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:**

**MPH Competencies**

(1) Search, describe and summarize findings from the scientific literature to describe the epidemiology of a public health problem, identify health disparities and identify risk factors.
   a. Final systematic review protocol paper – students will work throughout the semester to develop a protocol paper for a systematic review. They will learn the methodology to
conduct a systematic review in the process. As part of the final project they must identify a significant topic to conduct a systematic review on.

(2) Compare the relative strengths and weaknesses of epidemiological study designs, and choose the most appropriate design for specific research questions.
   a. Homework 2: Students are asked to develop a study design to examine the potential association between microcephaly and Zika infection.

Assess and identify strategies to minimize bias in analytic, along with assessing effect modification and confounding, then stratifying or adjusting as appropriate in analyses.
   a. Weekly discussions and discussion leader reflections: Students will lead discussion groups twice during the semester. All students in the class will post questions in response to the readings assigned; one applied reading (typically an outbreak investigation) and one research study reading. Student leaders aggregate these questions and must discuss at least two of the STROBE criteria during their weekly discussion groups. They then write a short reflection summarizing the discussion with their peers.

(5) Interpret these epidemiological analyses in the context of published literature and communicate key findings to various audiences.
   a. Final presentation: In the last two class sessions students present the methods they have planned to use for their protocol paper and a summary of their topic.

**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.
   a. Homework 2: Students are asked to develop a study design to examine the potential association between microcephaly and Zika infection.

(2) Critique and synthesize appropriate literature and research findings to address a research question.
   a. Final systematic review protocol paper – students will identify a topic
   b. Weekly discussions and discussion leader reflections: Students will lead discussion groups twice during the semester. All students in the class will post questions in response to the readings assigned; one applied reading (typically an outbreak investigation) and one research study reading. Student leaders aggregate these questions and must discuss at least two of the STROBE criteria during their weekly discussion groups. They then write a short reflection summarizing the discussion with their peers.

(3) Identify potential sources of bias for various study designs and their impact on study quality.
   a. Final review paper – students develop a protocol paper for a systematic review on a topic of their choosing and will outline specific inclusion/ exclusion criteria and identify how they will rank quality of the studies.
   b. Weekly discussions and discussion leader reflections: Students will lead discussion groups twice during the semester. All students in the class will post questions in response to the readings assigned; one applied reading (typically an outbreak investigation) and one research study reading. Student leaders aggregate these questions and must discuss at least two of the STROBE criteria during their weekly discussion groups. They then write a short reflection summarizing the discussion with their peers.

(5) Describe public health surveillance systems and their underlying data sources.
   a. Homework 3: Students assess five different types of surveillance system, including
standard passive surveillance for simplicity, flexibility, acceptability, data quality, sensitivity and predictive value positive (PvP), representativeness, timeliness, cost / resources. They then select one of four novel surveillance strategies and conduct a mini-literature review.

(7) Organize and deliver clear presentations of research findings in varying professional formats to diverse audiences.
   a. Final presentation: In the last two class sessions students present their systematic review protocol to the other students in the course.

PhD Epidemiology Competencies

(2) Develop research questions to address health problems by appraising and identifying gaps in the current scientific literature.
   a. Final review paper – students work throughout the semester to develop a systematic review protocol and write a protocol paper on a topic of their choosing. This entails them developing a research question that will be the focus of the systematic review and contextualizing and justifying its choice.

(5) Lead group interactions competently, ethically, respectfully and professionally to diverse audiences.
   a. Weekly discussions and discussion leader reflections: Students will lead discussion groups twice during the semester. All students in the class will post questions in response to the readings assigned; one applied reading (typically an outbreak investigation) and one research study reading. Student leaders aggregate these questions and must discuss at least two of the STROBE criteria during their weekly discussion groups. They then write a short reflection summarizing the discussion with their peers.

(6) Organize and deliver clear presentations of research findings in varying professional formats to diverse audiences.
   a. Final presentation: In the last two class sessions students present their systematic review protocol to the other students in the course.

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 text for this course.


Course Requirements: Students are required to actively participate in class discussion and activities include collaborative work during class periods. Class assignments, including reading assignments, homework and course projects, must be completed on time. Every student can have one extension no questions asked.
a. **Reading:** Two papers are listed for each session in the course schedule. Students are expected to read each assignment and prepare discussion points for D2L (see below). They should be ready to discuss readings in class.

b. **Discussion Board:** To facilitate the discussion of the readings, students are required to post two questions for each reading to the discussion board by noon on the Wednesday prior to class. This allows the Discussion Leader time to aggregate the questions. You should examine the papers in relation to the STROBE criteria for assessing the quality of epidemiological papers.

c. **Discussion Lead:** Students will serve as discussion lead for their small group break out sessions two times throughout the semester. You will be responsible for aggregating the discussion posts and organizing them to lead the discussion on the following Thursday session. As discussion lead, you will be responsible for writing up a short paragraph on one key point that was of interest to the discussion group.

d. **Quiz:** Quizzes on content from lectures will be given as indicated at the beginning of the class sessions. They will be based on the material delivered from the time of the last quiz (i.e. it is not cumulative). There are four quizzes during the semester.

e. **Homework:** There will be 4 homework throughout the semester that will reinforce concepts in 1) study design, 2) outbreak analysis, 3) surveillance systems, and 4)

f. **Systematic review protocol paper:** This is a group project that entails developing a rigorous protocol to conduct a systematic review of an infectious disease topic. Students have multiple interim deadlines including topic identification, search strategy (keywords, databases, inclusion/ exclusion criteria), data extraction tool, and final protocol paper.

g. **Final presentation:** Each student will write a conference-style abstract based on the group work.
Grading Scale/Student Evaluation and Policies:

Students’ final grade is determined by the following components:

<table>
<thead>
<tr>
<th>Assessment Methods</th>
<th>Due Dates</th>
<th>Total Points</th>
<th>Percent (point%) as the Final Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discussion Boards</td>
<td>Wednesdays, 12pm, each week</td>
<td>1 point each/ x 12</td>
<td>12%</td>
</tr>
<tr>
<td>Discussion Lead</td>
<td>As assigned</td>
<td>4 points/ x 2</td>
<td>8%</td>
</tr>
<tr>
<td>Quiz 1</td>
<td>2/13/2020</td>
<td>5</td>
<td>5%</td>
</tr>
<tr>
<td>Quiz 2</td>
<td>3/12/2020</td>
<td>5</td>
<td>5%</td>
</tr>
<tr>
<td>Quiz 3</td>
<td>4/16/2020</td>
<td>5</td>
<td>5%</td>
</tr>
<tr>
<td>Homework 1: Outbreak assessment</td>
<td>1/30/2020</td>
<td>5</td>
<td>5%</td>
</tr>
<tr>
<td>Homework 2: Study Design</td>
<td>2/20/2020</td>
<td>5</td>
<td>5%</td>
</tr>
<tr>
<td>Homework 3: Surveillance System</td>
<td>3/5/2020</td>
<td>5</td>
<td>5%</td>
</tr>
<tr>
<td>Homework 4: CDC Case study</td>
<td>4/9/2020</td>
<td>5</td>
<td>5%</td>
</tr>
<tr>
<td>Protocol paper</td>
<td>5/3/2020 at 5pm</td>
<td>25</td>
<td>25%</td>
</tr>
<tr>
<td>Presentation of SR protocol</td>
<td>4/23/2020 or 4/30/2020</td>
<td>20</td>
<td>20%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>100</td>
<td>100%</td>
</tr>
</tbody>
</table>

Grade scale for the final grade:

<table>
<thead>
<tr>
<th>Letter Grade</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>90%-100%</td>
</tr>
<tr>
<td>B</td>
<td>80%-89%</td>
</tr>
<tr>
<td>C</td>
<td>70%-79%</td>
</tr>
<tr>
<td>D</td>
<td>60%-69%</td>
</tr>
<tr>
<td>E</td>
<td>&lt; 60%</td>
</tr>
</tbody>
</table>
Final Systematic Review Protocol Paper:

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 you are reviewing.

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 and provide basic details on the number of hits.

Final paper sample screening: Develop a shared google sheets in which you pull in the first 20 titles from your test search. Set it up for all three individuals to review and indicate which are included and which are excluded and the reason why. For those that you would include in the abstract review, do the same thing – pull in the abstract, review the abstract and decide if it is included/excluded and why.

Final Paper Data Extraction form: A form will be created that you would use to extract information from each of the research articles that you will include within the final systematic review.

Final Paper: It should be no more than 2000 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 over it carefully and give you feedback on things that you need to change.

Class Attendance/Participation: Class attendance and participation is required. Participation will be assessed by contributions to the D2L discussion boards and by acting as the discussion lead for the small group discussions. 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.

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
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](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](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](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](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](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](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](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 off-line 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).”
<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Readings</th>
<th>Assignments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 1: 1/16/2020</td>
<td>Introduction to Infectious Disease Concepts</td>
<td>WHO Global Priorities, Christian et. al.</td>
<td>Discussion Board 1</td>
</tr>
<tr>
<td>Week 2: 1/23/2020</td>
<td>Outbreak Investigations Guest: Dr. Kristen Pogreba-Brown</td>
<td>Brown et. al, Huang et. al., WHO</td>
<td>Discussion Board 2</td>
</tr>
<tr>
<td>Week 3: 1/30/2020</td>
<td>Study Design in Infectious Disease Epidemiology Guest: Jean McClelland – Overview of Systematic Reviews</td>
<td>STROBE criterion Kahn et. al. Harder et. al.</td>
<td>Discussion Board 3, Homework 1: Outbreak detection</td>
</tr>
<tr>
<td>Week 4: 2/6/2020</td>
<td>Infectious Disease Surveillance</td>
<td>Camacho et. al., Benson et. al.</td>
<td>Discussion Board 4</td>
</tr>
<tr>
<td>Week 5: 2/13/2020</td>
<td>Sexually transmitted infections Guest: Dr. Purnima Madhivanan</td>
<td>Traeger et. al. Sullivan et. al.</td>
<td>Discussion Board 5, Quiz 1</td>
</tr>
<tr>
<td>Week 6: 2/20/2020</td>
<td>Vector-borne diseases Guest: Valerie Madera-Garcia</td>
<td>Rosenberg et. al., Tusting et. al.</td>
<td>Discussion Board 6, Homework 2: Study Designs</td>
</tr>
<tr>
<td>Week 7: 2/27/2020</td>
<td>Respiratory transmission Guest: Jean McClelland – Building your search strategy</td>
<td>Baker et. al. Lee et. al.</td>
<td>Discussion Board 7, Final review protocol: topic including 2-page referenced background and justification for the systematic review.</td>
</tr>
<tr>
<td>Week 8: 3/5/2020</td>
<td>Hospital acquired infections and antibiotic resistance Guest: Dr. Kate Ellingson</td>
<td>Ochoa-Hein et. al. See et. al.</td>
<td>Discussion Board 8, Homework 3: Surveillance systems</td>
</tr>
<tr>
<td>Week 9: 3/12/2020</td>
<td>Spring Break! Have fun and be safe!!</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Week 9: 3/19/2020</td>
<td>Immunity and Vaccine Preventable Diseases [Tentative] Guest: Pima County Health Department</td>
<td>Hadjipanayis et. al. Mack et. al.</td>
<td>Discussion Board 9, Quiz 2</td>
</tr>
<tr>
<td>Week 11: 3/26/2020</td>
<td>Fecal-oral transmission</td>
<td>Mertens et. al. Michel et. al.</td>
<td>Discussion Board 10</td>
</tr>
<tr>
<td>Week 12: 4/2/2020</td>
<td>Intro to Infectious Disease Modeling</td>
<td>Karl et. al.</td>
<td>Discussion Board 11 Final Review Paper: Data extraction tool</td>
</tr>
<tr>
<td>-------------------</td>
<td>-------------------------------------</td>
<td>--------------</td>
<td>----------------------------------------------------------</td>
</tr>
<tr>
<td>Week 14: 4/16/2020</td>
<td>Work in groups to prepare presentations</td>
<td>Quiz 3</td>
<td></td>
</tr>
<tr>
<td>Week 15: 4/23/2020</td>
<td>Group Presentations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Week 16: 4/30/2020</td>
<td>Group Presentations</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Final Protocol paper due 5/3/2020</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>