Course Overview and Summary

**Time:** Thursdays, 1 PM-3:50 PM

**Location:** Drachman Hall, Room 116

**Instructor:** Kacey C. Ernst, Associate Professor, Drachman Hall. (kernst@email.arizona.edu), Room A246

**Office Hours:** by appointment

**Course Description:** Introduction to Infectious Disease Epidemiology. The emphasis in this course is on the key concepts and methods of infectious disease epidemiology as used in public health practice and in epidemiologic research.

**Course Prerequisites:** EPID 573A; P or concurrent registration; EPID 573 B; EPID 576A

**Course Learning Objectives:**
During this course students will:

1. Compare appropriateness of study designs to answer specific questions in infectious disease epidemiology
2. Evaluate different strategies for infectious disease surveillance
3. Distinguish among basic modes of transmission
4. Synthesize literature on a self-selected topic in infectious disease epidemiology
5. Communicate ideas about strengths and weaknesses of epidemiological study designs
6. Critique infectious disease epidemiology studies
7. Connect changing infectious disease epidemiology with significant global changes

**Competencies Addressed:**

**MS Epidemiology Competencies:**
(1) Select appropriate study design for assessing the association between a given exposure and an outcome, and then understanding advantages and limitations of these approaches.
(2) Critique and synthesize appropriate literature and research findings to address a research question.
(3) Identify potential sources of bias for various study designs and their impact on study quality.
(4) Describe public health surveillance systems and their underlying data sources.
(7) Organize and deliver clear presentations of research findings in varying professional formats to diverse audiences.

PhD Epidemiology Competencies
(2) Develop research questions to address health problems by appraising and identifying gaps in the current scientific literature.
(5) Lead group interactions competently, ethically, respectfully and professionally to diverse audiences.
(6) Organize and deliver clear presentations of research findings in varying professional formats to diverse audiences.

Course Materials and Notes: Course materials, notes and required readings will be posted on D2L. Materials include: syllabus, schedule, readings, and exercises. In addition, lecture PowerPoint notes and other materials will be provided online at D2L before each session.

Required Texts: There is one required texts for this course.


Course Requirements: Exercises, Class participation, Mid-term, and Final. See Homework Sheets.

Grading/Student Evaluation:

Exercises (4) 5 points: 20 points total
Discussion Participation: (11) 1 point each session: 11 points total
Discussion Lead: (2) 4.5 points each: 9 points total
Quizzes: (4) 5 points: 20 points total
Final paper: 30 points
Final Presentation 10 points

Standard grading will be used to assign letter grades (90% and above) A, (80 – 89.9%) B, (70 – 79.9%) C, 60 – 69.9% D, below 60% F.

Exercises: There are 4 assignments over the course of the term. Each is worth 5 points.

Quizzes: There are 4 in-class quizzes over the course of the term. Each is worth 5 points.

Final Review Paper: The final paper is a review of evidence on an infectious disease topic of choice. This will be done in groups of 3 students in accordance with systematic review protocols. You may also elect to carry out a scoping review. A systematic review is a cohesive argument to examine the strength of the relationship and to identify gaps in knowledge it is not merely a summary of the literature. It should provide the basis for directions of future research to fill the gaps that are identified. Pick a narrow topic. There are due dates throughout the term to ensure review and feedback throughout the writing
process. Example topics are listed below. Any topic not on the list can be chosen but must be approved by the instructor. Be sure to keep Hill’s causal criteria in mind as you evaluate linkages but DO NOT WRITE THE PAPER SO THAT IT JUST PROVIDE DATA FOR EACH CRITERIA (not applicable to some topics).

- Temporal Sequence
- Strength of Association
- Dose-response relationship
- Consistency
- Plausibility
- Alternate explanations
- Experiment
- Specificity
- Coherence

Links between environmental changes and infectious diseases:
- Climate change and……(any infectious disease)
- Deforestation and…..
- Dam construction and ……
- Habitat loss and ……
- Biodiversity loss and …..
- Extreme weather events and …. 
- Urbanization and…. 

Supplements and Infectious Diseases
- Probiotics and…..
- Vitamin X and…. 

Genetic predispositions and infectious disease susceptibility

Infectious causes of chronic disease
- Malaria and cancer (liver or brain cancer)
- Borna disease virus and behavioral problems

Impact of co-infections on morbidity and mortality
- Malaria and pneumonia
- Malaria and schistosomias

Effectiveness of Control Strategies
- Housing construction and vector-borne diseases

Role of asymptomatic carriers on disease burden
- Any disease of interest

Factors contributing to the development of drug resistance
- Incomplete use of medication and.…
- Counterfeit drugs and malaria drug resistance
Factors contributing to susceptibility of individuals to infection

- Opioid use and ....
- Forest fires and respiratory infections

Prevalence/ incidence of specific risk factors

- Misuse of bed nets for other purposes
- Vaccine refusal in regions not typically examined (SE Asia, SSA, etc.)
- Counterfeit drugs
- Non-compliance with HAART

New distribution of disease

- The expansion of drug resistance bacteria in resource-poor countries and the impact of:
  - Pharmaceutical regulations on development of resistance
- HIV/ AIDS and drug resistance
- Antibiotic resistance and ........

**Incremental Tasks for Final Paper:**

**Final Paper Research Question:** Identify an area of interest and propose your research question. Provide a short paragraph of background and rationale. Include the major hypothesis or major proposed benefit underlying the association or method you are proposing to write about.

**Final Paper Literature Search Strategy and Inclusion/ Exclusion Criteria:** Develop your key word searches and search strategy, inclusion and exclusion criteria. Run your search in PubMed. Typically you would run this search in multiple search engines but for the purposes of the course, you will just use PubMed. PhD students are encouraged to run in multiple search engines.

**Final Paper Reference List Initial:** Your full list when running the search terms that you included above.

**Final Paper Reference List Final with Quality Assessment:** Your list of references when all inclusion/ exclusion criteria have been assessed for each article and the quality assessment table that includes each of the articles.

**Final Paper Outline:** Follow the recommended outline for scoping reviews and systematic reviews as outlined in the guidelines posted in D2L.

**Final Paper:** It should be **no more 3500 words**. Be concise, cite appropriately and be sure to summarize and integrate findings. Follow the PRISMA guidelines as much as possible. Do not just list result after result. I will read it over carefully and give you feedback on things that you need to change.

**Class Attendance/Participation:** Class attendance and participation is required. Participation will be graded based on preparation to act as the discussion leader for the article/ outbreak case-study during the weeks assigned (3 points each) and 1 point for questions (at least 2 from the article and 2 from the outbreak investigation) submitted by noon the day before each class session to be used in the discussion. Each discussion leader report should have a review of the STROBE criteria (if applicable) for the article discussed as well as a summary of additional important observations.
The noon cutoff will be strictly observed to allow the discussion leaders an opportunity to assimilate and organize questions. Discussion leaders should submit a short one-page summary of key points discussed, to include an assessment of at least 3 STROBE criteria, during the discussion and turn it in to obtain the 3 points credit as discussion leader.

Any student with more than 2 unexcused absences will lose a point for each subsequent absence i.e. for 3 unexcused absences you lose 1 point, for 4 you lose 2 points total etc. All holidays or special events observed by organized religions will be honored for those students who show affiliation with that particular religion. Absences related to professional improvement including conferences, presentations with community partners, will be excused with prior request. Absences pre-approved by the UA Dean of Students (or Dean’s designee) will be honored.

**Late policy:** A copy of each assigned exercise is due by 11:59 pm the day of class it is due in the appropriate folder on D2L. Each day that the homework assignment is late will result in a .5 point deduction from the homework grade. Students are allowed one (1) week long extension on a homework assignment during the course. This extension must be requested prior to the due date of the homework assignment except in cases of emergency. If the extended homework is not submitted within the seven-day period a .5 point deduction will be made for every day past the 7 day extension.

**Required examinations, papers and projects:**

Four exercises  
Participation in group discussions by posting questions on D2L  
Lead discussion  
Four quizzes  
Final paper  
Final Presentation

**Absence and Class Attendance/Participation:** (Expected attendance, participation levels)

In-person and Online courses: All students must attend and engage in the group discussions held each class period. All holidays or special events observed by organized religions will be honored for those students who show affiliation with that religion. Absences pre-approved by the UA Dean of Students (or Dean’s designee will be honored.)

The UA’s policy concerning class attendance, participation, and administrative drops is available at: [http://catalog.arizona.edu/policy/class-attendance-participation-and-administrative-drop](http://catalog.arizona.edu/policy/class-attendance-participation-and-administrative-drop)

The UA policy regarding absences for any sincerely held religious belief, observance or practice will be accommodated where reasonable, [http://policy.arizona.edu/human-resources/religious-accommodation-policy](http://policy.arizona.edu/human-resources/religious-accommodation-policy).

Absences pre-approved by the UA Dean of Students (or Dean Designee) will be honored, [http://deanofstudents.arizona.edu/](http://deanofstudents.arizona.edu/)

**Course Schedule:** (Present the weekly/daily schedule: dates of classes, topics, assignments, readings, including examinations)
Communications: You are responsible for reading emails sent to your UA account from your instructor and the announcements that are placed on the course web site. Information about readings, news events, your grades, assignments and other course related topics will be communicated to you with these electronic methods. The official policy can be found at: https://www.registrar.arizona.edu/personal-information/official-student-email-policy-use-email-official-correspondence-students

Accessibility and Accommodations:
At the University of Arizona, we strive to make learning experiences as accessible as possible. If you anticipate or experience physical or academic barriers based on disability or pregnancy, you are welcome to let me know so that we can discuss options. You are also encouraged to contact Disability Resources (520-621-3268) to explore reasonable accommodation. If our class meets at a campus location: Please be aware that the accessible table and chairs in this room should remain available for students who find that standard classroom seating is not usable. For additional information on Disability Resources and reasonable accommodations, please visit http://drc.arizona.edu/students

Code of Academic Integrity
Students are encouraged to share intellectual views and discuss freely the principles and applications of course materials. However, graded work/exercise must be the product of independent effort unless otherwise instructed. Students are expected to adhere to the UA Code of Academic Integrity, available through the office of the UA Dean Students: http://deanofstudents.arizona.edu/policies-and-codes/code-academic-integrity

Classroom Behavior: (Statement of expected behavior and respectful exchange of ideas:
Present policies to foster a positive learning environment, including use of cell phones, mobile devices, etc.).
Students are expected to be familiar with the UA Policy on Disruptive Student Behavior in an Instructional Setting found at: http://policy.arizona.edu/education-and-student-affairs/disruptive-behavior-instructional-setting

Threatening Behavior Policy: The UA Threatening Behavior by Students Policy prohibits threats of physical harm to any member of the University community, including to one’s self, http://policy.arizona.edu/education-and-student-affairs/threatening-behavior-students

Nondiscrimination and Anti-Harassment Policy:
The University of Arizona is committed to creating and maintaining an environment free of discrimination, http://policy.arizona.edu/human-resources/nondiscrimination-and-anti-harassment-policy

UA Smoking and Tobacco Policy:
The purpose of this Policy is to establish the University of Arizona’s (University) commitment to protect the health of University faculty, staff, students, and visitors on its campuses and in its vehicles, http://policy.arizona.edu/ethics-and-conduct/smoking-and-tobacco-policy

Syllabus Changes: Information contained in the course syllabus, other than the grade and absence policies, may be subject to change with reasonable advance notice, as deemed appropriate by the instructor.
Plagiarism: What counts as plagiarism?
- Copying and pasting information from a web site or another source, and then revising it so that it sounds like your original idea.
- Doing an assignment/essay/take home test with a friend and then handing in separate assignments that contain the same ideas, language, phrases, etc.
- Quoting a passage without quotation marks or citations, so that it looks like your own.
- Paraphrasing a passage without citing it, so that it looks like your own.
- Hiring another person to do your work for you, or purchasing a paper through any of the on- or offline sources.

Gender Pronoun Guideline

It is already UA policy that class rosters are provided to instructors with a student’s preferred name. Students may share their preferred name and pronoun with members of the teaching staff and fellow students, as desired, and these gender identities and gender expressions will be honored in this course. As the course includes group work and in-class discussion, it is critical to create an educational environment of inclusion and mutual respect. In this class, to be inclusive of all gender identities and expressions, students will be referred to by their first or last names, the pronoun of their choice, or by default, the pronoun “they”.

Content Advisory Guideline

Notification of Objectionable Materials (recommended, not required):
“This course will contain material of a mature nature, which may include explicit language, depictions of nudity, sexual situations, and/or violence. The instructor will provide advance notice when such materials will be used. Students are not automatically excused from interacting with such materials, but they are encouraged to speak with the instructor to voice concerns and to provide feedback. [http://gened.arizona.edu/content/course-syllabus-guidelines](http://gened.arizona.edu/content/course-syllabus-guidelines).”
Schedule

Week 1: January 10th - Introduction to class
Topic (Ernst): History of Infectious Disease Epidemiology and Introductory Concepts
In class Exercise
Readings: WHO Global Priorities, Christian et. al.

Week 2: January 17th
Topic: Key Concepts cont. and Study Design
Readings: Bingham et. al., Delemater et. al.
Due: Discussion Questions (DQ) 1

Week 3: January 24th
Topic: Infectious Disease Modeling
Guest lecturer: Jenna Coalson
Readings: Karl et. al., R- website links
Due: NO DQ this week, Dr. Coalson will go over the readings in class with you as a group, Homework 1 – Microcephaly and Zika

Week 4: January 31st
Topic: Immunity and Molecular Methods
Guest lecturer: Jean McClelland (Systematic Search Methods for Literature Review)
Readings: Witney et. al., Mugyia et. al.
Due: DQ 2, Quiz 1, Report Topic Idea

Week 5: February 7th
Topic: Infectious Disease Surveillance Systems
Guest: Mary Hayden
Readings: Camacho et. al., Benson et. al.
Due: DQ 3, Report Search Strategy and Inclusion/ Exclusion Criteria

Week 6: February 14th
Topic: Sexual Transmission
Guest: TBD
Readings: CDC, Sullivan et. al.
Due: DQ 4, Homework 2 – Surveillance Homework

Week 7: February 21st
Topic: Vector-borne Transmission
Guest Lecture: TBD
Readings: Rosenberg et. al., Tusting et. al.
Due: DQ 5, Quiz 2, Final Paper Initial Reference List

Week 8: February 28th
Topic: Outbreak Investigations
In class exercise
Readings: Brown et. al, Huang et. al., WHO
Due: DQ 6

Week 9: March 7th
Spring Break! Have Fun and Stay Safe!!

Week 10: March 14th
Topic: Fecal – Oral Transmission
Guest Lecture: Kristen Pogreba-Brown and Kerry Cooper
Readings: Baker et. al., Chokshi et. al, HeimanMarshall
Due: DQ 7, Homework 3 – Outbreak Investigation, Final Paper Reference List Final

Week 11: March 21st
Topic: Respiratory Infections
Guest Lecture: TBD
Readings: Hayward et. al, Lochlain et. al
Due: DQ 8, Quiz 3

Week 12: March 28th
Topic: Clinically-acquired infections
Guest Lecture: Kate Ellingson – Infections during transplantation
Readings: Munier et. al, Ndegwa et. al
Due: DQ 9, Homework 4 – Global Change,

Week 13: April 4th
Topic: Vaccine Preventable Diseases
Readings: Bavdekar et. al, Daley et. al.
Due: DQ 10, Paper Outline

Week 14: April 11th
Topic: “Chronic” diseases and infection
Readings: Schwille-Kjuntke et. al., Aguilar et. al.
Due: DQ 11, Quiz 4

Week 15: April 18th
Class Presentations

Week 16: April 25th
Class presentations

FINAL REPORT DUE APRIL 27th at 5pm