

PURDUE UNIVERSITY® FORT WAYNE

Department of Biology

Principles of Virology

BIOL 54400

SUMMER-I 2022 - 5/15/22-6/24/22

Format: Online asynchronous

Credits

Lecture: 3

Lectures: Mon/ Tue/ Thu 10:00 AM – 12:20 PM & ONLINE

Instructor: Dr. Jaiyanth Daniel

Preferred Pronouns: He/ him/ his

Office: SB 380

Phone: 481-5703

Email: danielj@pfw.edu

Office Hours: WebEx; By appointment

[Dr. Daniel's Webpage \(Click here\)](#)

Course Description

This is an intensive course focused on the molecular biology of viruses. Students will learn about the genetic and molecular structure of viruses, their replication and modes of infection. Viral RNA, DNA and protein synthesis will be discussed in detail. Intracellular trafficking, assembly and exit of viral particles will be studied. HIV pathogenesis and oncogenesis by viruses will get special emphasis along with vaccines and antiviral drugs. Molecular biological insights gained by study of viruses will be discussed in detail.

Prerequisites and Required Materials

- **BIOL 21800 Genetics and Molecular Biology**
- **iClicker2 for classroom quiz participation**

Course Access

Students should come prepared to class ready to fill in the notes and add important points throughout the lecture. Class participation is expected and will be assessed throughout the semester. This is an upper-level course meant for seniors and graduate students. Therefore, all students are expected to demonstrate/ learn advanced skills in understanding and evaluating information related to molecular biology.

Brightspace:

Information pertaining to this class will be listed on the course Brightspace site. **Partial lecture notes will be posted on Brightspace. Lecture recordings will be available on Brightspace.**

Course Goals

1. Introduce students to viruses and scientific methods used to study them.
2. Teach students about the structure and classification of viruses.
3. Instruct students about viral infection mechanisms.
4. Explain the processes used by viruses in the infection process.
5. Educate the learners about the molecular mechanisms used by the various classes of viruses.
6. Teach students about various diseases caused by viruses.
7. Explain the molecular connections between viruses and cancer.
8. Instruct students about vaccines and antiviral therapies.

Learning Objectives

When you complete this course, you will be able to:

1. Define a virus and describe the structure of viruses.
2. Outline the molecular basis of viral classification.
3. Explain the mechanisms of viral attachment and entry into host cells.
4. Describe the processes used by viruses in replicating their genomes.
5. Explain how viruses control protein synthesis and intracellular trafficking inside cells.
6. Describe AIDS, cancer, coronavirus disease from the viral perspective.
7. Outline the vaccines and antiviral therapies currently available.

Learning Resources & Texts

Required Textbook:

Introduction to Modern Virology, 7th Edition

Nigel J. Dimmock, Andrew J. Easton, Keith N. Leppard

ISBN: 978-1-119-97810-7

Supplementary Reading Material:

Recommended (Not Required) Textbook:

Principles of Virology, Third Edition (2008) Volumes I and II.

S. J. Flint, L.W. Enquist, V. R. Racaniello, A. M. Skalka

Print ISBN: 9781555814434

iClicker2 for classroom quiz participation.

Supplementing the textbook, Power Point slides and scientific articles will be used.

These materials are subjects for test questions.

Course Logistics

Classroom Policies: Lecture recordings will be posted on Brightspace by the end of day after each lecture. You will need to check the course web page in Brightspace on each lecture day and **utilize the notifications setting in Brightspace to stay up to date.**

Class Participation: Your participation in class will be assessed by your iClicker responses to questions in lecture. You can turn in your responses along with your Study Guide answers on the day of exam for that module. Group discussion will be encouraged during specified times in class. If you maintain more than 95% participation in lecture classes, you will be eligible for a 10 point bonus on your total points (after the final lecture). Your participation will critically affect your performance in this course. If you miss a class, it is your responsibility to find out what was taught in the previous class.

Emails: I encourage the use of email to contact me but please consider email etiquette. Use my email address at the top of this syllabus. Please write course name in email subject line. I will usually reply within 24 hours.

Assessments:

- **Exams:** The exams will be online on Brightspace and will be administered under proctoring. There will be multiple-choice, short answer questions and an essay question requiring a more detailed answer, all of which will cover the material from lecture and the assigned reading material used in the Study Guides. Any material from lecture and assigned scientific literature could appear on the exams, even if it is not included in your pre-printed notes- what this means is that the exam material is not restricted to the written lecture notes but will also encompass the verbal lecture that accompanies each set of notes.
- ❖ **Assignment: Topics, detailed instructions and sign-up sheet will be given in class after Exam-2.**
- **Undergraduate Students:** There will be one assignment with two components - a 10-minute slide presentation and a term paper based on an assigned research review article that will enhance your understanding of the subject material. You will also need to submit a 3-4 page written Term Paper using appropriate citations of scientific references on the day of your presentation (Detailed instructions will be provided after Exam-2).
- **Graduate Students:** A research paper will be selected by the student with the instructor's guidance which will be the basis for critical analysis in the presentation and the term paper. The assignment will involve a formal slide presentation (15 min) by you of a recent research paper that *analyzes your assigned topic*. You will select a research paper published in one of the journals listed under "Assignments". You will need to get the instructor's approval of your selected paper in advance of your presentation. You will also need to submit a 4-6 page written Term Paper using appropriate citations of scientific references on the day of your presentation (Detailed instructions will be provided after Exam-2).
- **Homework:** There will be four homework tasks- one for each exam module. This will involve students turning in handwritten responses to Study Guide questions in short-answer format using the reading material and lecture slides on the day of exam for each module. **Use figures/ diagrams along with your handwritten responses**, when appropriate/ possible. **DO NOT SUBMIT ELECTRONICALLY WORD-PROCESSED RESPONSES. Submit scanned hard copy: Scan your handwritten homework assignment** (use any free phone app for scanning), proof-read and ensure that your scanned document is properly aligned and formatted for readability on screen **and submit as one PDF document on Brightspace. (NOTE: Online Students- Add your Clicker question responses to the Study Guide and upload as one PDF).**

DUE DATE – on the day of each exam.

GRADING:

- Exams (4 exams, 50 points each) : 200 points
- Assignments
 - Oral presentation on assigned topic : 50 points
 - Term paper on assigned topic : 50 points
- Homework (4 Tasks; 25 points each) : 100 points
- Participation (BONUS) : (10 points)

Total = 400 points

Grading Scale

A: 90-100 %; **B+**: 85-89 %; **B** : 80-84 %; **C+**: 75-79 %; **C** : 70-74 %; **D+**: 65-69 %; **D** : 60-64 %
F : 0-59 %

- Make-Up Exams: **Exams will not be given before the scheduled exam date.** You must make every effort to be in attendance for all exams. Make-up exams may be given at the discretion of the instructor for extreme circumstances and students must notify the instructor prior to the exam via email. **There will be no make-up exam for the final exam. Make-ups must be scheduled within 1 week of the original exam and students must be on time for the scheduled make-up exam, otherwise no credit will be given.** If the university cancels class on the day of an exam the exam will take place on the next regularly scheduled class period.

Virtual Office Hours

I will be available (by appointment) through WebEx for discussing any questions you might have regarding the course content in lectures, study guides and assignments. Please email me to fix an appointment.

[Dr. Jaiyanth Daniel's WebEx Meeting Room](https://purdue.webex.com/join/daniel58)

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Course Evaluation

During the last two weeks of the course, you will be provided with an opportunity to evaluate this course and your instructor. You will receive an invitation to complete an anonymous evaluation from the Department of Biology, Purdue University Fort Wayne. Your participation is an integral part of this course, and your feedback is vital to improving education at Purdue University. I strongly urge you to participate in the evaluation system.

How to Succeed in this Course

Tools for Success

- Prepare for each class by reading the PRE-LECTURE READING ASSIGNMENT.
- Review the lecture recordings posted in the Content section of the course in Brightspace.
- After each lecture, complete the relevant part of the Study Guide *by hand*, reviewing your previous lecture notes and textbook chapter being taught.
- Come to each lecture with your questions from previous lecture/ your reading/ study guide for DISCUSSION TIME.
- Keep up with lectures by going over each lecture at home and making your own notes.
- Studying only on the night before the exam is unlikely to help you achieve a good grade.

- FORM STUDY GROUPS.
- Feel free to meet me over WebEx or email me for additional assistance.

PRE-LECTURE READING ASSIGNMENTS

The lecture schedule below indicates the sections of the textbook you are required to read PRIOR to each lecture.

Course Schedule

Tentative Lecture Schedule- *Subject to change*

Lecture recordings will be made available on Brightspace at the end of day for each lecture.

	<u>Topic(s)</u>	<u>Textbook Chapter/ Source Material</u>
1	Towards a definition of a virus	1
2	The structure of virus particles	2
3	Classification of viruses	3
4	Techniques for studying viruses	5
5	Overview of viral infection mechanisms - I	15, 18, 19
6	Overview of viral infection mechanisms - II	13, 14
	REVISION FOR EXAM -1	
	EXAM – 1: Tue, May 24	
7	Viral Attachment and Entry	6
8	Replication of Viral DNA	7
9	Genome replication in RNA viruses	8
10	Reverse-transcribing Viruses	9
11	Gene expression in DNA viruses	10
	REVISION FOR EXAM - 2	
	EXAM – 2: Mon, June 6	
12	Gene regulation and expression in RNA viruses	11
	SPRING BREAK	
13	Protein Synthesis & Intracellular Trafficking	10-12
14	Viral assembly, maturation and exit from cells	12
15	HIV and AIDS	21
16	Vector-borne Infections - Dengue	23
	REVISION FOR EXAM - 3	
	EXAM – 3: Tue, June 14	
17	Exotic and Emerging Viral Infections: Coronavirus	24
18	Carcinogenesis and tumor viruses	25
19	Vaccines	26
20	Antiviral Therapy	27
	REVISION for EXAM - 4	
	EXAM-4: Thu, June 23	
	ASSIGNMENTS – SUBMIT ON BRIGHTSPACE	

Important Dates

Please consult the Purdue University Fort Wayne [academic calendar](#) for the Last Day to Request to Withdraw from Course. I will appreciate you consulting me prior to withdrawing.

Academic Dishonesty

Cheating, including but not limited to copying another student's work, will not be tolerated. Any offense will result in failing the entire course and will be reported to the student's major department Chair and Dean of their school per the Student Handbook.

Diversity and Nondiscrimination:

Purdue Fort Wayne prohibits discrimination against any member of the university community on the basis of race, religion, color, sex, age, national origin or ancestry, genetic information, marital status, parental status, sexual orientation, gender identity and expression, disability, or status as a veteran..."

Disability Statement

- **Students with Disabilities:** Special arrangements can be made to accommodate most needs. Contact the Director of DISABILITY ACCESS CENTER (Walb Union, Room 113, telephone number 481-6657). For more information, please visit the website for SSD at <https://www.pfw.edu/ssd>

Student Support Services

Technical Support: Call the PFW helpdesk at 481-6030.

Purdue University Fort Wayne is committed to your academic and personal success. Visit the [student support services page](#) for a list of student support services, including academic services, technology services, health and wellness, and support from administrative offices.

Emergency Statement

In the event of a major campus emergency, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances. I will post updates as needed, on Course Announcements in Brightspace.