

## **BISC 499 Pandemics: The Biology of Infectious Agents and Public Health Studies of Outbreaks**

**4 units, Summer 2020**

**M-Tu-W-Th-F 10:00am – 12:30pm**

**Room: ONLINE**

**Instructor: Nancy Castro, Ph.D.**

**Office:** ONLINE

**Office Hours:** Monday & Wednesday 12:30 – 1:30pm

**Contact Info:** [ncastro@usc.edu](mailto:ncastro@usc.edu)

**Instructor: Michael Cousineau, Ph.D.**

**Office:** ONLINE

**Office Hours:**

**Contact Info:** [cousinea@usc.edu](mailto:cousinea@usc.edu)

### **Required Texts:**

No textbook required. Research articles discussed in lecture will be posted on Blackboard with advanced notice.

### **Course Description**

This course will focus on how infectious agents cause disease and affect populations. Course material will explore the biology behind these infectious agents as well as the impact they have had on societies, economies and history. The class will examine the COVID-19 (SARS-CoV-2, 2019 Novel Coronavirus) pandemic by comparing it to other pandemics. It will include ways societies manage pandemics, prevent future outbreaks, and how resources for mitigating and preventing are governed at the global, national and state levels. The biology of the infectious agents will include discussion on testing, therapeutics and vaccines. The course is intended for Natural Science and Health Science majors and will begin by briefly providing necessary background in microbiology and immunology. In the subsequent lectures, we will be discussing an infectious disease with information about the lifecycle of the pathogen, the immune response, vaccines and treatment, as well as epidemiological studies and the social and historical impact of specific diseases.

**Prerequisite(s):** no prerequisites

### **Learning Objectives**

- Students will identify the basics of microbiology and immunology of infectious agents that cause specific diseases.
- Students will evaluate basic human biology at the genetic, cellular and physiological levels.
- Students will compare modern biomedical scientific approaches to treating disease.
- Student will evaluate the basic components of public health and epidemiology related to infectious diseases.
- Students will identify the basic components of Public Health policies on mitigating and preventing outbreaks of infectious agents.

**Blackboard and Posting of Grades.** The course grades will be posted on Blackboard (<https://blackboard.usc.edu/>). Blackboard is convenient system to communicate grades; however, *those grades are not authoritative*. It is the student's responsibility to notify the professor ASAP in the event of any mistakes in your posted grade.

Please remember that (1) the course mean given on Blackboard is also NOT authoritative, and (2) that only the total number of points earned determines your course grade. We will be glad to discuss your performance, and your possible grades, at any time throughout the course. Help provided in this way should be considered only provisional. Your later performance may change (sometimes dramatically) the best- meant extrapolation.

### Email Communication:

To ensure privacy, only student's USC email accounts may be used for email communications. Students are responsible for understanding the content of email messages that the instructor sends to their USC accounts. Therefore, each student must check their USC email regularly and make sure their account is not over quota, so new messages can be received.

### Grading Breakdown

The course grade will be based upon **375 possible points**:

Assignment	Points	% of Grade
Midterm 1	100	27
Midterm 2	100	27
Research Paper	100	27
Article summaries	50 (5 pts x 10)	13
Group Project	25	6
<b>Total</b>	<b>375</b>	<b>100</b>

### Grading Scale

Course final grades will be determined using the following scale:

A	90.1 - 100
A-	86.7 - 90
B+	83.3 - 86.6
B	80 - 83.2
B-	76.7 - 79.9
C+	73.3 - 76.6
C	70 - 73.2
C-	66.7 - 69.9
D+	63.3 - 66.6
D	60 - 63.2
D-	56.7 - 59.9
F	≤56.6

**Exams.** There will be 2 Midterm exams during this course session. The exams will be administered online via Blackboard. The Lockdown Browser and Respondous Monitor programs will be used to monitor the exams. It is the responsibility of the student to download these programs and make sure there are no technical difficulties before taking the exams. The Midterms will consist of multiple choice, short answer, matching or fill-in-the-blank questions. The exams will NOT be open book nor open notes. A student is not allowed to start an exam after the first student has left the online exam room.

**Research Paper.** The research paper will be submitted electronically in Blackboard via Turnitin. A link will be available on Blackboard which will be used to upload the research paper. The research paper will be due by **Sunday, July 26 at 11:59pm.**

Each student will be required to write a research paper on any one of the following three topic options:

- 1) Option 1: A 3-5 page report, double-spaced, on one of the infectious diseases studied in this course. The research paper will focus on this specific infectious disease and the impact it had on society, medical field, technological progress, and human history. The objective of this assignment is to provide you a chance to express your thoughts in response to a controversial infectious disease topic in a more detailed format.
- 2) Option 2: A 3-5 page paper describing one aspect of the current COVID-19 pandemic and your ideas for responding, managing or preventing its negative health and social effects. This could include how the Pandemic is affecting certain populations (such as people experiencing homelessness, incarcerated, school children, those in nursing homes, other). This would involve studying current strategies for managing COVID-19 in these populations and recommendations for improvements.
- 3) Option 3: A 3-5 page paper on strategies for developing a drug delivery platform for antibodies, vaccines or anti-viral therapeutics for COVID-19. This research paper should discuss currently approved drug treatments for COVID-19 and the safety and efficacy in treating the disease with minimal side effects. The advantages and disadvantages for developing drug treatment options for COVID-19 should be discussed. This will include current strategies and ideas for developing, manufacturing and deploying these drug agents.

**Research Paper Grading Rubric (100 points):**

Content	Description	Points
<b>Background information</b>	Convey thorough information on subtopics that will be reviewed; clearly and concisely states the purpose	25
<b>Focus &amp; Content</b>	Paper written in a clear and focused manner; strong, rich supporting details and examples;	25

<b>Organization</b>	Strong Introduction and Conclusion; consistent and coherent logical progression; and use clear and skillful transitions.	30
<b>Spelling &amp; Grammar</b> <b>Correct Format</b>	Times New Roman 12 pt, double-spaced, 1-inch margins, numbered pages	10
<b>References (5 minimum)</b>	Use APA format to cite references	10
	<b>Total Points</b>	100

**Research article discussions and assignments.** Research articles will be posted on Blackboard with a minimum of 1-week before the class discussion takes place. Students will be expected to read the research articles and come to class prepared to discuss the assigned article. Students are expected to demonstrate effective communication skills through the discussion in class of pandemics and the effect on public health. A **1-page summary** outlining the focus of the article and the relevant findings will be assigned and should be uploaded onto Blackboard by 9 PM on the day the article discussion takes place as posted on the course schedule.

**In-class group projects.** These projects will require preparation prior to class and will involve in-class activity and the submission of a product or deliverable by 9 PM on the day of the in-class activity as posted on the course schedule. This in-class project assignment will be completed in groups of 2-3 students and each group member will submit a brief memo (further detailed instructions are located below in Lecture sessions 4 & 5 description). This assignment is worth 25 points.

### Grading Timeline

Grades for the Midterms will be posted within one calendar week following the exam date.

### *Resources for tracking the Covid 19 pandemic*

- Johns Hopkins University: <https://coronavirus.jhu.edu/>
- CDC: Situation Summary: <https://www.cdc.gov/coronavirus/2019-ncov/cases-updates/summary.html>
- WHO: [https://www.who.int/health-topics/coronavirus#tab=tab\\_3](https://www.who.int/health-topics/coronavirus#tab=tab_3)
- CDC standards and guidelines: <https://www.cdc.gov/coronavirus/2019-nCoV/hcp/index.html>
- Los Angeles County Public Health:
- <http://www.publichealth.lacounty.gov/media/Coronavirus/>

## Additional Policies

**Missed exams. Make-up exams will be allowed in the course.** In case a midterm exam must be missed for legitimate reasons, discuss the situation with the course instructor(s) prior to the exam, if possible. If an exam is missed for an emergency or for a valid health reason (written documentation must be provided), the make-up exam will be scheduled for a later date and time. The make-up exam will be worth the same points and will be administered in a similar format as the original exam.

**Please note:** The Student Health Center has changed their medical excuse policy. The Student Health Center will no longer provide: 1) class excuse notes for illness, 2) clinical appointments for class excuse, and 3) authentication of outside physician certificates. The Absence of Class - Self Verification Form provided by the Student Health Center is *insufficient documentation* for our purposes.

**Re-grades of exam questions.** Your midterm exams will be given online via Blackboard. If you feel an error was made in the grading of your exam, you must let your instructor(s) know why you think your answer deserves more credit, and submitted within 3 days of the time the exam answer key is posted.

## Course Schedule: Pandemics

Week	Lecture #	Date	Lecture Topic	Lecturer	Assignments
<b>1</b>	1	Wed, July 8	Part I - The COVID-19 pandemic and the basic components of Public Health	Cousineau/ Castro	
	2	Thurs, July 9	Introduction to Immunology	Castro	
	3	Fri, July 10	Introduction to Viruses and Bacteria	Castro	
<b>2</b>	4	Mon, Jul 13	COVID-19 pandemic: epidemiological 1	Cousineau	Read article and review class assignment A
	5	Tues, July 14	The COVID-19 pandemic Mitigation approaches	Cousineau	Class project A Due 9 PM July 14
	6	Wed, July 15	COVID-19, impact in the USA and in LA County	Cousineau	Article discussion

	7	Thurs, July 16	Global health (The role of the WHO)	Cousineau (Wipfli, invited)	
	8	Fri, July 17	Comparing COVID-19 with other pandemics	Cousineau	Article Discussion
<b>3</b>	9	Mon, July 20	Covid 19 Therapeutics and vaccines	Castro	Article Discussion
	10	Tues, July 21	The Black Plague	Castro	
	11	Wed, July 22	Small Pox & Polio virus	Castro	Article Discussion
		Thurs, July 23	<b>Exam 1 (Lectures 1-9)</b>		
	12	Fri, July 24	Cholera	Castro	Article Discussion
<b>4</b>	13	Mon, July 27	Spanish-1918 Flu	Castro	(American Experience documentary)
	14	Tues, July 28	HIV/AIDs	Castro	Article Discussion
	15	Wed, July 29	Ebola	Castro	Article Discussion
	16	Thurs, July 30	COVID-2 Impact on health care systems	Cousineau	Article discussion
	17	Fri, July 31	COVID-2 Impact on the economy	Cousineau	Article Discussion
<b>5</b>	18	Mon, Aug 3	Ethical issues	Cousineau	Article discussion
		Tues, Aug 4	<b>Exam 2 (Lectures 10-18)</b>		

**Articles for review/group projects:**

**Lecture session 2** - Read and review the following:

Nicholson, Lindsey. The Immue System. Essays in Biochemistry (2016) 60 275–301. DOI: 10.1042/EBC20160017

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5091071/pdf/bse0600275.pdf>

**Lecture session 3 – Read and review the following:**

Rouse, B., Sehrawat, S. Immunity and immunopathology to viruses: what decides the outcome? Nature Review. 2010. 10 514-526.

[https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3899649/pdf/41577\\_2010\\_Article\\_BFnri2802.pdf](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3899649/pdf/41577_2010_Article_BFnri2802.pdf)

**Lecture sessions 4 and 5 – In-class group projects:**

1. After session 4, review the IHME and/or other data bases and choose two states for comparative analysis. Include at least one large state, and one small rural or medium size state. Determine what approach those states are taking in response to the COVID 19 epidemic. Note the observed (actual) projected cases and mortality in relationship to the number of available hospital beds.
2. Assume the role of a committee of health advisors to the Governor of those 2 states about how to respond to COVID 19. Write a one-half page memo outlining your recommendations to the Governor for mitigating against the effects of the epidemic in his or her state. What evidence-based changes would you make and why?
3. Deliverable: Each group is to choose two states and submit 2 memos, one for each state. Submit on Blackboard by **9 PM on July 14**.

**In-class Group Project Grading Rubric (25 points)**

<b>Were two states chosen based on assignment, yes =5, no=0</b>
<b>Was there a clear and compelling statement of need, excellent =10, adequate = 5, poor = 0</b>
<b>Quality of the letters written to the Governors and rationale for the recommendations, excellent = 10, adequate = 5, poor = 0</b>
<b>Total : 25 points</b>

**Lecture session 5 - Read and review one of the following:**

**UNESCO Adverse consequences of school closure**

<https://en.unesco.org/covid19/educationresponse/consequences>

McMichael, T. M., Currie, D. W., Clark, S., et al. (2020). Epidemiology of Covid-19 in a Long-Term Care Facility in King County, Washington. N Engl J Med.

<https://www.nejm.org/doi/full/10.1056/NEJMoa2005412>

**Lecture session 6** - Read and review one of the following:

Ibram X. Kendi, "Why don't we know who the coronavirus victims are?" The Atlantic

<https://www.theatlantic.com/ideas/archive/2020/04/stop-looking-away-race-covid-19-victims/609250/>

COVID-19 and the Crisis: Vulnerabilities in Los Angeles

[https://dornsife.usc.edu/assets/sites/242/docs/COVID\\_04.pdf](https://dornsife.usc.edu/assets/sites/242/docs/COVID_04.pdf)

**Lecture session 8** - Read and review the following:

Joshua C. Morganstein, Carol S. Fullerton, Robert J. Ursano, Darrin Donato, and Harry C. Holloway. Pandemics: Health Care Emergencies. In Ursano, R. J., Fullerton, C. S., Weisæth, L., & Raphael, B. (2017). *Textbook of disaster psychiatry*. Cambridge, UK: Cambridge University Press.

<https://www.cambridge.org/core/books/textbook-of-disaster-psychiatry/pandemics-health-care-emergencies/478824C480288A8935798FBF151D96FA/core-reader>

**Lecture session 9** – Read and Review the following:

Callaway, E. The Race for Coronavirus Vaccine. *Nature Review*. 2020. 580 576 – 577.

<https://media.nature.com/original/magazine-assets/d41586-020-01221-y/d41586-020-01221-y.pdf>

**Lecture session 10** – Read and Review the following:

Kenawy, M., Hamid, Y., Ashry, H. A Brief Report on Bubonic Plague (The Black Death) and its Origin. *Scientific Exhalers*. 2018. 1 1-9.

[file:///Users/ncastro/Downloads/KenawyPlagueSEJDiseases%20\(1\).pdf](file:///Users/ncastro/Downloads/KenawyPlagueSEJDiseases%20(1).pdf)

**Lecture session 11** – Read and Review the following:

Mehndiratta, M., Mehndiratta, P., Pande, R. Poliomyelitis: Historical Facts, Epidemiology, and Current Challenges in Eradication. *The Neurohospitalist* 2014. Vol. 4(4) 223-229

[https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4212416/pdf/10.1177\\_1941874414533352.pdf](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4212416/pdf/10.1177_1941874414533352.pdf)

**Lecture session 12** – Read and Review the following:

Davies, H., Bowman, C., Luby, S. Cholera – management and prevention. *Journal of Infection*. 2017. 7 S66-S73.

[https://www.journalofinfection.com/article/S0163-4453\(17\)30194-9/pdf](https://www.journalofinfection.com/article/S0163-4453(17)30194-9/pdf)

**Lecture session 13** – Read and Review the following:

Martini, M., Gazzaniga, V., Barberis, B. The Spanish Influenza Pandemic: a lesson from history 100 years after 1918. *J PREV MED HYG* 2019; 60: E64-E67.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6477554/pdf/jpmh-2019-01-e64.pdf>



**Lecture session 14** – Read and Review the following:

Bhatti, A., Usman, M., Kandi, V. Current Scenario of HIV/AIDS, Treatment Options, and Major Challenges with Compliance to Antiretroviral Therapy. Cureus 8(3): e515. DOI 10.7759/cureus.515

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4818110/pdf/cureus-0008-00000000515.pdf>

**Lecture session 15** – Read and Review the following:

Rosello et al. Ebola virus disease in the Democratic Republic of the Congo, 1976-2014. eLife 2015;4:e09015. DOI: 10.7554/eLife.09015.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4629279/pdf/elife09015.pdf>

**Lecture session 16** - Read and review one of the following:

STAT News Article: <https://www.statnews.com/2020/04/23/community-management-strategy-for-covid-19-works/>

Keck Evidence-Based COVID-19 Summary: <https://keck.usc.edu/coronavirus/> (click on yellow bar at the top)- please read sections 4, 5 and 7

**Lecture session 17** - Read and review one of the following:

Derek Thompson The Four rules of Pandemic economics. The Atlantic, April; 2, 2020.

<https://www.theatlantic.com/ideas/archive/2020/04/new-laws-pandemic-economics/609265/>

**Lecture session 18** - Read and review one of the following:

Gostin, L. O., Friedman, E. A., & Wetter, S. A. (2020). Responding to COVID-19: How to Navigate a Public Health Emergency Legally and Ethically. Hastings Cent Rep.

<https://onlinelibrary.wiley.com/doi/10.1002/hast.1090>

Sandeep Jauhar MD, "In a Pandemic, Do Doctors still have a Duty to Treat?" New York Times April 2020.

<https://www.nytimes.com/2020/04/02/opinion/sunday/coronavirus-doctors-duty.html>

## Statement on Academic Conduct and Support Systems

### Academic Conduct:

Plagiarism – presenting someone else’s ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in SCampus in Part B, Section 11, “Behavior Violating University Standards” [policy.usc.edu/scampus-part-b](http://policy.usc.edu/scampus-part-b). Other forms of academic dishonesty are equally unacceptable. See

additional information in SCampus and university policies on scientific misconduct, [policy.usc.edu/scientific-misconduct](http://policy.usc.edu/scientific-misconduct).

### **Support Systems:**

*Counseling and Mental Health - (213) 740-9355 – 24/7 on call*  
[studenthealth.usc.edu/counseling](http://studenthealth.usc.edu/counseling)

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

*National Suicide Prevention Lifeline - 1 (800) 273-8255 – 24/7 on call*  
[suicidepreventionlifeline.org](http://suicidepreventionlifeline.org)

Free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week.

*Relationship and Sexual Violence Prevention Services (RSVP) - (213) 740-9355(WELL), press “0” after hours – 24/7 on call*  
[studenthealth.usc.edu/sexual-assault](http://studenthealth.usc.edu/sexual-assault)

Free and confidential therapy services, workshops, and training for situations related to gender-based harm.

*Office of Equity and Diversity (OED) - (213) 740-5086 | Title IX – (213) 821-8298*  
[equity.usc.edu](http://equity.usc.edu), [titleix.usc.edu](http://titleix.usc.edu)

Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants.

*Reporting Incidents of Bias or Harassment - (213) 740-5086 or (213) 821-8298*  
[usc-advocate.symplicity.com/care\\_report](http://usc-advocate.symplicity.com/care_report)

Avenue to report incidents of bias, hate crimes, and microaggressions to the Office of Equity and Diversity | Title IX for appropriate investigation, supportive measures, and response.

*The Office of Disability Services and Programs - (213) 740-0776*  
[dsp.usc.edu](http://dsp.usc.edu)

Support and accommodations for students with disabilities. Services include assistance in providing readers/notetakers/interpreters, special accommodations for test taking needs, assistance with architectural barriers, assistive technology, and support for individual needs.

*USC Campus Support and Intervention - (213) 821-4710*

[campussupport.usc.edu](http://campussupport.usc.edu)

Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

*Diversity at USC - (213) 740-2101*  
[diversity.usc.edu](http://diversity.usc.edu)

Information on events, programs and training, the Provost’s Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

*USC Emergency - UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call*

[dps.usc.edu](https://dps.usc.edu), [emergency.usc.edu](https://emergency.usc.edu)

Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

*USC Department of Public Safety - UPC: (213) 740-6000, HSC: (323) 442-120 – 24/7 on call*

[dps.usc.edu](https://dps.usc.edu)

Non-emergency assistance or information.

*Office of the Ombuds - (213) 821-9556 (UPC) / (323-442-0382 (HSC)*

[ombuds.usc.edu](https://ombuds.usc.edu). A safe and confidential place to share your USC-related issues with a University Ombuds who will work with you to explore options or paths to manage your concern.