

BILD 30: Biology of Plagues, Past and Present

UC San Diego – Spring 2023

Where and When

Lecture time: MWF 12:00-12:50am

Lecture location: room 1330, Humanities and Social Sciences Building (Muir)

Website: UCSD Canvas site for BILD 30, Spring 2023 (go to <https://coursefinder.ucsd.edu/>)

Section information: See below for section information, including IA names and emails.

Basic Contact Information for BILD 30 Professor

Cressida Madigan, PhD

Assistant Professor, Molecular Biology

Email: cmadigan@ucsd.edu

Office: Tata Hall 4402

Office Hours: WF 2-3pm. If you want to meet and these times don't work for you, please send me an email to schedule another time.

Required and Optional Materials

Required materials: none

Lecture slides, readings and links to movies will be posted on the class website.

Welcome to BILD 30

BILD 30 is a frank examination of the history and biology of plagues. For the purposes of this course, “plagues” will refer to epidemic infectious diseases that have had an outsized impact on society, which is a focus of this course. We will examine the biological and societal causes and outcomes of pandemics, including bubonic plague, influenza, and COVID-19. Further, we will learn about these plagues from a diversity perspective. This means that the experiences of minorities and the role of discrimination will be emphasized (yellow fever, HIV/AIDS, TB, prions). Our goal is to provide students with an entertaining yet honest look at why plagues happen, and how humans have responded.

First, we will review of the biology of infections at the organismal and societal level, and understand how early medicine first conceptualized infectious disease. Then, we will discuss the first European plagues in recorded history (bubonic plague) and how society responded. We will discuss the most prominent historical causes of death from infection: TB, malaria, and smallpox. We will discuss the causes of European epidemics in the 19th-20th centuries, including cholera, influenza and polio. Finally, the on-going societal impacts of modern epidemics (HIV/AIDS, Ebola, Mad Cow Disease, zika virus, COVID-19) will be examined. Quizzes on the readings and lectures will be given every 3-5 lectures. Grades will include quizzes, discussion section activities, and a final exam. Please read the disclaimer below.

Prerequisite: NONE, although knowledge of high-school biology is helpful.

DISCLAIMER/TRIGGER WARNING

This class is about plagues, so illness and death will be discussed. We will view and discuss medical images of sickness, and depictions of sickness and death in art. Further, we will discuss controversial topics in detail that have impacted the development of plagues and reactions to them. These include racism (yellow fever),

homophobia (HIV/AIDS), xenophobia (COVID), antisemitism (bubonic plague), cannibalism (prions), and others. For a list of the specific diseases and topics covered, and related readings, see the list of lecture topics and References.

It is never the intention of the teaching team to upset any student. Before you take this course, please consider whether discussing the topics above will upset you. If so, please don't take the course. Give special consideration to your feelings around COVID-19, since we will discuss the pandemic at the end of the course. If you do decide to take this course and find a lecture or discussion upsetting, please feel free to leave the room.

BILD 30 Class Culture

BILD 30 is a **community of students** trying to increase their understanding about plagues and infection biology. The classroom culture is designed to engage you in collaborating and thinking like a scientist.

When people collaborate to work towards a common goal, in this case learning, we must **establish shared values** so that everyone understands acceptable ways of working together. In organizations, these are commonly called codes of conduct or ethics. In this course, we use the following statement, adapted from the International Center for Academic Integrity (<https://academicintegrity.org/>) and Dr. Tricia Bertram Gallant, to explicitly state our values and describe the behaviors that maintain and protect these values.

	As students we will...	As the teaching team we will...
Honesty	<ul style="list-style-type: none"> Honestly demonstrate your knowledge and abilities according to expectations listed in the syllabus or in relation to specific assignments and exams Communicate openly without using deception, including citing appropriate sources 	<ul style="list-style-type: none"> Give you honest feedback on your demonstration of knowledge and abilities on assignments and exams Communicate openly and honestly about the expectations and standards of the course through the syllabus and in relation to assignments and exams
Responsibility	<ul style="list-style-type: none"> Complete assignments on time and in full preparation for class Show up to class on time and be mentally and physically present Participate fully and contribute to team learning and activities Take ownership of your own learning by using course and outside resources, including the BILD2 team, to clarify confusions and extend your knowledge 	<ul style="list-style-type: none"> Give you timely feedback on your assignments and exams Show up to class on time and be mentally and physically present Create relevant assessments and class activities Providing selected resources and a helpful environment to help you address your confusions and extend your knowledge
Respect	<ul style="list-style-type: none"> Speak openly with one another while respecting diverse viewpoints and perspectives Provide sufficient space for others to voice their ideas 	<ul style="list-style-type: none"> Respect your perspectives even while we challenge you to think more deeply and critically Help facilitate respectful exchange of ideas

Fairness	<ul style="list-style-type: none"> Contribute fully and equally to collaborative work, so that we are not freeloading off of others on our teams Not seek unfair advantage over fellow students in the course 	<ul style="list-style-type: none"> Create fair assignments and exams and grade them in a fair and timely manner Treat all students and collaborative teams equitably
Trustworthiness	<ul style="list-style-type: none"> Not engage in personal affairs while on class time Be open and transparent about what we are doing in class Not distribute course materials to others in an unauthorized fashion 	<ul style="list-style-type: none"> Be available to all students when we say we will be Follow through on our promises Not modify the expectations or standards without communicating with everyone in the course
Courage	<ul style="list-style-type: none"> Say or do something when we see actions that undermine any of the above values Accept the consequences of upholding and protecting the above values 	<ul style="list-style-type: none"> Say or do something when we see actions that undermine any of the above values Accept the consequences of upholding and protecting the above values

Note on electronic devices

If necessary, you are welcome to bring laptops or other devices to lecture to take notes. However, research shows that **“multi-tasking” on computers is likely to decrease not only your grade but also the grades of people around you who can see your screen!**³ For this reason, we ask that you do not flip between lecture notes and the internet unless as part of an in-class activity.

³ Sana *et al.* 2013. Laptop multitasking hinders classroom learning for both users and nearby peers.
<https://www.sciencedirect.com/science/article/pii/S0360131512002254>

Grading

The activities, requirements, and assignments that comprise this course are designed to **promote your learning** and facilitate your understanding of infection biology. In addition, these assignments give me highly valuable information that allows me to adjust the course to meet your educational needs. Due to the size of this course, no late work will be accepted.

How Your Letter Grade will be Assigned

Grade assignments will be based on the percentage of total points earned. We do not decide your grade, but rather **you as a student do the work to earn your grade.**

%	Grade	%	Grade	%	Grade	%	Grade
98+	A+	87-89	B+	77-79	C+	60-69	D
93-97	A	83-86	B	73-76	C	0-59	F
90-92	A-	80-82	B-	70-72	C-		

How Your Grade will be Calculated

Course Component	Total Points	~% of Grade
Section activity (8 @ 27 points each)	200	20%
Submitting CAPE	28	3%
Quizzes	552	55%
Highest scoring quiz	138	
Next highest scoring quiz	138	
Third highest scoring quiz	138	
Fourth highest scoring quiz	138	
Final Exam	200	20%
Professionalism	20	2%
TOTAL	1000	100%

Grades will be posted regularly on Canvas.

A note on re-grading

We are always happy to meet with you **to discuss your learning**. If you believe that a grading error has been made, please email your IA **within one week** of the assignment or exam being returned. In your email, please include an explanation of the error. If you think your work deserves more points (i.e. it's not a transcription or arithmetic error), please also include a concise description of the error, how your answer compares to the rubric and why you think it should have earned more points.

Explanation of Course Components

Discussion Section Attendance and Activity

Discussion section will not meet the first week. Weekly discussion sections are designed to review the readings assigned to each lecture, and have students participate in a group activity. Therefore, part of your score will depend on participation in section activities. The first sections will meet the 2nd week of class. Completing at least 85% of section activities (8/10) will award you a full section activity score. Discussion section activities may include working in groups to generate questions and glossaries of the readings, or give presentations.

You should already be enrolled in a section, and **you must attend the section which you are enrolled to** receive credit. We are not able to change the number of students in a section, so if a section is full you must choose another one.

Quizzes

Quizzes will be given every 3-5 lectures. They are fully online, open-note and Internet. The purpose of these quizzes is to test your understanding of the lectures & readings. Questions will be in a variety of formats, including multiple-choice and short answer. Any material covered in or closely related to the lectures & readings will be tested. The lowest quiz score is dropped from your final grade.

Final Exam

The final exam will cover all lectures and readings. It must be taken individually but it is open-note (and internet). **Everyone must take the final exam. If you need to miss the final exam due to a verifiable, unplanned emergency, you must notify me (by phone or e-mail) of the problem as soon as it is reasonable to do so.** You must also provide adequate documentation (doctor's note, copy of death certificate, etc.). Contact me immediately to discuss your best options given your circumstances.

Professionalism

This portion of the course grade is intended to motivate you to **consider the impact of your actions on your own learning and the learning of others** in the course. Unprofessional interactions consume time yet have no meaningful benefits to you, your fellow students, and/or the teaching team. Analogously in the workplace, being unprofessional to your colleagues or supervisors will only discount you. When you are discounted, you will not be invited for new opportunities that you may or may not be aware of.

Professionalism can be demonstrated through individual and community efforts (10pts extra credit described below). The individual component is to account for you personally demonstrating maturity and professionalism.

By default, everyone is assumed to be professionally mature, so this component is automatically awarded to you at the beginning of the quarter. During the quarter, based on observations by the teaching team, including but not limited to one-on-one interactions, electronic communication, and follow-up conversations on grades, **your professionalism credit may be deducted** in steps of 5pts.

Examples of interactions with meaningful benefits:

- Developing deeper insight into course material, concepts, biology, and/or society in general
- Working collaboratively to improve in skill building and future opportunities
- Clarifying course material that facilitates deeper learning
- Learning conceptually and meaningfully why full credit was not awarded for an assignment
- Reporting errors or problems in class, on assignments, or other course material

Examples of interactions that have no meaningful benefits and thus should be avoided:

- Contributing inequitably to team work in class, in discussion section, or on exams
- Harassing and/or bullying the instructional team or other students, either in person or online
- Ignoring the directions or requests from the instructional team
- Being disruptive to fellow students in class, in discussion section, or on exams

Extra Credit Opportunities

You have opportunities for extra credit. Extra credit questions will be offered on each exam to make up for exam points missed. In addition, extra credit is awarded (10 pts) for **meeting with Prof. Madigan or an IA** during office hours or another scheduled meeting.

Course Policies

Students with Disabilities

If you have a disability, please contact me early in the quarter to work out reasonable accommodations to support your success in this course. To ensure fairness and proper supports, anyone who requests accommodations because of a disability must provide a current Authorization for Accommodation (AFA) letter issued by the Office for Students with Disabilities (OSD). The AFA letters must be presented to faculty and to the OSD Liaison in the Division of Biological Sciences in advance so we make appropriate arrangements. **Here is how to contact the OSD:** <http://disabilities.ucsd.edu/>, osd@ucsd.edu, 858-534-4382.

Whenever possible, we strive to use universal designs that are inclusive. If you have feedback on how to make the class more accessible and inclusive, please get in touch!

Podcasts and Lecture Recording

Whenever possible, **classes will be recorded and made available online** as a resource for learning (<http://podcast.ucsd.edu>). However, remember that active participation and contribution are highly encouraged, which cannot be replicated by watching a video. In addition, I may record class in order to study my own effectiveness as an instructor.

Academic Integrity and Originality

Integrity of scholarship and learning is fundamental to creating our classroom community and the academic community at large. The University expects that both students and faculty will honor this principle to protect the validity of University intellectual work.

For you, this means that all academic work you submit for this course should be **your own new original work**. We emphasize this for several reasons. First, **using your own thoughts and putting things in your own words helps you learn**. There is no better way to discover quickly what you understand and what you don't than to try to explain a concept. Second, in professional settings, trying to hide dishonest behavior or pass someone else's words off as your own can lead to trouble.

To encourage original thought and writing in this class, we take precautions. For example, exams are scanned before being graded, and we route written submissions through Turnitin, an originality checking service. **Our goal is not to catch anyone** (although we can't give credit for dishonest work or plagiarized material), **but to help everyone make a habit of using their own thoughts and voice**.

In addition, part of being a good member of a community **is not facilitating dishonest behavior by others**. No course materials, particularly homework and exams, may be posted online, submitted to private or public repositories, or distributed to unauthorized people outside of the course.

To hold everyone accountable for their actions, any suspected instances of a breach of academic integrity will be reported to the Academic Integrity Office for review. For more information on academic integrity, please visit <https://students.ucsd.edu/academics/academic-integrity/index.html>.

Helpful Resources at UCSD

College is a time of great stress for everyone, including stress from academics, social pressures, and living away from home. **If you are experiencing anxiety, depression, or worse, you are not alone.** On top of facing these stressors, many college students are in their late teens or early twenties, which is when many mental illnesses emerge for the first time because of brain maturation. In addition, you may be experiencing the effects of trauma or violence. Or, you might be one of the 19% of UC students who report not being able to access adequate food⁴ or who do not have a safe, stable place to live.

Whatever your situation, or whether your problems feel big or small, we on the BILD 30 instructional team encourage you to seek help and support. You are welcome to discuss these issues with us instructors. We also encourage you to connect with professional resources on campus, some of which are listed in the table below.

<i>Help and Resources</i>		
Academic Support	Psychology and Physical Safety*	Basic Needs
<p>OASIS http://oasis.ucsd.edu The Office of Academic Support & Instructional Services (OASIS) offers Math and Science Tutorial Programs for everyone. They also have services and scholarships for those of you who have overcome significant obstacles to become successful (like are first in your families to go to college or from communities with fewer resources).</p> <p>Teaching + Learning Commons http://commons.ucsd.edu The Teaching + Learning Commons offers tutoring, consultations, and workshops on learning strategies as well as assistance with writing in the Writing + Critical Expression Hub.</p>	<p>CAPS http://caps.ucsd.edu CAPS offers free, confidential counseling. They can help with urgent crises, such as an assault or thoughts of self-harm. They offer drop-in and group workshops and forums. They can also talk if you are worried about a friend or classmate.</p> <p>CARE at SARC http://care.ucsd.edu Campus Advocacy, Resources, and Education at the Sexual Assault Resource Center (CARE at SARC) offers support for those of you who have experienced sexual violence or violence from a partner. They have free confidential counseling, including on nights and weekends.</p>	<p>Triton Food Pantry http://basicneeds.ucsd.edu/triton-food-pantry/ The Triton Food Pantry discreetly offers food for current UCSD students. Its goal is to ensure that each of you has enough energy and nutrition to get through the day.</p> <p>The Hub https://basicneeds.ucsd.edu The Hub connects those of you who have trouble accessing basic needs, including food or stable housing, or who have financial emergencies. They can help you connect with a variety of on-campus and off-campus programs, including the Food Pantry, CalFresh, emergency loans, emergency housing, or changes to your financial aid, depending on your situation.</p>

It is also important to find a community of like-minded people around you. You may be interested in the following resources: the Black Resource Center (brc.ucsd.edu), the Cross-Cultural Center (ccc.ucsd.edu), the LGBT Resource Center (lgbt.ucsd.edu), the Raza Resource Centro (raza.ucsd.edu), the Student-Parents Resource page (students.ucsd.edu/well-being/wellness-resources/student-parents), the Student Veterans Resource Center (students.ucsd.edu/sponsor/veterans), the Women's Center (women.ucsd.edu).

⁴ Martinez *et al.* 2016. University of California Global Food Initiative: Student Food Access and Security Study. <https://www.ucop.edu/global-food-initiative/best-practices/food-access-security/student-food-access-and-security-study.pdf>

*Please note that while we on the instructional team are here to support you, instructors are obligated by law to notify UCSD's Title IX coordinator if a student (or any person at UCSD) discloses to us a personal experience of sexual harassment, sex or gender discrimination, domestic violence, or stalking. This is so that the University can properly address the issue. If you do not want your experiences to be reported, please contact CAPS or CARE, which can talk to you confidentially.

Section Meeting Times

You must attend the section to which you are assigned.

Section	Day	Time	Location		IA	IA email
A01	M	10-10:50pm	CENTR	207	Kevin Wei	hwei@ucsd.edu
A02	M	11-11:50pm	CENTR	207	Kevin Wei	hwei@ucsd.edu
A03	F	6-6:50pm	CENTR	207	Michelle Munguia Figueroa	mmunguiafigueroa@ucsd.edu
A04	F	7-7:50pm	CENTR	207	Michelle Munguia Figueroa	mmunguiafigueroa@ucsd.edu

IA Office Hours

You are encouraged to attend any IA's office hours.

IA	Day	Time	Location	Zoom link
Michelle Munguia Figueroa	W	9-10am	Art of Espresso	https://ucsd.zoom.us/j/2402194697?pwd=aVRlQ1ZaQ3YzcVpXRW52WFBMdlVoQT09
Kevin Wei	W	1-2pm	Roots (Muir college dining hall)	https://ucsd.zoom.us/my/kevinwei

Date	Lecture topic	Readings
Class #1 M Apr. 3	Introduction to course	Reading: Syllabus
Class #2 W Apr. 5	Origins of infection	Read Wayne & Bolker, <i>Infectious Disease</i> , chapters 1 & 2
Class #3 F Apr. 7	Innate immunity	Read Klenerman, <i>The Immune System</i> , chapters 1 & 2
Class #4 M Apr. 10	Adaptive immunity	Read Klenerman, <i>The Immune System</i> , chapter 3
Class #5 W Apr. 12	Epidemiology	Read Saracci, <i>Epidemiology</i> , chapters 1 & 10
Class #6 F Apr. 14	QUIZ 1	
Class #7 M Apr. 17	Why so many infections? SMH	
Class #8 W Apr. 19	Humoral medicine	Read Snowden "Humoral Medicine"
Class #9 F Apr. 21	The earliest plagues	Read selections from <i>Pestilence, Pandemics and Plagues</i>
Class #10 M Apr. 24	Bubonic plague	Read Snowden "Plague as a Disease"
Class #11 W Apr. 26	Bubonic plague 2	Read Snowden "Responses to Plague"
Class #12 F Apr. 28	QUIZ 2	
Class #13 M May 1	TB & leprosy	Watch <i>Bending the Arc</i>
Class #14 W May 3	Malaria	Read Winegard "Mosquito Legions: The Rise and Fall of the Roman Empire"
Class #15 F May 5	Smallpox	Read Snowden "The Historical Impact of Smallpox"
Class #16 M May 8	The Columbian Exchange (typhus, small pox, syphilis)	Read Snowden "War and Disease: Napoleon, Dysentery, and Typhus in Russia, 1812"
Class #17 W May 10	QUIZ 3	
Class #18 F May 12	Germ theory	Read Snowden "The Germ Theory of Disease"
Class # 19 M May 15	Cholera FR	Read Johnson "Eyes sunk, lips dark blue"
Class #20 W May 17	Influenza AR	Watch <i>American Experience: Influenza 1918</i>

Class #21 F May 19	Polio & enteroviruses	Watch <i>American Experience: The Polio Crusade</i>
Class #22 M May 22	QUIZ 4	
Class #23 W May 24	Prions & Mad Cow Disease	Watch <i>Kuru: The Science and the Sorcery</i>
Class #24 F May 26	Ebola	Read Quammen “Thirteen Gorillas”
M May 29	No lecture – Memorial Day	
Class #25 W May 31	Vector viruses: dengue, zika, yellow fever	Read Snowden “War and Disease: Napoleon, Yellow Fever, and the Haitian Revolution”
Class #26 F June 2	QUIZ 5	
Class #27 M June 5	HIV/AIDS	Read Washington “Infection and Inequity”
Class #28 W June 7	Review session with IAs	Review readings & slides
Class #29 F June 9	Final Exam, 12-12:50 online	

References for readings

Byrne, J.P. 2008, *The Encyclopedia of Pestilence, Pandemics and Plagues*, Greenwood Press, Westport

Johnson, J. 2006, *The Ghost Map: the story of London’s most terrifying epidemic – and how it changed science, cities, and the modern world*, Riverhead Books, New York

Klenerman, P. 2017, *The immune system: a very short introduction*, Oxford University Press, New York

Quammen, D. 2012, *Spillover: animal infection and the next human pandemic*, Norton, New York

Saracci, R. 2010, *Epidemiology: a very short introduction*, Oxford University Press, New York

Snowden, F. 2019 *Epidemics and Society: from the Black Death to the present*, Yale University Press, New Haven

Washington, H. 2006, *Medical apartheid: The dark history of medical experimentation on Black Americans from colonial times to the present*, Anchor Books, New York

Wayne, M. and Bolker, B. 2015, *Infectious disease: a very short introduction*, Oxford University Press, New York

Winegard, T. 2019, *The Mosquito: a human history of our deadliest predator*, Dutton, New York