

Term Information

Effective Term Summer 2021

General Information

Course Bulletin Listing/Subject Area Evol, Ecology & Organismal Bio
Fiscal Unit/Academic Org Evolution, Ecology & Org Bio - D0390
College/Academic Group Arts and Sciences
Level/Career Undergraduate
Course Number/Catalog 3998
Course Title Undergraduate Research: Infectious Disease Ecology, Evolution, and Transmission
Transcript Abbreviation UGrad Res: Disease
Course Description This course will focus on innate and adaptive immunity, host-pathogen evolution, phenotypic plasticity, host jump, wild life ecology, the role of social behavior, diet, habitat, geography, and life history in disease transmission in human and nonhuman animals. It will also cover research methods, common statistical and geospatial analyses in investigations of infectious diseases.
Semester Credit Hours/Units Fixed: 3

Offering Information

Length Of Course 14 Week, 12 Week
Flexibly Scheduled Course Never
Does any section of this course have a distance education component? Yes
Is any section of the course offered 100% at a distance
Grading Basis Letter Grade
Repeatable No
Course Components Laboratory, Lecture
Grade Roster Component Lecture
Credit Available by Exam No
Admission Condition Course No
Off Campus Never
Campus of Offering Columbus

Prerequisites and Exclusions

Prerequisites/Corequisites
Exclusions Not open to freshmen
Electronically Enforced Yes

Cross-Listings

Cross-Listings

Subject/CIP Code

Subject/CIP Code 26.1309
Subsidy Level Baccalaureate Course
Intended Rank Sophomore, Junior, Senior

Requirement/Elective Designation

The course is an elective (for this or other units) or is a service course for other units

Course Details

Course goals or learning objectives/outcomes

- Students will learn the foundations of disease ecology
- Students will be able to identify ecological and evolutionary mechanisms that drive the transmission of pathogens
- Students will learn how social behavior, diet, habitat use, life history, and geography contribute to disease risk in in human and nonhuman animals with implications for conservation and population health.
- Students will be able to design studies, use common statistical and geospatial methods in investigations of infectious diseases, collect and interpret data, and present findings
- Students will gain necessary communication and critical thinking skills for scientific inquiry and address broader implications of a research question

Content Topic List

- Evolution and ecology of infectious diseases
 - Host & parasite traits, social behavior, diet, habitat use, life history, geography, & disease risk in human and nonhuman animals
 - Behavioral and immune defenses
 - Cross-species transmission of pathogens
 - Research design and statistical analysis
 - Nonhuman animal, human clinical and behavioral research ethics
- No

Sought Concurrence

Attachments

- EEOB 3998_Ian Anderson_DL.docx: Distance Learning Course Component Technical Review
(Other Supporting Documentation. Owner: Hamilton,Ian M)
- EEOB Curriculum Maps September 2020.xlsx: Curriculum Maps
(Other Supporting Documentation. Owner: Hamilton,Ian M)
- Infectious Diseases_Online_9_27_20.docx: Syllabus
(Syllabus. Owner: Hamilton,Ian M)

Comments

- This course was offered as a section of EEOB 3194 - Group Studies in Summer 2020. *(by Hamilton,Ian M on 09/27/2020 02:40 PM)*

Workflow Information

Status	User(s)	Date/Time	Step
Submitted	Hamilton,Ian M	10/01/2020 11:09 AM	Submitted for Approval
Approved	Hamilton,Ian M	10/01/2020 11:10 AM	Unit Approval
Approved	Haddad,Deborah Moore	10/01/2020 12:40 PM	College Approval
Pending Approval	Jenkins,Mary Ellen Bigler Hanlin,Deborah Kay Oldroyd,Shelby Quinn Vankeerbergen,Bernadette Chantal	10/01/2020 12:40 PM	ASCCAO Approval

**EEOB 3998 - UNDERGRADUATE RESEARCH:
INFECTIOUS DISEASE ECOLOGY, EVOLUTION, AND TRANSMISSION
TENTATIVE SYLLABUS
SUMMER 2020 FULL TERM - 3 CR HRS**

Instructor: Dr. Zeynep Benderlioglu

Office Hours: By appointment via Carmen zoom

e-mail: benderlioglu.1@osu.edu

Phone: 614 292 5965

Required Textbook: *Applied Statistics and the SAS Programming Language 5th Edition* (hard copy). 2006. Cody, R, Smith J. Pearson/Prentice Hall.

Web link: <http://www.amazon.com/Applied-Statistics-Programming-Language-Edition/dp/0131465325>

Recommended Textbook: Common Statistical Methods for Clinical Research, 3rd Edition, 2010, Walker GA. ISBN-13: 978-1590470404

<https://www.amazon.com/Statistical-Methods-Clinical-Research-Examples/dp/1590470400>

Additional Readings: Reading assignments on articles, other course materials, lecture notes, and handouts will be posted on CARMEN (<http://carmen.osu.edu/>).

Prerequisites: Not open to freshmen

Course Description

The emergence of the global pandemic COVID-19 and other diseases that result from cross-species transmission remind us once more the need to understand the wildlife ecology of infectious diseases, evolutionary arms race between host and pathogens, and the impact of environmental pressures on global disease transmission.

Our specific topics in this course will include innate and adaptive immunity, host-pathogen evolution, phenotypic plasticity, host jump, the role of social behavior, diet, habitat, geography, and life history in disease transmission in human and nonhuman animals.

This course will also teach you research methods and common statistical analyses in investigations of infectious diseases. You will learn advanced applied statistics with SAS software and other analytic and presentation tools using online geographical information systems sources, namely ArcGIS. You will learn how to map out disease outbreaks, prepare dashboards, and engage in interactive analyses. At the end of the term, you will participate in a virtual research symposium by presenting an ArcGIS story map as your final research project.

Learning Objectives:

- a. Students will learn the foundations of disease ecology
- b. Students will be able to identify ecological and evolutionary mechanisms that drive the transmission of pathogens
- c. Students will learn how social behavior, diet, habitat use, life history, and geography contribute to disease risk in human and nonhuman animals with implications for conservation and population health.
- d. Students will be able to design studies, use common statistical and geospatial methods in investigations of infectious diseases, collect and interpret data, and present findings
- e. Students will gain necessary communication and critical thinking skills for scientific inquiry and address broader implications of a research question

Evaluation

Students are expected to actively participate in classwork and data collection. They will work in groups in the form of virtual labs, thus emphasizing the importance of collaboration in any scientific work.

There will be several take-home exams, discussion question postings, and a final project assignment throughout the semester. The exams will be on research methods and statistics. The due dates are posted in the weekly schedule below. They will be time-constrained in that each individual will have 24 hours to complete the exam from the time it is posted. Discussion questions will provide the groundwork for research projects. Students will first design and propose research. These proposals will then be turned into actual projects. Group projects up to 3 individuals are allowed. Data will be collected from global infectious disease resource centers and geospatial information made available by OSU's ArcGIS online subscription. Virtual data labs will be flexible and based on student schedules. They aim to facilitate the implementation of the symposium.

The grades will be assessed according to the following scheme:

1. *Research Methods Quiz* (5)
2. *Homework assignment: Literature Review* (5 points)
3. Discussion Questions (15 points)
4. *Presentation of Research Design and Hypotheses* (15 points)
5. *Final Project* (15 points)
6. *Midterm I* (15 points)
7. *Midterm II* (15 points)
8. *Participation* (15 points)

Total: 100 points

Grade Scale: Your final grade will be based on the following scale:

93–100: A
90–92.9: A-
87–89.9: B+
83–86.9: B
80–82.9: B-
77–79.9: C+
73–76.9: C
70–72.9: C-
67–69.9: D+
60–66.9: D
Below 60: E

There are no extra credits. However, minor adjustments may be made on the basis of improvement and/or participation. Course policies regarding the assignments are outlined below.

Grading and feedback

Before an assignment's/exam's due date, a handout on how to complete it will be posted on Carmen. These guidelines should be followed closely as they constitute what your assignments/exams should cover and what sources you should be using.

You can generally expect feedback within 7 days. I will reply to e-mails within 24 hours on school days.

Online live/recorded sessions

All live, scheduled events for the course are optional. For live presentations/discussions on research, geospatial software, and statistical methods, I will provide a recording that you can watch later. I will also provide written information and supplementary material on Carmen. Check our weekly schedule below for the timeline of the class activities. Zoom sessions are optional, but students are encouraged to provide common schedules so that I can hold live sessions on those times in case you would like to participate.

Attendance, participation, and discussions

Because this is a distance-education course, your attendance is based on your online activity and participation (15% of the total grade). The following is a summary of expected participation:

- Logging in: AT LEAST THREE TIMES PER WEEK either through virtual data labs or discussion forums. Overall, I expect daily activity coming from a variety of student lab groups. Participation in virtual data labs and recorded lectures through discussion questions will greatly affect your total grade.
- Typical course week will be two 80-minute-long lecture-equivalent of online instruction. That is, an 80-min face-to face instruction of course material will be translated into a recorded session and posted on Carmen. This will be done twice a week. Plus, there will be a virtual data lab once a week. Labs are based on student schedules. A class survey will be distributed during the first week of the semester to find common schedules. The time spent for labs should focus on discussion questions, data collection, statistical and geospatial analyses. It is expected that the students spend at least two hours a week on virtual labs.

The following are my expectations for how we should communicate as a class. Above all, please remember to be respectful and thoughtful.

- Tone and civility: Please maintain a supportive learning community
- Citing your sources: When we have academic discussions, please cite your sources to back up what you say.

Course technology and necessary skills:

This is an online course, you must be skilled or seek help on:

- Carmen Zoom text, audio, and video chat
- Collaborating in CarmenWiki
- Recording a slide presentation with audio narration
- Recording, editing, and uploading video

The following equipment is necessary in following the course material:

- Computer: current Mac (OS X) or PC (Windows 7+) with high-speed internet connection
- Webcam: built-in or external webcam, fully installed
- Microphone: built-in laptop or tablet mic or external microphone

Necessary software

- Microsoft Office 365 ProPlus. All Ohio State students are now eligible for free Microsoft Office 365 ProPlus through Microsoft's Student Advantage program. Each student can install Office on five PCs or Macs, five tablets (Windows, iPad® and Android™) and five phones.
- Students are able to access Word, Excel, PowerPoint, Outlook and other programs, depending on platform. Users will also receive 1 TB of OneDrive for Business storage.
- Office 365 is installed within your BuckeyeMail account. Full instructions for downloading and installation can be found <https://ocio.osu.edu/kb04733>.
- SAS online for academics will be used for statistics. The software is free and cloud based. A class account will be created at the start of the term. You will get access to the software at https://www.sas.com/en_us/software/on-demand-for-academics.html
- ArcGIS for geographical information systems. All students at OSU has access to this software through <https://doc.arcgis.com/en/arcgis-online/get-started/what-is-ago.html> Further instructions will be provided in virtual labs.

For help with your password, university e-mail, Carmen, or any other technology issues, questions, or requests, contact the OSU IT Service Desk. Standard support hours are available at <https://ocio.osu.edu/help/hours>, and support for urgent issues is available 24x7.

- Self-Service and Chat support: <http://ocio.osu.edu/selfservice>
- Phone: 614-688-HELP (4357)
- Email: 8help@osu.edu
- TDD: 614-688-8743

Academic integrity policy

Policies for this online course

- Quizzes and exams: You must complete the midterm and final exams yourself, without any external help or communication.
- Reusing past work: You are prohibited in university courses from turning in work from a past class to your current class, even if you modify it.

- Falsifying research or results: All research you will conduct in this course is intended to be a learning experience; you should never feel tempted to make your results
- Collaboration and informal peer-review: The course includes many opportunities for formal collaboration with your classmates. While study groups are encouraged, remember that comparing answers on a quiz or exam is not permitted. If you're unsure about a particular situation, please feel free just to ask ahead of time.
- Group work: This course includes teamwork in the form of virtual labs and group projects, which can be stressful for students when it comes to dividing work, taking credit, and receiving grades and feedback. Please let me know if you have any questions.

Ohio State's academic integrity policy

It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term "academic misconduct" includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct <http://studentlife.osu.edu/csc/>.

Copyright disclaimer

The materials used in connection with this course may be subject to copyright protection and are only for the use of students officially enrolled in the course for the educational purposes associated with the course. Copyright law must be considered before copying, retaining, or disseminating materials outside of the course.

Diversity

The Ohio State University affirms the importance and value of diversity in the student body. Our programs and curricula reflect our multicultural society and global economy and seek to provide opportunities for students to learn more about persons who are different from them. We are committed to maintaining a community that recognizes and values the inherent worth and dignity of every person; fosters sensitivity, understanding, and mutual respect among each member of our community; and encourages each individual to strive to reach his or her own potential. Discrimination against any individual based upon protected status, which is defined as age, color, disability, gender identity or expression, national origin, race, religion, sex, sexual orientation, or veteran status, is prohibited.

Statement on title IX

Title IX makes it clear that violence and harassment based on sex and gender are Civil Rights offenses subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories (e.g., race). If you or someone you know has been sexually harassed or assaulted, you may find the appropriate resources at <http://titleix.osu.edu> or by contacting the Ohio State Title IX Coordinator, Kellie Brennan, at titleix@osu.edu

Accessibility accommodations for students with disabilities

The university strives to make all learning experiences as accessible as possible. In light of the current pandemic, students seeking to request COVID-related accommodations may do so through the

university's [request process](#), managed by Student Life Disability Services. If you anticipate or experience academic barriers based on your disability (including mental health, chronic, or temporary medical conditions), please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I may request that you register with Student Life Disability Services. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. SLDS contact information: slds@osu.edu; 614-292-3307; slds.osu.edu; 098 Baker Hall, 113 W. 12th Avenue.

Accessibility of course technology

This online course requires use of Carmen (Ohio State's learning management system) and other online communication and multimedia tools. Tools such as Zoom, Office 365, and Carmen are updated regularly. If you need additional services to use these technologies, please request accommodations with your instructor.

- Carmen (Canvas) accessibility
- Streaming audio and video
- Synchronous course tools

Your mental health!

As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce a student's ability to participate in daily activities. The Ohio State University offers services to assist you with addressing these and other concerns you may be experiencing. If you or someone you know are suffering from any of the aforementioned conditions, you can learn more about the broad range of confidential mental health services available on campus via the Office of Student Life's Counseling and Consultation Service (CCS) by visiting ccs.osu.edu or calling 614- 292-5766. CCS is located on the 4th Floor of the Younkin Success Center and 10th Floor of Lincoln Tower. You can reach an on call counselor when CCS is closed at 614-292-5766 and 24 hour emergency help is also available through the 24/7 National Suicide Prevention Hotline at 1-800-273- TALK or at suicidepreventionlifeline.org

Errors & Omissions: This syllabus may be altered based on unforeseen circumstances. Corrected versions will be posted on CARMEN.

Weekly Schedule

Week	Dates	Topics, Readings, Assignments, Deadlines
1	Week of May 12	Introduction: Evolution and ecology of infectious diseases Infectious disease data resource centers

2	Week of May 17	Innate and adaptive immunity: immunological memory, autoimmunity, & immunodeficiency in human and nonhuman animals, wildlife disease ecology ArcGIS Module I (Intro) <i>Carmen Week 2 Readings</i>
3	Week of May 24	Host & parasite traits, social behavior, diet, habitat use, life history, geography, & disease risk in human and nonhuman animals ArcGIS Module II (Map Viewing) Carmen Week 3 Readings
4	Week of June 1	Behavioral and immune defenses: implications for wildlife conservation and human health Host-pathogen evolution: virulence and phenotypic plasticity ArcGIS Module III (Map Prep) Carmen Week 4 Readings
5	Week of June 7	Cross-species transmission of pathogens: COVID-19, HIV, Ebola, SARS, swine flu, avian influenza ArcGIS Module IV (Dashboards) Carmen Week 5 Readings
6	Week of June 14	Research design principles/ literature review, development of hypotheses, sampling ArcGIS Module V (Story Maps) Carmen Week 6 Lecture Notes Assignment due: literature review: June 16 Quiz: June 18
7	Week of June 21	Introduction to descriptive statistics and SAS programming language, Biostatistics: Common statistical methods in investigations of infectious diseases Walker GA, Chapters 1, 2. SAS onDemand for Academics https://www.sas.com/en_us/software/on-demand-for-academics.html
8	Week of June 28	Nonhuman animal, human clinical and behavioral research ethics Office of Responsible Research Practices (ORRP) at OSU – https://orrrp.osu.edu/

		Assignment due: Recorded Project Proposals – June 30
9	Week of July 5	T-tests, and one-way analysis of variance (ANOVA), non-parametric statistics Walker GA, Chapters 4, 6, 13, Midterm I – July 9
10	Week of July 12	Correlation, regression, odds ratio, risk analyses Walker GA, Chapters 9, 10, Cody & Smith Chapters 7, 9
11	Week of July 19	Multi-factor and repeated measures ANOVA Interpretation of data and graphics Walker GA, Chapters 7, 8, Cody & Smith Chapters 5, 6
12	Week of July 26	Climate change, natural disasters, migration, and global pandemics, biological and social factors underlying health disparities in human populations Carmen Week 12 Readings Midterm II -July 30
13	August 2	Final Project Story Maps – Research Symposium: (live discussions will also be arranged in Zoom through web-based poll for a common time. Students are encouraged to attend, but participation is optional)

Note: Discussion question posting deadlines and topics will be announced during the term.

Arts and Sciences Distance Learning Course Component Technical Review Checklist

Course: EEOB 3998

Instructor: Dr. Zeynep Benderlioglu

Summary: Infectious Disease Ecology, Evolution and Transmission

Standard - Course Technology	Yes	Yes with Revisions	No	Feedback/Recomm.
6.1 The tools used in the course support the learning objectives and competencies.	X			<ul style="list-style-type: none"> Articles, reading assignments, lecture notes, handouts and other course materials will be made available in Carmen.
6.2 Course tools promote learner engagement and active learning.	X			<ul style="list-style-type: none"> Weekly posts using Carmen Discussion boards Group project using Zoom
6.3 Technologies required in the course are readily obtainable.	X			<ul style="list-style-type: none"> All tools should be available for free via OSU site license.
6.4 The course technologies are current.	X			<ul style="list-style-type: none"> Tools such as Zoom, Office 365 and Carmen are updated regularly.
6.5 Links are provided to privacy policies for all external tools required in the course.	X			<ul style="list-style-type: none"> No third party tools are used. So all privacy policies are covered by OSU agreements.
Standard - Learner Support				
7.1 The course instructions articulate or link to a clear description of the technical support offered and how to access it.	X			Links to 8HELP are included
7.2 Course instructions articulate or link to the institution's accessibility policies and services.	X			a
7.3 Course instructions articulate or link to an explanation of how the institution's academic support services and resources can help learners succeed in the course and how learners can obtain them.	X			b
7.4 Course instructions articulate or link to an explanation of how the institution's student services and resources can help learners succeed and how learners can obtain them.	X			c
Standard – Accessibility and Usability				
8.1 Course navigation facilitates ease of use.	X			Recommend using the Carmen Distance Learning “Master Course” template developed by ODEE and available in the Canvas Commons to provide student-users with a consistent user experience in terms of navigation and access to course content.
8.2 Information is provided about the accessibility of all technologies required in the course.	X			
8.3 The course provides alternative means of access to course materials in formats that meet the needs of diverse learners.	X			Recommend that resources be developed to address any requests for alternative means of access to course materials.

8.4 The course design facilitates readability	X		Recommend using the Carmen Distance Learning "Master Course" template developed by ODEE and available in the Canvas Commons to provide student-users with a consistent user experience in terms of navigation and access to course content.
8.5 Course multimedia facilitate ease of use.	X		All assignments and activities that use the Carmen LMS with embedded multimedia facilitates ease of use. All other multimedia resources facilitate ease of use by being available through a standard web browser.

Reviewer Information

- Date reviewed: 9/14/20
- Reviewed by: Ian Anderson

Notes: Replace reference to CarmenConnect with CarmenZoom.

^aThe following statement about disability services (recommended 16 point font): Students with disabilities (including mental health, chronic or temporary medical conditions) that have been certified by the Office of Student Life Disability Services will be appropriately accommodated and should inform the instructor as soon as possible of their needs. The Office of Student Life Disability Services is located in 098 Baker Hall, 113 W. 12th Avenue; telephone 614- 292-3307, slds@osu.edu; slds.osu.edu.

^bAdd to the syllabus this link with an overview and contact information for the student academic services offered on the OSU main campus. <http://advising.osu.edu/welcome.shtml>

^cAdd to the syllabus this link with an overview and contact information for student services offered on the OSU main campus. <http://ssc.osu.edu>. Also, consider including this link in the "Other Course Policies" section of the syllabus.