



SYLLABUS

ENTMLGY 2400H

Evaluating Evidence in Biology & Medicine

Autumn 2022

3 credit hours

In-Person T& TH 12:45-2:05PM; Lazenby Hall 001

COURSE OVERVIEW

Instructor

Instructor: Dr. Ellen Klinger

Email address: klinger.80@osu.edu (preferred contact method)

Office: Kottman Hall 255

Office hours: Tuesday 2:45-3:45PM, e-mail instructor to arrange appointment for other in-person or virtual meetings

Prerequisites

Honors Standing

Course description

Explores information and scientific literacies in biology and medicine, with emphasis on science as reported in the media and the use of insects and other organisms as model systems. We use evolutionary theory as the unifying framework for all life on earth. The ability to scrutinize science as reported in popular sources and to procure additional, credible information is emphasized.

Course fulfills Legacy GE for Natural Science/Biological Science

Course learning outcomes

By the end of this course, students should successfully be able to:

- locate, acquire, assess, and summarize science-related information from an array of sources (e.g. scholarly journals, government websites, news outlets, social media, etc.).
- evaluate the currency, relevance, context, authority, accuracy, purpose, reliability, and potential bias associated with a given source.
- compare & contrast the nature of scientific information from various sources (scholarly, primary sources; review articles, textbooks, various websites, news outlets, etc.).
- explain why authorities/information sources in one realm (e.g., scientists/peer-reviewed publications) may disagree with authorities/sources in another realm (e.g., public officeholders/government health orders).
- provide examples of how technology has advanced science and medicine, and how society has responded to innovations and challenges, e.g. COVID-19 pandemic.

Legacy general education expected learning outcomes

As part of the Natural Science/Biological Science category of the Legacy General Education curriculum, this course is designed to prepare students to be able to do the following:

- Students understand the basic facts, principles, theories and methods of modern science.
- Students understand key events in the development of science and recognize that science is an evolving body of knowledge.
- Students describe the inter-dependence of scientific and technological developments.
- Students recognize social and philosophical implications of scientific discoveries and understand the potential of science and technology to address problems of the contemporary world.

How the course fulfills these Legacy GE outcomes: To develop lifelong skills for making informed decisions about science and health-related issues, we discuss hypotheses and methodologies, evaluate sources and expertise, interpret scientific data and claims, and weigh relevant evidence. We apply these skills throughout the semester. We operate within the unifying framework of modern evolutionary theory, which recognizes the shared ancestry of all life on earth, and understand that countless advances in biology and medicine owe much to evolution as a utilitarian, predictive, evidence-based theory.

HOW THIS COURSE WORKS

Mode of delivery: This course is 100% in-person. Supporting information will be posted on our Carmen page, however, students are expected to attend class (see attendance policy below).

Credit hours and work expectations: This is a **3-credit-hour course**. According to Ohio State policy (go.osu.edu/credithours), students should expect around 3 hours per week of timespent on direct instruction (e.g., instructor content and Carmen activities) in addition to 6 hours of homework (e.g., reading and assignment preparation) to receive a grade of (C) average.

Attendance and participation requirements: You are expected to attend most of the in-person lectures. Your attendance grade will reflect your effort for attendance, with the option of missing up to 2 class periods.

- **Excused absences:** Legitimate excused absences include: participation in an activity of an official University organization, verifiable illness, verifiably scheduled COVID-19 test, verifiable family emergency, subpoena, jury duty, military service, and professional reasons (e.g., attendance at professional society meeting, job interview). Other serious personal problems will be considered on an individual basis. Instructor may require proof of documentation, contact instructor as soon as you know you will be absent due to an excused reason. Arrangements will be made between the instructor and student individually on how missed assignments or exams will be handled in the case of excused absences.
- **Office hours: OPTIONAL**

COURSE MATERIALS AND TECHNOLOGIES

Textbooks

Required

- Textbook: *How Science Works: Evaluating Evidence in Biology and Medicine*. 2004. S.H. Jenkins. ISBN-10: 0195158954; available through OSU bookstore or other sellers.

The text is available as an OSU e-book: <https://library.ohio-state.edu/record=b8938191>

NOTE: A total of three individuals can use the OSU e-book simultaneously, so access to this text may be limited.

- Newspaper access: *New York Times* (e-version @ OSU Libraries). Two steps to access:
 1. Use your name.number & password to log onto OSU libraries <https://library.osu.edu/>
 2. Use short-cut link for NY Times: <https://www-nytimes-com.proxy.lib.ohio-state.edu/>
- Other materials (essays, articles, podcasts or videos) will be posted on Carmen or shared during class.

Course technology

Technology support

For help with your password, university email, Carmen, or any other technology issues, questions, or requests, contact the Ohio State IT Service Desk. Standard support hours are available at ocio.osu.edu/help/hours, and support for urgent issues is available 24/7.

- **Self-Service and Chat support:** ocio.osu.edu/help
- **Phone:** 614-688-4357(HELP)
- **Email:** servicedesk@osu.edu
- **TDD:** 614-688-8743

Technology skills needed for this course

- Basic computer and web-browsing skills

- Navigating Carmen (go.osu.edu/canvasstudent)
- CarmenZoom virtual meetings (go.osu.edu/zoom-meetings)
- Recording a slide presentation with audio narration (go.osu.edu/video-assignment-guide)
- Recording, editing, and uploading video (go.osu.edu/video-assignment-guide)

Required equipment

- Computer: current Mac (MacOs) or PC (Windows 10) with high-speed internet connection
- Webcam and microphone: built-in or external webcam and microphone, fully installed and tested or corresponding mobile device with video capabilities, if your group decides on this type of meeting.
- Other: a mobile device (smartphone or tablet) to use for BuckeyePass authentication
- It will be ideal if you can bring either a mobile device, tablet or laptop to you to class each session, as we will be actively searching resources during most classes.

Required software

- Microsoft Office 365: All Ohio State students are now eligible for free Microsoft Office 365. Full instructions for downloading and installation can be found at go.osu.edu/office365help.
- Top Hat: Students will need to register for an Ohio State University Top Hat account. This access is free and participation via Top Hat can be used for some attendance purposes. <https://tophat.com/>

Carmen access

You will need to use BuckeyePass (buckeyepass.osu.edu) multi-factor authentication to access your courses in Carmen. To ensure that you are able to connect to Carmen at all times, it is recommended that you take the following steps:

- Register multiple devices in case something happens to your primary device. Visit the BuckeyePass - Adding a Device help article for step-by-step instructions (go.osu.edu/add-device).
- Request passcodes to keep as a backup authentication option. When you see the Duo login screen on your computer, click **Enter a Passcode** and then click the **Text me newcodes** button that appears. This will text you ten passcodes good for 365 days that can each be used once.
- Download the Duo Mobile application (go.osu.edu/install-duo) to all of your



registered devices for the ability to generate one-time codes in the event that you lose cell, data, or Wi-Fi service

If none of these options will meet the needs of your situation, you can contact the IT Service Desk at 614-688-4357 (HELP) and IT support staff will work out a solution with you.

GRADING AND FACULTY RESPONSE

How your grade is calculated

ASSIGNMENT CATEGORY	POINTS
Class Participation and Attendance	75
Answers to Worksheets (10 points each)	150
Online quizzes (15 points each)	30
Group take-home exam #1	60
Group take-home exam #2	60
Final exam (cumulative; students complete individually and in-person)	100
Total	475

See Course Schedule below for assignment due dates.

Descriptions of major course assignments

Class Participation and Attendance

Description: This class relies heavily on class discussion and attendance and engagement is important. Student attendance will be taken at each in person class session via Top Hat. Each student attendance in lecture is worth 1 point (25 points total). In addition, participation will be measured as your performance as a group member will be evaluated via self and peer evaluations for each group take home exam (20 points), in addition to your participation in class (30 points). Your instructor will review the parameters of ideal participation at the beginning of the semester, and the guidelines will be posted in



Carmen. The instructor will alert you at the midterm timepoint if your in-class participation required improvement to gain full points.

Worksheets

Description: These enable you to practice interpreting and evaluating information from various sources of science-related data (however good/questionable) that come at us every day, as well as organizing thoughts from your text in preparation for discussion. Worksheets are due and discussed in class on the dates indicated in the **Course Schedule**.

Each Worksheet (posted at Carmen) includes explicit instructions and in many cases the worksheets are good practice for group take-home exams. Deadlines for submitting your work are posted at Carmen. Students may work together on these worksheets, but **all submitted work must be original (do not submit copies of another student's work)**.

To receive full credit your work must: 1) be substantive, 2) demonstrate a good faith effort, and 3) be posted before class commences on the days that they are due. "Substantive" in this context may be defined as "meaningful and explicitly expressed;" thus, be sure you answer the question/prompt fully, using language that is clear and unambiguous. "Demonstrate good faith effort" means you have been conscientious and diligent-- your answer evidences a sincere attempt to do a good job completing the work as opposed to a perfunctory one and the instructor can clearly see that you have utilized the resources in the worksheet (book chapter, online video, etc.).

Online quizzes

Description: Two online multiple-choice quizzes will be assigned to students. These multiple-choice quizzes are meant to mimic and prepare students for the multiple-choice format of the final exam. These exams can be completed open book by students, but they will be timed. Students must not work with other students on these exams. Refer to the Carmen assignment for due date.

Group take-home exams

Description: These are designed with the **course learning outcomes** in mind. You will be asked to locate various types of sources, evaluate their content and authority, and answer questions regarding information they provide, whether it conflicts with/corroborates other reports, etc.

Your instructor will assign student teams, each to comprise no more than 5 students. Each team will complete a Group Contract (posted at Carmen), which provides a written plan for how the team is going to complete the exam—who is doing what, when the team has agreed to meet, etc. Each team will complete one contract per group take-home exam, submit via Carmen, and update it as needed. By signing the Group Contract, team



members indicate their intention to adhere to the written plan and to act in accord with the stated behaviors and responsibilities. **All exam work must be original.**

Prior to release of the first group take-home exam, your instructor will provide guidance in class regarding 1) expectations for exam answers, 2) how to function as a team member, and 3) when and how to contact her if an unexpected problem arises that the group cannot solve independently. The class period immediately following the deadline for submitting the final version of the exam answers is devoted to discussing the exam (see syllabus for exam dates and deadlines).

Dissension Document for Group take-home exams: Any student may opt to disagree with their team's answer to a given exam question. If a student disagrees with the team's answer and provides the CORRECT ANSWER, said student will earn the appropriate points (and the team will not). If a student dissents and provides an INCORRECT answer, the student will lose points accordingly.

How to dissent from a group exam answer: The student uses the Dissent template (posted at Carmen) to provide a brief but complete justification for an alternate answer and posts the document to the team's Carmen site. If more than two students decide to dissent and wish to provide the same answer, it may be posted as a single dissension, but the document must clearly indicate the names of the dissenting students.

Self- and peer-evaluation forms. Templates are posted at Carmen and list the key elements of good teamwork. Upon completion of a given take-home exam, each student will fill out and submit to Carmen one self-evaluation form, and one peer-evaluation form per team member. *The completed forms are confidential; only your instructor will have access to them.*

Final exam

Description: The final exam will be taken in person and individually. This exam will test your cumulative knowledge gained in the course in regard to the techniques used in evaluating evidence as well as your ability to interpret various sources of scientific information.

Late Assignments

- Without an excused absence, late assignments will be subject to a 10% grade deduction during the first two hours, with additional 25% deductions accruing for every day it is late. Due to the discussion nature of the exams in class, no late exams will be accepted, unless there is a validated excused absence.

Grading scale

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

Instructor feedback and response time

Below is my intended availability throughout the course. (Remember that you can call **614-688-4357(HELP)** at any time if you have a technical problem.)

- **Grading and feedback:** For large weekly assignments, you can generally expect feedback within **7 days or less**.
- **Email:** I will reply to emails within 24 hours on weekdays (M-F).

OTHER COURSE POLICIES

Discussion and communication guidelines

Below are my expectations for how we should communicate as a class. Please remember to be respectful and thoughtful. At times we will discuss topics that many students have varied opinions on- remember this class specifically is using science to evaluate evidence.

- **Tone and civility:** At all times we will maintain a supportive learning community where everyone feels safe and where people can disagree amicably.
- **Writing style:** Write using good grammar, spelling, and punctuation. All work must

be your own/your team's. I will deduct points for answers that are unclear, particularly on group take-home exams.

- **Citing sources:** while engaging in class discussions please be aware that some statements will need a scientific source to back it up. While it is not expected that the student have sources for everything they say in class discussion can be limited by the instructor to scientifically relevant material. It is best practice in writing to state sources for statements made on topics that are not taken from class material.
- **Backing up your electronic work:** I cannot overemphasize how important this is. Group work will take place via shared documents, but I encourage students to work offline and have alternate copies of the group work.

Academic integrity policy

Your instructor will include with each assignment specific instructions on academic integrity.

Ohio State's academic integrity policy

Academic integrity is essential to maintaining an environment that fosters excellence in teaching, research, and other educational and scholarly activities. Thus, The Ohio State University and the Committee on Academic Misconduct (COAM) expect that all students have read and understand the university's *Code of Student Conduct* (studentconduct.osu.edu), and that all students will complete all academic and scholarly assignments with fairness and honesty. Students must recognize that failure to follow the rules and guidelines established in the university's *Code of Student Conduct* and this syllabus may constitute "Academic Misconduct."

The Ohio State University's *Code of Student Conduct* (Section 3335-23-04) defines academic misconduct as: "Any activity that tends to compromise the academic integrity of the university or subvert the educational process." Examples of academic misconduct include (but are not limited to) plagiarism, collusion (unauthorized collaboration), copying the work of another student, and possession of unauthorized materials during an examination. Ignorance of the university's *Code of Student Conduct* is never considered an excuse for academic misconduct, so I recommend that you review the *Code of Student Conduct* and, specifically, the sections dealing with academic misconduct.



If I suspect that a student has committed academic misconduct in this course, I am obligated by university rules to report my suspicions to the Committee on Academic Misconduct. If COAM determines that you have violated the university's *Code of Student Conduct* (i.e., committed academic misconduct), the sanctions for the misconduct could include a failing grade in this course and suspension or dismissal from the university.

If you have any questions about the above policy or what constitutes academic misconduct in this course, please contact me.

Other sources of information on academic misconduct (integrity) to which you can refer include:

- Committee on Academic Misconduct web page (go.osu.edu/coam) Ten Suggestions for Preserving Academic Integrity (go.osu.edu/ten-suggestions)
- Eight Cardinal Rules of Academic Integrity (go.osu.edu/cardinal-rules)

Safe and Healthy Buckeyes

Health and safety requirements: All students, faculty and staff are required to comply with and stay up to date on all university safety and health guidance (<https://safeandhealthy.osu.edu>). Non-compliance will result in a warning first, and disciplinary actions will be taken for repeated offenses.

Copyright for instructional materials

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.

Commitment to a diverse and inclusive learning environment and creating an environment free from harassment, discrimination and sexual misconduct.

The Ohio State University is committed to building and maintaining a community to reflect diversity and to improve opportunities for all. All Buckeyes have the right to be free from harassment, discrimination, and sexual misconduct. Ohio State does not discriminate on the basis of age, ancestry, color, disability, ethnicity, gender, gender identity or expression, genetic information, HIV/AIDS status, military status, national origin, pregnancy (childbirth,

false pregnancy, termination of pregnancy, or recovery therefrom), race, religion, sex, sexual orientation, or protected veteran status, or any other bases under the law, in its activities, academic programs, admission, and employment. Members of the university community also have the right to be free from all forms of sexual misconduct: sexual harassment, sexual assault, relationship violence, stalking, and sexual exploitation.

To report harassment, discrimination, sexual misconduct, or retaliation and/or seek confidential and non-confidential resources and supportive measures, contact the Office of Institutional Equity:

1. Online reporting form at equity.osu.edu,
2. Call 614-247-5838 or TTY 614-688-8605,
3. Or Email equity@osu.edu

The university is committed to stopping sexual misconduct, preventing its recurrence, eliminating any hostile environment, and remedying its discriminatory effects. All university employees have reporting responsibilities to the Office of Institutional Equity to ensure the university can take appropriate action:

- All university employees, except those exempted by legal privilege of confidentiality or expressly identified as a confidential reporter, have an obligation to report incidents of sexual assault immediately.
- The following employees have an obligation to report all other forms of sexual misconduct as soon as practicable but at most within five workdays of becoming aware of such information: 1. Any human resource professional (HRP); 2. Anyone who supervises faculty, staff, students, or volunteers; 3. Chair/director; and 4. Faculty member.

Diversity Statement

The Ohio State University affirms the importance and value of diversity of people and ideas. We believe in creating equitable research opportunities for all students and to providing programs and curricula that allow our students to understand critical societal challenges from diverse perspectives and aspire to use research to promote sustainable solutions for all. We are committed to maintaining an inclusive community that recognizes and values the inherent worth and dignity of every person; fosters sensitivity, understanding, and mutual respect among all members; and encourages each individual to strive to reach their own potential. The Ohio State University does not discriminate on the basis of age, ancestry, color, disability, gender identity or expression, genetic information, HIV/AIDS status, military status, national origin, race, religion, sex, gender, sexual orientation, pregnancy, protected

veteran status, or any other bases under the law, in its activities, academic programs, admission, and employment.

To learn more about diversity, equity, and inclusion and for opportunities to get involved, please visit:

- <https://odi.osu.edu/>
- <https://odi.osu.edu/racial-justice-resources>
- <https://odi.osu.edu/focus-on-racial-justice>
- <http://mcc.osu.edu/>

In addition, this course adheres to The Principles of Community adopted by the College of Food, Agricultural, and Environmental Sciences. These principles are located on the Carmen site for this course; and can also be found at <https://go.osu.edu/principlesofcommunity>. For additional information on Diversity, Equity, and Inclusion in CFAES, contact the CFAES Office for Diversity, Equity, and Inclusion (<https://equityandinclusion.cfaes.ohio-state.edu/>). If you have been a victim of or a witness to a bias incident, you can report it online and anonymously (if you choose) at <https://studentlife.osu.edu/bias/report-a-bias-incident.aspx>.

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 Counseling and Consultation Services (CCS) by visiting ccs.osu.edu or calling (614) 292-5766. CCS is located on the 4th Floor of the Younkun 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



David Wirt, wirt.9@osu.edu, is the CFAES embedded mental health counselor. He is available for new consultations and to establish routine care. To schedule with David, please call 614-292-5766. Students should mention their affiliation with CFAES when setting up a phone screening.

ACCESSIBILITY ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES

Requesting accommodations

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.

In addition, please feel free to discuss class performance or your ability to complete a class task with your instructor. My priority is to facilitate a positive learning environment during this period of

uncertainty. Do not hesitate to e-mail me (klinger.80@osu.edu) if you have questions or concerns.

Accessibility of course technology

This online course requires use of CarmenCanvas (Ohio State's learning management system) and other online communication and multimedia tools. If you need additional services to use these technologies, please request accommodations with your instructor.

- [Canvas accessibility \(go.osu.edu/canvas-accessibility\)](https://go.osu.edu/canvas-accessibility)
- Streaming audio and video
- CarmenZoom accessibility (go.osu.edu/zoom-accessibility)
- Collaborative course tools

COURSE SCHEDULE

Refer to the Carmen course for up-to-date assignment due dates



Week	Day and Date	Topic	References/Assignments due
1	Tue 8/23	Class introduction; Science: What is it?	
	Th 8/25	Science: Why trust it? How does info get shared in science?	Worksheet 1: Why trust science
2	Tue 8/30	Evaluating scientific credibility & expertise	Worksheet 2: Credibility
	Th 9/1	Applying the CRAAP Test (seriously!) to sources	Worksheet 3: CRAAP
3	Tue 9/6	Evolution Basics	Worksheet 4: Evolution
	Th 9/8	Translation & application in techniques (PCR, etc.)	Worksheet 5: Technology
4	Tue 9/13	Types of medical studies: Do vitamin C and other antioxidants benefit health? (Jenkins Ch. 2)	Worksheet 6: Jenkins Ch. 2
	Th 9/15	Types of medical studies: Do vitamin C and other antioxidants benefit health? (Jenkins Ch. 2)	Online Quiz 1 due; 11:59PM
5	Tue 9/20	Types of error/legality: Police dogs smelling criminals? (Jenkins Ch. 3)	Worksheet 7: Jenkins Ch. 3
	Th 9/22	Class time to work on Exam 1	
6	Tue 9/27	Class time to work on Exam 1	
	Th 9/29	Discuss Exam #1 answers in class— Come prepared to share! Ecological studies: Observations and testable hypotheses: Why are frogs in trouble? (Jenkins Ch. 4)	Exam 1 due before class. Worksheet 8: Jenkins Ch. 4
7	Tue 10/4	Ecological studies: Observations and testable hypotheses. (Jenkins Ch. 4)	
	Th 10/6	Testing Alternative Hypotheses and well-designed experiments: How do animals find stored food? (Jenkins Ch. 5)	Worksheet 9: Jenkins Ch. 5
8	Tue 10/11	Testing Alternative Hypotheses and well-designed experiments: How do animals find stored food? (Jenkins Ch. 5)	
	Th 10/13	Fall break- No class	



9	Tue 10/18	Causation: What causes cancer (Jenkins Ch. 6)?	Worksheet 10: Jenkins Ch 6
	Th 10/20	Combining multiple studies: How does coffee affect health?	Worksheet 11: Jenkins Ch 8 Online Quiz 2 Due; 11:59PM
10	Tue 10/25	Logic and logical fallacies	
	Th 10/27	In class work on Exam 2	
11	Tue 11/1	In class work on Exam 2	
	Th 11/3	Current news: Viral diseases: Immune response, herd immunity, etc.	Exam 2 Due Before class
12	Tue 11/8	Current news: Viral diseases continued	Worksheet 12
	Th 11/10	Current News: Invasive insects	
13	Tue 11/15	Current news: Climate change	Worksheet 13
	Th 11/17	Current news: Climate change	
14	Tue 11/22	Current news: Health and wellness	
	Th 11/24	Thanksgiving break- no class	
15	Tue 11/29	Current news: Health and wellness	Worksheet 14
	Th 12/1	Discuss Final Exam: <i>What to expect, how it will be conducted</i> Science and society, the arts, and humanities; Read Jenkins pp. 184-190 and share your thoughts during class	
	Tue 12/6	No class- watch movie assigned for final exam.	
Finals week	Final: Tuesday December 13th 11:59PM due		