PBHL 3999 – Diffusion: How things Spread
Spring 2023, virtual

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Office Hours: Tu/Fr 2-3pm ("drop in" or by appt - https://calendly.com/jimiadams)
                     NOTE: "Drop in" hours will use the Zoom link provided on Canvas; appointments
                     will auto-generate a link.

Course Description

How do infectious diseases spread through a population? How do novel ideas become popular, or fade away? How do we learn the behaviors we engage in? This class will investigate the various ways that these types of things spread through a population. We will explore the similarities and differences between things like infectious diseases, ideas and behaviors in the ways they spread.

Objectives

- Differentiate between simple and complex models of contagion.
- Identify why diseases, ideas, and behaviors (and other "bits") differ in the ways they diffuse.
- Describe the basic stages of a diffusion curve.
- Apply select network models of diffusion (density, centrality, etc.) to account for diffusion success/failure and speed.

Assigned Readings

All required readings and supplemental materials will be available via Canvas.

Course Structure & Requirements

First and foremost, this course will be organized as an online seminar. What this means practically is that you are expected to *contribute to* as much as you *consume from* the content of the course. To do so will require that you: (1) *complete* and *critically analyze* readings from the various perspectives pertinent to understanding, explaining, and seeking to improve these public health issues, (2) *learn from* posted online lectures and related materials that interpret those readings and related scholarship, (3) *produce content* in a variety of formats that demonstrates comprehension and application of those ideas, and (4) *make use* of that material in exams. Much of our reading for this course will be primary peer-reviewed research articles. At times the content of these will be over your head. This is to be expected. Your aim will not be to fully interpret the minutiae of every aspect of these readings, but to **extract the key dimension(s) of public health they bring to bear on the topic at hand**, and use those ideas to help construct a well-informed course. To aid this, I will provide guidance on strategies for how to optimize your reading, particularly on how to extract key ideas from articles **used for different aims** in the course.

Requirements
I – Reading Elements (33%)
   A. **Reading Reactions (25 points each)** For any 8 class modules (your choice), you are responsible to submit a brief engagement with one of the assigned reading(s). More details are provided in a separate handout for the aims/structure of these reactions.

II – Project Elements (33%)

Each of these elements *can* (but are not required to) address the same topic, in which case each element (and the feedback you receive on it) can be built upon (but not merely reproduced) in the later element(s). More details are provided in separate handouts for each of these assignments.

A. Article Summary (35 points, 6% of total grade)

You will *individually* present a summary of a primary research article (from beyond the required set) on a topic of your choosing. These presentations will be 7-10 minutes, and presentation style is up to the student. The key aim here is to *distill* core components of a primary research article and communicate those in *written and oral form* to *generally informed scholars* (in training) who share some common knowledge about the broad topic matter, but not the particulars of your specific focus.

B. Infographic (65 points, 11% of total grade)

Individually, or with a partner, you will produce an infographic addressing (at least) 4 key elements of a single behavior/attitude/health outcome pertinent to the topic of diffusion. The key idea here is to present in *visual/graphical form* the "big ideas" that an uninformed member of the public should know about your topic. The article summarized in part A can be *a* source for this element, but should ***not*** be the only source material you use in this assignment (3-5 sources likely necessary). If you choose to do this assignment as a group, all group members will receive the same grade.

C. Podcast or Video (100 points, 17% of total grade)

Individually, or with a partner, you will produce a podcast or video of 6-8 minutes highlighting an event/outcome/story that *illustrates* a diffusion phenomenon and *interpreting* that through the lens of the scientific study of diffusion. The key aims here are (1) to *apply the conceptual and theoretical ideas* developed in the course to (2) convey those to a general audience in a way that translates those ideas for someone who hasn't encountered them before, in an *oral and/or video format*. The article summarized in part A can be *a* source for this element, but should ***not*** be the only source material you use in this assignment (3-5 sources likely necessary). If you choose to do this assignment as a group, all group members will receive the same grade.

III – Exams (200 points, 33% of total grade):

A. Mid-term Exam (100 points, 16.5% of total grade)

All material covered up to the class period preceding the mid-term is fair game for this exam. It will consist of a mix of multiple choice, short answer, and essay questions. Exams will be conducted on Canvas, see schedule for details.

B. Second Exam (100 points, 16.5% of total grade)

The second exam is not comprehensive, and will focus primarily on material covered since the mid-term. However, some material in this course will build on itself over time, and that aggregation of knowledge is fair game if it carries over. We may also revisit any poorly understood concepts from the first half of the course if necessary, making them also appropriate as 2nd exam material. Exams will be conducted on Canvas, see schedule for details.

Grading

Maximum Potential Points (600):

Reading (33%, 200 points)	Projects (33%, 200 points)	Exams (33%, 200 points)
Reactions (25 points each)	Article Summary (35 points)	Exam 1 (100 points)
	Infographic (65 points)	Exam 2 (100 points)
	Podcast/Video (100 points)	

Grading Expectations:
Participation, presentation, and paper grades you earn will reflect how thoroughly your work demonstrates the particular assignment requirements *and* overall course aims, which will correspond to the following sets of expectations:

A   Work that, **in addition to** meeting an assignment's **minimum requirements**, also *consistently* reflects **engagement** with other material from the course where appropriate & in ways that **exceed course objectives** will earn grades in the A range.

F   Work that, **in addition to** meeting an assignment's **minimum requirements**, also *occasionally* reflects **engagement** with other material from the course where appropriate, in ways that **meet course objectives** will earn grades in the B range.

C   Work that **addresses only** an assignment's **minimum requirements** will earn grades in the C range.

D   Work that **incompletely addresses** an assignment's **minimum requirements** will earn grades in the D range.

B   Work that **fails to address** an assignment's **minimum requirements** will earn grades in the F range.

Please note now that there are NO extra credit opportunities in this course. For this course to be successful and for you to be successful in this course, we need everyone keeping up with requirements throughout the semester.

Final Grade Computation:
Your final grade will be determined by summing the number of points earned from each of the above categories. Letter grades will be determined from your point total as follows:

Letter Grade	Points Range	Letter Grade	Points Range	Letter Grade	Points Range
A	564+	B	498-525	C	435-464
A-	540-563	B-	480-497	C-	420-434
B+	526-539	C+	465-479	D	360-419

Any student accumulating 359 or fewer points will receive an F for the course.

Course Expectations

What I expect from you:
1 – *Make a concerted effort to bring the best you can to the course.* This means doing readings each week, completing required assignments on time, putting forth effort into the evaluated elements of the course. It also means taking ownership over the grades you earn.
2 – *Treat others in the class with respect.* This includes simple norms of regular interaction in an online forum and thoughtfully considering the contributions of others. At times we'll potentially cover material of a sensitive nature; being able to respect other's expressed opinions makes critical discourse possible.

What you can expect from me:
1 – *Make a concerted effort to bring the best I can to the course.* This means leading a class appropriate to its level, selecting "up to date" material that helps illustrate the course's key aims (though I'll aim to keep covid from over-taking our course, even despite its direct relevance), regularly being available for interaction via Canvas & office hours, and adapting as is appropriate for the needs of the class.
2 – *Treat others in the class with respect.* This includes being prepared for class, returning graded materials in a timely manner with useful feedback, seeking to be impartial in the assessment of student

work, while holding it to the standards of the course and college. It also means fostering an environment where diverse perspectives can comfortably be shared in class.

What we all can expect from each other:
Behave in a manner reflecting common courtesies. Show up to office hours or other appointments as scheduled. Maintain professionalism in all electronic communication (e.g., email/Canvas messages). Put forth our best efforts to maintain a productive and welcoming course.

Due Dates & Late Assignments:
- Reading Reactions are due to Canvas by ***11:59pm on their respective due dates***. Given that there are multiple opportunities to complete these throughout the semester, no late summaries will be accepted.
- Article Summary, Infographic & Podcast/Video Project Elements are due to Canvas by ***11:59pm, on their specified due dates***. If late, they will be deducted 25% if they are 5 minutes to 24 hours late, 50% if 24-48 hours late, and will not be accepted if more than 48 hours late.
- Exams are administered on Canvas with availability spanning a full week, and need to be completed in one consecutive 90 minute setting. in class on the specified dates. Unexcused absences will result in a zero on the missed exam.

Course Communication:
- *The Syllabus* has answers to the most common questions pertaining to the course. Be sure check the syllabus first, before asking me about due-dates, assignment requirements, etc.
- *Office Hours* are available to add to your experience in this course. **Please make use of them.** These are meant to supplement required course work and in-class elements. As such, while I am happy to discuss course materials or other aspects of public health/academia in general with you during this time, they should not be viewed as an opportunity to ask, "What did I miss in class?" (You should find peers in the class with whom you can share notes for that purpose.)
- *Canvas* will be used for the majority of communication in this course. You can find a copy of the syllabus, additional assigned readings, and all assignments there. I will also post any lecture notes after each class. To make your experience in this course successful, you should expect to make this resource a *regular* part of your preparation for this course.
- *E-mail* should be used for quick communications (things that can be responded to in no more than a few sentences); use office hours for anything requiring more depth. You should only use your UCD email account for communication related to this course; I will not read/reply to emails from your personal accounts (e.g., Yahoo!, Hotmail, etc; honestly they very regularly get filtered from my inbox). Please consider e-mail as subject to the same standards of communication as you would all other forms written material in this course (i.e., you should use complete sentences, proper punctuation, etc.). I will typically respond to email within ***48 hours***.

University & CLAS Policies

For relevant university deadlines and procedures & academic support services, visit: https://clas.ucdenver.edu/faculty-staff/sites/default/files/attached-files/student_services_and_calendar.pdf

Academic Dishonesty (CLAS Academic Dishonesty Policy): Students are required to know, understand, and comply with the CU Denver Academic Dishonesty Policy as detailed in the Catalog and on the CLAS website. A university's reputation is built on a standing tradition of excellence and scholastic integrity. As members of the University of Colorado Denver academic community, faculty and students accept the responsibility to maintain the highest standards of intellectual honesty and ethical conduct. Academic

dishonesty consists of plagiarism, cheating, fabrication and falsification, multiple submission of the same work, misuse of academic materials, and complicity in academic dishonesty. If you are not familiar with the definitions of these offenses, go to http://www.ucdenver.edu/academics/colleges/CLAS/faculty-staff/policies/HandlingAcademicDishonesty/Pages/Definition-of-Academic-Dishonesty.aspx).

Disability Services Information: The University of Colorado Denver is committed to providing reasonable accommodation and access to programs and services to persons with disabilities. Students with disabilities who want academic accommodations must register with Disability Resources and Services (DRS) in Academic Building 1, #2116, Phone: 303-315-3510, Fax: 303-315-3515. Website: http://www.ucdenver.edu/student-services/resources/disability-resources-services/Pages/disability-resources-services.aspx. I will be happy to provide approved accommodations, once you provide me with a copy of DRS's letter.

Grades of Incomplete: The current university policy concerning incomplete grades will be followed in this course. Incomplete grades are given only in situations where unexpected emergencies prevent a student from completing the course. Students have up to one year (three semesters) to complete course requirements. Dr. adams is the final authority on whether you qualify for an incomplete. Incomplete work must be finished within the time allowed or the "I" will automatically be recorded as an "F" on your transcript.

Course Schedule Overview

Please note that this schedule is subject to change. Changes will be announced in class and on Canvas.

Topic	Readings	Focus	Assignments Due

Preliminaries (Jan 17-20) – Setting the Stage

Topic	Readings	Focus	Assignments Due
Introductions	none		
Overview	Gladwell 2000	C	

Module 1 (Jan 23-Feb 3) – Models (NOTE: this module spans 2 weeks)

Topic	Readings	Focus	Assignments Due
SEIR & R_0	Mishra et al 2011	M	
Measles	Rasmussen et al 2015	E	
Model Variants	adams 2020	M	
Infection Duration	Darbon et al 2019	E	

Module 2 (Feb 6-10) – Infectious Diseases

Topic	Readings	Focus	Assignments Due
Basic Epidemiology	Friis & Sellers 2014	C	
HIV	Rothenberg et al 1998	E	

Module 3 (Feb 13-17) – Slowing Epidemics

Topic	Readings	Focus	Assignments Due
Vaccines & Herd Immunity	Anderson & May 1985	M	
Disrupting Flu	Salathé & Jones 2010	E	Article Summary

Module 4 (Feb 20-24) – Complex Contagions

Topic	Readings	Focus	Assignments Due
From Simple to Complex	Centola 2018	M	
Contraception	Valente et al 1997	E	

Module 5 (Feb 27-Mar 3) – Innovations

Topic	Readings	Focus	Assignments Due
Diffusion of Innovations	Rogers 1995	C	
Tetracycline Prescribing	Coleman et al 1957	E	

Module 6 (Mar 6-10) – Misinformation & Perceptions

Secrets	Cowan 2014	C	
Corrections & Backfires	Swire-Thompson et al 2022	E	Infographic

Exam 1 (Available Mar 12-18, allowed 90 minutes to complete once started)

Module 7 (Mar 27-31) – Network (Interpersonal) Approaches

Network Models	Kadushin 2012	M	
Concurrency	Morris 2007	E	

Module 8 (Apr 3-7) – Indirect (Broadcast) Approaches

Critical Mass Models	Valente 1995	M	
Media & Small Groups	Katz & Lazarsfeld 1955	C	

Module 9 (Apr 10-14) – Behavioral Influence

Interpersonal Dynamics	Brechwald & Prinstein 2011	C	
Opioids	de Vaan & Stuart 2019	E	

Module 10 (Apr 17-21) – Complex Contagions, part 2

Blacklists	Rossman 2004	E	
Health Lifestyles	adams et al 2022	E	Podcast

Module 11 (Apr 24-28) – Mediated Contagion

Vector-borne Diseases	Costa et al 2017	C	
Chikunguya & Zika	Riou et al 2017	E	

Module 12 (May 1-5) – Spatial Approaches

Spatial & "Spatial" Models	González-Bailón 2017	M	
Cholera	Emch et al 2009		

Exam 2 (Available May 6-12, allowed 90 minutes to complete once started)

Full Reference Information for Required Readings

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- Gabriel Rossman. 2004. "Elites, Masses, and Media Blacklists: The Dixie Chicks Controversy." *Social Forces* 83(1): 61–79.
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