indicated by the policy to maintain

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academic honesty. Please note, letting someone cheat off of your exam is cheating!

Please review UCSD's Policy on Academic Integrity:

<https://senate.ucsd.edu/Operating-Procedures/Senate-Manual/Appendices/2>

Additional student resources and policies on discrimination and harassment:

Please see document titled "Student Resources for BIMM 114" in "Syllabus" folder on Canvas.

How can I succeed in BIMM 114?

1. **Read** the assigned pages before lecture. You will understand the lectures better. The lecture will be based upon the reading, but there will not be enough time to cover every detail in class. Nevertheless, you are accountable for all reading on the exams. If you bump into material that is too technically challenging, *don't get bogged down*. Skip it (temporarily). Return to the most difficult material later.
2. **Outline** the important points as you read on index cards or a notebook. This will help you remember the flow of information and contextualize the details.
3. **Come** to class and participate in discussion.
4. **Rewatch** lectures.
5. **Review** your notes and the lecture slides. Slides will NOT contain the instructor's notes. They will contain announcements, illustrations, diagrams, and photos which augment the lecture. They will be posted after each lecture. You are accountable for everything in the lecture slides.
6. **Study in groups**. You are encouraged to study with other students in the course. However, work on exams must be solely your own. See "Academic Integrity" statement above.
7. **Go** to your discussion section and office hours. There will be opportunities to review the material and ask questions.
8. **Engage** with the material. If you are curious and invested in learning about virology, you have a much higher chance of absorbing and retaining the material and getting a good grade.
9. **Take quizzes seriously**. Though short, these will give you a sense for the types of questions that will be on exams.
10. **Prepare for exams**. Unlike quizzes, midterm and final exams will be closed book and closed note. Please prepare for these exams with this in mind.

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Class schedule:

Date	Class	Topic	Relevant reading
Jan 9	1	Introduction, history & methods	pg. 2-11, 312-313
Jan 11	2	Structure and classification	pg. 11-40
Jan 16	3	Replication cycle	pg. 11-17 and Chapter 4
Jan 18	4*	Replication cycle/Host defense	Chapters 4 & 33, outside reading**
Jan 23	5	Host defense	Chapter 34
Jan 25	6	Evolution and emerging viruses	pg. 40-44, outside reading**
Jan 30	7	Midterm I, in class	
Feb 1	8*	+ssRNA: <i>Picornaviridae</i>	Chapter 11, outside reading**
Feb 6	9	+ssRNA: <i>Flavi-</i> and <i>Togaviridae</i>	Chapters 12 & 13
Feb 8	10	Guest lecture on viral pathogenesis	Outside reading**
Feb 13	11	+ssRNA: <i>Coronaviridae</i> and SARS-CoV-2	Chapter 14
Feb 15	12*	-ssRNA: <i>Paramyxo-</i> and <i>Filoviridae</i>	Chapters 15 & 16, outside reading**
Feb 20	13	Segmented RNA viruses: <i>Orthomyxo</i> , <i>Bunya-</i> and <i>Reoviridae</i>	Chapters 18 & 19
Feb 22	14	Midterm II, in class	
Feb 27	15	dsDNA: <i>Polyoma-</i> , <i>Papilloma-</i> and <i>Adenoviridae</i>	Chapters 21, 22 & 23
Feb 29	16*	Large dsDNA: <i>Herpes-</i> and <i>poxviridae</i>	Chapters 24 & 26, outside reading**
Mar 5	17	RT utilizing: Hepadna- and retroviridae	Chapters 30 & 28
Mar 7	18	Retroviridae and HIV	Chapters 28 & 29
Mar 12	19	Vaccines/antiviral drugs	Chapters 35 & 36
Mar 14	20*	Endogenous elements and review	Outside reading**
Mar 21		Final Exam, 3pm - 6pm	

* - please watch prerecorded lecture on your own time. In class time will be for discussion.

** - outside reading will be posted on Canvas and labeled by class # and date.

Please note the dates of the midterms and final. There will be no make-up exams possible.

Note that lecture material may be presented outside of the days described above.