

Term Information

Effective Term Autumn 2024

General Information

Course Bulletin Listing/Subject Area Biology
Fiscal Unit/Academic Org Introductory Biology - D0326
College/Academic Group Arts and Sciences
Level/Career Undergraduate
Course Number/Catalog 2750
Course Title Biological Reasoning for Informed Citizenship
Transcript Abbreviation Bio Reason for Cit
Course Description Study of historical and contemporary biological methodology, and philosophy with a focus on identification of validated biological discovery and comparison with misinformation and misconduct in the biological sciences.
Semester Credit Hours/Units Fixed: 3

Offering Information

Length Of Course 14 Week, 12 Week, 8 Week
Flexibly Scheduled Course Never
Does any section of this course have a distance education component? No
Grading Basis Letter Grade
Repeatable No
Course Components Lecture, Workshop
Grade Roster Component Lecture
Credit Available by Exam No
Admission Condition Course No
Off Campus Never
Campus of Offering Columbus, Lima, Mansfield, Marion, Newark, Wooster

Prerequisites and Exclusions

Prerequisites/Corequisites Completion of GE Foundations: Natural Sciences requirement
Exclusions
Electronically Enforced Yes

Cross-Listings

Cross-Listings

Subject/CIP Code

Subject/CIP Code 26.0101
Subsidy Level General Studies Course
Intended Rank Sophomore, Junior, Senior

Requirement/Elective Designation

Lived Environments

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 evaluate both controversies in biology as well as biological topics viewed as controversial by parts of society.
- Students will use critical thinking skills to evaluate the validity of biological claims presented as scientific in social media and the popular press.
- Students will synthesize evidence-based arguments to diverse audiences using knowledge and skills from other coursework explaining how biology and technology address problems of the contemporary world.
- Students will differentiate biological science from pseudoscience and non-science.
- Students will identify examples of logical fallacies used in biological misinformation.
- Students will use logical fallacies to evaluate examples of biological research as well as biological misinformation.
- Students will compare anecdotal thought and experiences to biological data and reasoning.
- Students will differentiate between hypotheses, predictions, theories, laws, and facts.
- Students will synthesize the contributions of various scientific philosophers in the age of scientific reasoning from both eastern and western culture.
- Students will recognize that interpretation of data is a regular part of methodology in the natural sciences.
- Students will analyze the inherent risk of bias as a product of biological research being a human endeavor.
- Students will synthesize sound scientific explanations grounded in the scientific process.
- Students will summarize the process of peer review and publication commonly used in the natural sciences.
- Students will explain the self-correcting nature of science using examples from the history of biological research.
- Students will compare and differentiate between theoretical biology and applied biology.
- Students will compare knowledge in the biological sciences to other forms of knowledge.
- Students will contrast the questions applicable to the scientific process and those that cannot be answered by science.
- Students will assess uncertainty and its role in biological literacy and agenda-driven interpretation in the media.
- Students will construct and deliver sound arguments appealing to different ways of thinking in specified environments.
- Students will apply critical thinking skills to assess human willingness or susceptibility to accept claims without evidence.
- Students will reflect on the ways their personal experiences have influenced their own thought or perceptions.
- Students will analyze scientific misconduct in the biological sciences and the conditions that encourage intentional and unintentional malfeasance.
- Students will analyze the misrepresentation of biological data by individuals and groups within the biological sciences.

Content Topic List

- Introduction to Science and Malarkey
- The Philosophy of Science and the Community of Scientists
- Biological Methodologies
- Correlation and Causality in Biology
- Statistical Traps
- Common Data Visualization practices in biology
- Publication Bias
- Predatory Publishers
- Critical Thinking
- Misconduct in biology

Sought Concurrence

Yes

Attachments

- Statistics Concurrence.pdf: Concurrence from Statistics
(Concurrence. Owner: Andrews,Adam Lee)
- Pyschology Concurrence for Biology 2750.pdf: Concurrence from Psychology
(Concurrence. Owner: Andrews,Adam Lee)
- CS Concurrence Request - Biology 2750.pdf: Concurrence from Comparative Studies
(Concurrence. Owner: Andrews,Adam Lee)
- Communications Concurrence Request.pdf: Concurrence request Comm. - No response received
(Concurrence. Owner: Andrews,Adam Lee)
- EEOB Concurrence.pdf: Concurrence from EEOB
(Concurrence. Owner: Andrews,Adam Lee)
- Biology 2750 submission-lived-environments.pdf: Lived Environments Submission Form
(Other Supporting Documentation. Owner: Andrews,Adam Lee)
- Proposal for Biology 2750.pdf: Full Proposal
(Other Supporting Documentation. Owner: Andrews,Adam Lee)
- Biology 2750 Syllabus.pdf
(Syllabus. Owner: Andrews,Adam Lee)

Comments

Workflow Information

Status	User(s)	Date/Time	Step
Submitted	Andrews,Adam Lee	10/04/2023 01:23 PM	Submitted for Approval
Approved	Kulesza,Amy Elizabeth	10/05/2023 08:19 AM	Unit Approval
Approved	Vankeerbergen,Bernadette Chantal	10/19/2023 04:55 PM	College Approval
Pending Approval	Jenkins,Mary Ellen Bigler Hanlin,Deborah Kay Hilty,Michael Neff,Jennifer Vankeerbergen,Bernadette Chantal Steele,Rachel Lea	10/19/2023 04:55 PM	ASCCAO Approval

Appendix B: Sample Course Syllabus



THE OHIO STATE UNIVERSITY

Biology 2750
Biological Reasoning
for Informed Citizenship
Autumn 2024
3 Credit Hours

Lecturers: **James Chiucchi, Ph.D.**
Samantha Herrmann, Ph.D.
Center for Life Sciences Education
Jennings Hall

Course Coordinator:

Teaching Associates: TAs and other personnel will be listed here.

Class Meeting Schedule

Lecture: TU/TH (55-minute lectures)

Workshop: 80 minutes, once weekly

Course Materials

Required: *The Scientific Endeavor: A Primer on Scientific Principles and Practice Edition 2.0* by Jeffrey A. Lee; ISBN: 9781536893830.

Assigned Readings Provided to Students:

Carroll, S. B. (2019). *The Story of Life: Great Discoveries in Biology (First Edition)*. Chapter 2. W. W. Norton & Company, Inc.

Cook, J., Ecker, U. K. H., Trecek-King, M., Schade, G., Jeffers-Tracy, K., Fessmann, J., Kim, S. C., Kinkead, D., Orr, M., Vraga, E., Roberts, K., & McDowell, J. (2022). The cranky uncle game—combining humor and gamification to build student resilience against climate misinformation. *Environmental Education Research, 4*, 1–17. <https://doi.org/10.1080/13504622.2022.2085671>

Idso, C. D., Carter, R. M., S Fred Singer, Nongovernmental International Panel On Climate Change, & Heartland Institute (Chicago, Ill. (2016). *Why scientists disagree about global warming: the NIPCC report on scientific consensus*. NIPCC By The Heartland Institute.

Loss, S. R., Will, T., Longcore, T., & Marra, P. P. (2018). Responding to misinformation and criticisms regarding United States cat predation estimates. *Biological Invasions, 20*(12), 3385–3396. <https://doi.org/10.1007/s10530-018-1796-y>

Mammola, S., Malumbres-Olarte, J., Arabesky, V., Barrales-Alcalá, D. A., Barrion-Dupo, A. L., Benamú, M. A., Bird, T. L., Bogomolova, M., Cardoso, P., Chatzaki, M., Cheng, R.-C., Chu, T.-A., Classen-Rodríguez, L. M., Čupić, I., Dhiya'ulhaq, N. U.,

Drapeau Picard, A.-P., El-Hennawy, H. K., Elverici, M., Fukushima, C. S., & Ganem, Z. (2022). The global spread of misinformation on spiders. *Current Biology*, 32(16), R871–R873. <https://doi.org/10.1016/j.cub.2022.07.026>

National Academies of Sciences, E. (2019). Reproducibility and Replicability in Science. In *nap.nationalacademies.org*.
<https://nap.nationalacademies.org/catalog/25303/reproducibility-and-replicability-in-science>

Osborne, J., Pimentel, D., Alberts, B., Allchin, D., Barzilai, S., Bergstrom, C., Coffey, J., Donovan, B., Kivinen, K., Kozyreva, A., & Wineburg, S. (2022). *Science Education in an Age of Misinformation*. Stanford University, Stanford, CA.

West, J. D., & Bergstrom, C. T. (2021). Misinformation in and about science. *Proceedings of the National Academy of Sciences*, 118(15), e1912444117. <https://doi.org/10.1073/pnas.1912444117>

Internet Access: Your access to Carmen is an integral and necessary part of this course. You must activate your OSU email account to have access to Carmen. The Carmen URL is <http://carmen.osu.edu> and Biology 2750 should be listed under My Courses on your Carmen homepage. The username to log on is your OSU name.# and the password is the one you use with all OSU email and registration systems. If you have a problem logging in or using Carmen, contact 688-HELP or carmen@osu.edu. IMPORTANT: The CLSE and its course staff will send email ONLY to your official OSU email account.

Prerequisites: GE Foundational coursework in Natural Sciences.

Course Description: *Study of historical and contemporary biological methodology, and philosophy with a focus on identification of validated biological discovery and comparison with misinformation and misconduct in the biological sciences.*

General Education Natural Science Goals & Objectives

Students who successfully complete this course will fulfill the following General Education goals and objectives:

Themes: General	
Goals	Expected Learning Outcomes
GOAL 1: Successful students will analyze an important topic or idea at a more advanced and in-depth level than the foundations.	Successful students are able to ...
	<p>1.1 Engage in critical and logical thinking about the topic or idea of the theme.</p> <p>1.2 Engage in an advanced, in-depth, scholarly exploration of the topic or idea of the theme.</p>
GOAL 2: Successful students will integrate approaches to the theme	2.1 Identify, describe, and synthesize approaches or experiences as they apply to the theme.

<p>by making connections to out-of-classroom experiences with academic knowledge or across disciplines and/or to work they have done in previous classes and that they anticipate doing in future.</p>	<p>2.2 Demonstrate a developing sense of self as a learner through reflection, self-assessment, and creative work, building on prior experiences to respond to new and challenging contexts.</p>
<p>Theme: Lived Environments</p>	
<p>GOAL 1: Successful students will explore a range of perspectives on the interactions and impacts between humans and one or more types of environments (e.g., agricultural, built, cultural, economic, intellectual, natural) in which humans live.</p>	<p>Successful students are able to ...</p> <p>1.1 Engage with the complexity and uncertainty of human-environment interactions.</p> <p>1.2 Describe examples of human interaction with and impact on environmental change and transformation over time and across space.</p>
<p>GOAL 2: Successful students will analyze a variety of perceptions, representations and/or discourses about environments and humans within them.</p>	<p>2.1 Analyze how humans' interactions with their environments shape or have shaped attitudes, beliefs, values and behaviors.</p> <p>2.2 Describe how humans perceive and represent the environments with which they interact.</p> <p>2.3 Analyze and critique conventions, theories, and ideologies that influence discourses around environments.</p>

Successful students in Biology 2750 will analyze the processes central to scientific endeavors specifically within the biological sciences, and the effect of these processes in the context of current and historical social responses, evaluating the validity of biological research and biology misinformation, and demonstrating ability to apply the skills learned to evaluate these claims to novel circumstances they will encounter in our modern world.

Biology 2750 Goals and Learning Outcomes

Upon successful completion of Biology 2750, students will demonstrate the ability to:

Goals	Expected Learning Outcomes
<p>Goal 1: Students will develop science literacy skills and the ability to construct a scientifically literate argument.</p>	<p><input type="checkbox"/> 1.1 Students will evaluate both controversies in biology as well as biological topics viewed as controversial by parts of society.</p> <p><input type="checkbox"/> 1.2 Students will use critical thinking skills to evaluate the validity of biological claims presented as scientific in social media and the popular press.</p>

	<input type="checkbox"/> 1.3 Students will synthesize evidence-based arguments to diverse audiences using knowledge and skills from other coursework explaining how biology and technology address problems of the contemporary world.
Goal 2: Students will develop critical thinking skills through and exploration of logical fallacies and their use in arguments.	<input type="checkbox"/> 2.1 Students will differentiate biological science from pseudoscience and non-science.
	<input type="checkbox"/> 2.2 Students will identify examples of logical fallacies used in biological misinformation.
	<input type="checkbox"/> 2.3 Students will use logical fallacies to evaluate examples of biological research as well as biological misinformation.
	<input type="checkbox"/> 2.4 Students will compare anecdotal thought and experiences to biological data and reasoning.
Goal 3: Students understand the scientific process in both modern and historical contexts.	<input type="checkbox"/> 3.1 Students will differentiate between hypotheses, predictions, theories, laws, and facts.
	<input type="checkbox"/> 3.2 Students will synthesize the contributions of various scientific philosophers in the age of scientific reasoning from both eastern and western culture.
	<input type="checkbox"/> 3.3 Students will recognize that interpretation of data is a regular part of methodology in the natural sciences.
	<input type="checkbox"/> 3.4 Students will analyze the inherent risk of bias as a product of biological research being a human endeavor.
	<input type="checkbox"/> 3.5 Students will synthesize sound scientific explanations grounded in the scientific process.
	<input type="checkbox"/> 3.6 Students will summarize the process of peer review and publication commonly used in the natural sciences.
	<input type="checkbox"/> 3.7 Students will explain the self-correcting nature of science using examples from the history of biological research.
Goal 4: Students will describe the inter-dependence of scientific and technological developments.	<input type="checkbox"/> 4.1 Students will compare and differentiate between theoretical biology and applied biology.
Goal 5: Students will analyze and interpret major forms of human thought, culture, and expression.	<input type="checkbox"/> 5.1 Students will compare knowledge in the biological sciences to other forms of knowledge.
	<input type="checkbox"/> 5.2 Students will contrast the questions applicable to the scientific process and those that cannot be answered by science.

Goal 6: Students evaluate how ideas influence the character of human beliefs, the perception of reality, and the norms which guide human behavior.	<input type="checkbox"/> 6.1 Students will assess uncertainty and its role in biological literacy and agenda-driven interpretation in the media.
	<input type="checkbox"/> 6.2 Students will construct and deliver sound arguments appealing to different ways of thinking in specified environments.
	<input type="checkbox"/> 6.3 Students will apply critical thinking skills to assess human willingness or susceptibility to accept claims without evidence.
	<input type="checkbox"/> 6.4 Students will reflect on the ways their personal experiences have influenced their own thought or perceptions.
	<input type="checkbox"/> 6.5 Students will analyze scientific misconduct in the biological sciences and the conditions that encourage intentional and unintentional malfeasance.
	<input type="checkbox"/> 6.6 Students will analyze the misrepresentation of biological data by individuals and groups within the biological sciences.

Credit hour and work expectation: This is a 3-credit-hour course. According to Ohio State policy, students should expect around 3 hours per week of time spent on direct instruction (instructor content, labs, and Carmen activities, for example) in addition to 6 hours of homework (reading and assignment preparation, for example) to receive a grade of (C) average. [ASC Honors](#) provides an excellent guide to scheduling and study expectations.

Grading and Evaluation

Graded assignments may come in three forms, and students should note the expectations for each in the descriptions of our class assignments below.

- Independent Work (👤):** Strictly non-collaborative, original-individual work. You may discuss this assignment only with your instructor. Discussions with other individuals, either in person or electronically, are strictly prohibited.
- Collaboration Required (👥):** An explicit expectation for collaboration among students either in-class or outside (i.e., group work).
- Optional-Collaboration (👥👉):** Students are permitted, but not required, to discuss the assignment or ideas with each other. However, all submitted work must be one's original and individual creation.

Assignment	Points	Assignment Type
Workshop Assignments (10 x 20 pts each)	200 pts.	👥
Writing Assignments (4 x 20 pts each)	80 pts.	💬
Lecture Quizzes (5 x 50 pts each)	250 pts	↑
Final Project	50 pts.	↑
Misinformation Inventory	30 pts	↑
In-class Activities (including TopHat)	50 pts.	💬
SALG	5 pts.	↑
TOTAL COURSE POINTS	665	

Workshop Assignments 👥: During workshop, cooperative groups will apply knowledge gained in lecture to analyze relevant case studies. These case studies will vary each week but will primarily consist of short answer responses, graph and figure analysis, and some multiple-choice questions. Groups will submit their work at the beginning of workshop the following week. Examples of topics discussed will include Climate change research and climate change denial, COVID -19 and vaccine misinformation, GMO's, misinformation on invasive species, nutrition misinformation, alternative medicine, Conservation Biology, Evolution misinformation, and genetic engineering techniques. Examples of these assignments are designed to help students 1) better understands credible biology sources, 2) use lateral reading to determine source credibility, 3) discuss the role of expertise in biological fields, and 4) parse conflicting credible information within the field of biology itself.

Writing Assignments 💬: These assignments will be a mix of writing assignments asking students to synthesize content from lecture, reading assignments, and individual research of articles in the popular and primary literature (we have included an example assignment at the end of this document – *Appendix C: Sample Writing Assignment Debunk the Bunk*).

Lecture Quizzes ↑ : These brief quizzes will serve as checkpoints for students to keep up with objective components of lecture. They will be held at the beginning of lecture and consist of multiple choice and short answer questions reflective of lecture material. There will be 5 progressive quizzes throughout the semester.

Final Project ↑ : This final paper will ask students to research an example of pseudoscience and provide a scientific counterargument aimed at winning a “Thanksgiving debate with your uncle.”

Misinformation Inventory: You will keep track of all misinformation you encounter for a week as well as the misinformation you create and/or try to debunk for an entire week. This data will then be turned into a visual representation of your choice. Be creative here and think of ways you might want to display this data. Examples will be shown during class to help give you some ideas.

In-Class Activities 🗨️: Active learning opportunities in lecture will include group case studies as well as TopHat questions.

SALG 📊: The Student Assessment of Learning Gains is a survey taken during the final week of the course and will be worth 5 points for completion.

Final Grades:

Your final grade will be based on the percentage of the 665 points that you earn during the semester, as indicated below. Please note that we do not grade the course on a curve and *Carmen* does not round scores up to the next nearest percentage point, so 92.11% and 92.97% both earn the grade of A-.

Grade Scale

A	A-	B+	B	B-	C+	C	C-	D+	D	E
100 – 93.0%	92.9 – 90.0%	89.9 – 87.0%	86.9 – 83.0%	82.9 – 80.0%	79.9 – 77.0%	76.9 – 73.0%	72.9 – 70.0%	69.9 – 67.0%	66.9 – 60.0%	59.9 – 0%

Posting Of Grades:

All grades will be posted on Carmen. After grades are posted you have 10 working days to challenge any grade or inquire regarding an unposted or missing grade. **After that time, grades are final as posted or zero if missing.** To challenge or inquire about a grade, contact your TA. **IMPORTANT:** Make sure that all of your grades are properly posted on Carmen as you receive them. Challenges about grades, particularly after the end of the semester, cannot be entertained after the 10-day grace period.

Late Assignments Policy:

All written assignments are due by 11:59 pm on the assigned dates. A late assignment (except exams) will be subject to a 25% deduction for each day late. This corresponds to 100% point deduction if assignments are turned in after 4 days of the due date.

Instructor Feedback and Response Expectations:

- ❑ **Email Response:** The CLSE's expectation of instructors is that emails will be responded to within one business day. If your email is sent during the evening or over the weekend, you may not receive a response until the next business day.
- ❑ **Class announcements:** We will send all important class-wide messages through the Announcements tool in CarmenCanvas. Please check [your notification preferences](#) (go.osu.edu/canvas-notifications) to ensure you receive these messages.
- ❑ **Graded Assignments** will be graded and returned to you within one week after they were turned in. All scores are posted on Carmen no later than the day the graded assignment is returned.

Absences:

If you are unable to take a quiz at the regularly scheduled time, you must contact the course coordinator within 24 hours to schedule a makeup. If your absence is excused

for a university-sanctioned event, if you are ill and have been seen by a medical practitioner on the day of the quiz, or have other documentable reasons for missing, you may be offered a makeup quiz without penalty. If you have no documentation to support your absence, or your absence from an quiz is not for an excused reason, you will still be offered the opportunity for a makeup quiz, with a 25% overall deduction on your exam score. There will not be an opportunity to make up unexcused quiz absences. Lack of transportation, loss of electricity, travel plans, etc. will not be considered as valid excuses. Arrivals to the quiz after the first student has turned in an exam will be considered an unexcused absence, and the policy above will apply. The format for makeup assignments is at the discretion of the instructor.

The final quiz is scheduled for (insert University scheduled exam time). Make sure that this time does not conflict with your future plans. No early quizzes will be given. The only makeup quiz will be held on (date to be determined) and is available only for emergency situations and with pre-approval from the course coordinator.

Religious Accommodations

Our inclusive environment allows for religious expression. Students requesting accommodations based on faith, religious or a spiritual belief system in regard to examinations, other academic requirements or absences, are required to provide the instructor with written notice of specific dates for which the student requests alternative accommodations at the earliest possible date. For more information about religious accommodations at Ohio State, visit <https://odi.osu.edu/religious-accommodations>.

Section changes:

All section changes and adds are done by the Course Coordinator. Due to the need to keep up-to-minute availability of seats in each workshop, the lecturer and the workshop instructors are unable to sign any permission forms.

Copyrighted Class Materials:

©The Instructor's lectures and course materials, including power point presentations, tests, outlines, and similar materials, are protected by copyright. You may take notes and make copies of course materials for your own use. You may not and may not allow others to reproduce or distribute lecture notes and course materials publicly whether or not a fee is charged without the express written consent of the Course Instructor or Course Coordinator.

Accommodation of Special Needs:

The University strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability (including mental health, chronic or temporary medical conditions), please let the course

coordinator know immediately so that we can privately discuss options. To establish reasonable accommodations, we may request that you register with Student Life Disability Services. Only the course coordinator is authorized to complete SLDS accommodations. This will help us ensure that your individual needs will be met appropriately and fairly. **SLDS contact information: slds@osu.edu; 614-292-3307; slds.osu.edu; 098 Baker Hall, 113 W. 12th Avenue.**

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 are or someone you know is 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.

If you are thinking of harming yourself or need a safe, non-judgmental place to talk, or if you are worried about someone else and need advice about what to do, 24-hour emergency help is also available through the Suicide Prevention Hotline 1-- 800-273-TALK or at suicidepreventionlifeline.org

Course Technology:

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.

Carmen:

- Carmen, Ohio State's Learning Management System, will be used to host materials and activities throughout this course. To access Carmen, visit Carmen.osu.edu. Log in to Carmen using your name.# and password. If you have not setup a name.# and password, visit my.osu.edu.
- Help guides on the use of Carmen can be found at <https://resourcecenter.odde.osu.edu/carmen>

- **This course requires use of Carmen (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.**

□ [Carmen accessibility](#)

Secured Media Library

- Some of the videos for this course will be posted in the University's Secured Media Library. The link will be posted on the class Carmen page, and you will be automatically directed to the correct video.
- [Secured Media Library](#) help guide

Turnitin

- Students at The Ohio State University are accountable for the integrity of the work they submit. Therefore, you should be familiar with the guidelines provided by the [Committee on Academic Misconduct \(COAM\)](#) and [Section A of OSU's Code of Student Conduct](#) in order to meet the academic expectations concerning appropriate documentation of sources. In addition, OSU has made Turnitin, a learning tool and plagiarism prevention system, available to instructors. For this class, you will submit your papers to Turnitin from Carmen. When grading your work, we will interpret the originality report, following [Section A of OSU's Code of Student Conduct](#) as appropriate. For more information about Turnitin, please see [the vendor's guide for students](#). Note that submitted final papers become part of the OSU database.
- Please know that we view TurnItIn first and foremost as a teaching tool to make you a better writer. You will see in your individual originality reports exactly what the instructors see. We WANT you to look at this report as soon as you submit your assignments. If you see an issue, please correct it right away, before we start grading the assignment. You can resubmit without penalty as many times as you want prior to the established due date for any assignment. After the due date, the late policy is in effect.

Top Hat

- Top Hat is a web-based response system that allows students to use their own devices provide responses in the classroom. This course uses Top Hat to promote active engagement, allow for synchronous feedback, and monitor attendance.
- [Top Hat](#) help guide

□ **Self-Service and Chat support:** <http://ocio.osu.edu/selfservice>

□ **Phone:** 614-688-HELP (4357)

□ **Email:** 8help@osu.edu

□ **TDD:** 614-688-8743

Necessary software

- Word processor with the ability to save files under .doc, .docx, .rtf, or .pdf. Most popular word processing software programs including Microsoft Word and Mac Pages have these abilities.
 - OSU students have access to Microsoft Office products free of charge. To install, please visit https://osuitsm.servicenow.com/selfservice/kb_view.do?sysparm_article=kb04733 Other Course Policies

Discussion and communication guidelines:

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

- **Tone and civility:** Let's maintain a supportive learning community where everyone feels safe and where people can disagree amicably. Remember that sarcasm doesn't always come across online and is not always appreciated in-person. The instructional team work very hard to provide a positive learning experience. Please keep this in mind and remain civilized and respectful in your class communications.
- **Citing your sources:** When we have academic discussions, please cite your sources to back up what you say.

Academic Misconduct:

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 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/>. We will adhere to this policy.

- Unless otherwise specified for a particular assignment, all submitted work should be a student's own unique effort. Collaborative efforts are not permitted unless expressly sanctioned for a particular assignment.
- Unless otherwise specified for a particular assignment, use of AI-generated materials for course submissions is not permitted.
- **Reusing past work:** In general, you are prohibited in university courses from turning in work from a past class to your current class, even if you modify it. If you want to build on past research or revisit a topic you've explored in previous courses, please discuss the situation with the course coordinator.
- Using others' verbatim words without the use of quotation marks *and* citation is plagiarism. Paraphrased work requires citation to denote the use of others' ideas. Copying other's words without quotation while using citations is still considered plagiarism.

- Use of any technology during a quiz or exam (including but not limited to cell phones, smart watches, headphones, electronic dictionaries, etc.) is strictly prohibited.

Diversity and Inclusion:

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.

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 at titleix@osu.edu.

Issue Resolution:

The CLSE believes that student concerns are usually most effectively addressed by the staff closest to the situation. Therefore, students are ordinarily expected to address issues or concerns first with their instructor. If the issue cannot be resolved by your instructor, or for some reason you feel that you absolutely cannot address your concern with your instructor, please feel free to contact the Course Coordinator or Assistant Director Adam Andrews (andrews.171@osu.edu).

Lyft Ride Smart:

Lyft Ride Smart at Ohio State offers eligible students discounted rides, inside the university-designated [service area](#), from 7 p.m. to 7 a.m. Discounted rides will be made available on a first-come, first-served basis with the average cost expected to be \$2 or less. Prices may be impacted by distance, traffic, time of day, special events and prime time surcharges. To qualify for program discounts, users must select "shared ride" when booking in the Lyft app. For more information, visit: <https://ttm.osu.edu/ride-smart>.

Building Emergency Action Plan:

Each building on campus has a Building Emergency Action Plan (BEAP) outlining that specific building's specific procedures to be followed in the event of a range of emergency situations, including fire, weather, terrorism, chemical spills, etc. It is the role of every Buckeye to help keep each other safe and to be aware of these procedures. You can find all of the campus BEAPs at <https://dps.osu.edu/beap>.

Weather or Other Short-Term Closing

Should in-person classes be canceled, students will be notified as to which alternative methods of teaching will be offered to ensure continuity of instruction for this class. Communication will be via Carmen announcements and course-wide email.

Autumn 2024 TENTATIVE SCHEDULE

Information in this syllabus is subject to change with as much notice to students as possible.

Week	Lecture Topic	Assigned Chapters (<i>Scientific Endeavor</i>) and readings	Assignments Due
1	Introduction to Science and Malarkey	1	Workshop Assignment 1: Understanding Sources
2	The Philosophy of Science and the Community of Scientists <input type="checkbox"/> Focus on the unifying theories of modern biology (Cell Theory, Evolution, Central Dogma/Heredit)	2	Workshop Assignment 2: How to read a scientific paper
3	Biological Methodologies: <input type="checkbox"/> Types of research studies in biology <input type="checkbox"/> Qualitative vs Quantitative biology <input type="checkbox"/> Observational studies and clinical trials in Biology <input type="checkbox"/> Pilot Studies	3, 4	Writing Assignment 1 due; Lecture Quiz 1
4	How Biological Research Works <input type="checkbox"/> In the lab/field – what happens? <input type="checkbox"/> Publishing – What are journals? <input type="checkbox"/> Peer Review	3, 4	Workshop Assignment 3: Visit a journal website: How do you submit a paper?
5	Correlation and Causality in Biology <input type="checkbox"/> Storks deliver babies? <input type="checkbox"/> Interpreting correlations <input type="checkbox"/> Common Causes in correlation <input type="checkbox"/> Determining Causality	6	Writing Assignment 2 due; Workshop Assignment 4: Storks Deliver Babies ($p = 0.008$)
6	Statistical Traps in Biological research <input type="checkbox"/> Interpreting p-values in biological research <input type="checkbox"/> Multiple tests and the p-value <input type="checkbox"/> False positives and negatives	6	Lecture Quiz 2
7	Common Data Visualization practices in biology <input type="checkbox"/> Bar Charts <input type="checkbox"/> Line Graphs <input type="checkbox"/> Y-axis values <input type="checkbox"/> Misleading figures and how to spot them	7	Workshop Assignment 5: Data Analysis Skills and reading figures

8	Publication Bias within the natural sciences <input type="checkbox"/> What studies get published? <input type="checkbox"/> Negative results are just as interesting?	National Academies of Sciences, E. (2019); West and Bergstrom (2021)	Writing Assignment 3 due Workshop Assignment 6: Conflicting Information – Vitamin E
9	Predatory Publishers <input type="checkbox"/> What are they? <input type="checkbox"/> How do we spot them? <input type="checkbox"/> How do we fight back?	West and Bergstrom (2021)	Lecture Quiz 3
10	Evaluating Biological Claims <input type="checkbox"/> Wakefield et al. controversy surrounding vaccines and autism <input type="checkbox"/> Why are most biological claims you come across false?	(Idso et al., 2016)	Workshop Assignment 7: Lateral Reading – Determining the credibility of biological claims

11	How to spot biological misinformation <input type="checkbox"/> Where do we find this? <input type="checkbox"/> What do we look for?	3; (Idso et al., 2016); Cook (2022)	Writing Assignment 4 due Workshop Assignment 8: Why scientists disagree about global warming
12	Critical Thinking in Biology <input type="checkbox"/> Find the source <input type="checkbox"/> Think about the big picture – linking multiple biological ideas together	6; Osborne et al. (2022)	Lecture Quiz 4
13	Strategies to correct biological misinformation <input type="checkbox"/> Finding correct information <input type="checkbox"/> Methods to correct <input type="checkbox"/> Strategies to engage with misinformation	Loss et al. (2018); Mammola et al. (2022)	Workshop Assignment 9: Bluff the listener
14	Misconduct in biology <input type="checkbox"/> The Legacy of Wakefield <input type="checkbox"/> Spider Misconduct <input type="checkbox"/> Misconduct at OSU	Chapter 5; (Carroll, 2019)	Final Project Due Friday at 11:59 p.m. Workshop 10: Who can be trusted as a credible scientist?
15	Final Exam Week	No readings	Lecture Quiz 5 on assigned final exam day

Proposal for Biology 2750 –Biological Reasoning for Informed Citizenship
3 Credit Hours

Course Description: *Study of historical and contemporary biological methodology, and philosophy with a focus on identification of validated biological discovery and comparison with misinformation and misconduct in the biological sciences.*

Prerequisite: Completion of course requirements in GE Foundations: Natural Sciences

Today, scientific misinformation can spread at an alarming rate, often attacking topics with overwhelming scientific consensus and the scientific processes themselves. Biology as a field has many areas of research that are often at the center of public controversies and misconceptions. Many social and ethical issues of society – climate change ecology, genetic engineering and genetic testing, food and agriculture, drug testing, environmental conservation, medical treatments, disease outbreaks, and invasive species – are inherently biological issues. Owing to a lack of general understanding of core principles of biological methodology and sensationalism in the media and across the internet, it becomes easier to improperly question the validity of biological research. These misconceptions can be found in the public but also easily observed in biological sciences majors in our courses. To combat these issues, we are proposing a new course that would fulfill the General Education *Lived Environments* theme and serve as an elective to the Biology Major curriculum.

While many Foundational GE science courses will devote a small amount of time to the nature of science, this is often limited to a brief description of the scientific process focused exclusively on the inductive reasoning approach before moving on to more focused topics and course material. This course aims to build on that foundational material by looking deeper into the research approaches that biologists often use by exploring the modern methods of biological research, including various approaches to the scientific method, peer review process, nature of biological theories, and the role of methodologies within different disciplines of the natural sciences. Specifically, as detailed in the attached syllabus, using Jeffrey Lee's *The Scientific Endeavor* as a textbook for the course, we will take a stepwise progression through the history and methodology of scientific processes utilizing both historical and contemporary events as a framework for the effect science has on a society. Building on this framework, the course will use readings from primary and secondary literature (examples of these are listed in the syllabus below) to focus on methodologies used specifically in the biological sciences and provide a platform to discuss how biology research occurs in our modern world. Next, we will guide students in developing skills to effectively evaluate biological based claims found in the media and primary literature alike. From here, we build critical thinking skills biologists use to help spot misinformation in our field and provide a framework to discuss uncertainty and variability in biological data using statistical techniques. Furthermore, this course will discuss the formation of misinformation in biology stemming from changes in the way research results make their way into the

public sector through the rise of preprint servers that gain media attention, publication biases, predatory publishers, and malfeasance (example: Andrew Wakefield's misconduct fabricating the link between vaccines and autism). Overall, this course will provide students a framework to recognize misleading biological-based claims making them more informed citizens in addition to providing several skills suited to successful completion of their broader curriculum.

We are proposing that this course fulfill a General Education Lived Environments Theme. From its western origins with Francis Bacon, the scientific method has grown through the contributions of philosophers like Karl Popper and his ideas of falsifiability, to the modern methods and ever-changing nature of peer review. Students will be exposed to a diverse field of biologists that contribute to the historical and contemporary study of biology. This will fulfill the first and second goals of the Lived Environments Theme. These learning objectives will be measured using a diverse array of assessment techniques including exams, quizzes, workshop activities, in-class assignments, and writing assignments.

The public outcry against some 'useless' research will provide us the backdrop to compare theoretical and applied research in biology. An understanding that technology, an applied science, is the product of theoretical research is key to this comparison and will fulfill the third GE learning objective. Debates that arise from where public research money should be focused will lead us to the discussion of the value of biology research and its contribution to society. These objectives will primarily be assessed through the written assignments, though some formative exam and quiz questions may be used to address the third objective.

The frequent writing assignments in the course, as outlined in the attached syllabus, will require students to analyze the impacts of scientific methodologies on society, through the development of technology, the effects of misconduct in science, and the perceptions of reality that exist – including those driving the rise in misinformation. All the writing assignments will have students researching examples and synthesizing their findings with the principles discussed in lecture and in the assigned reading from *The Scientific Endeavor* as well as chosen articles from the primary and secondary literature and popular press.

The course will be set up with two hours of weekly lecture (2x55 minutes) with an additional 80-minute weekly active workshop meeting. The lecture will be taught by a faculty member, while the smaller workshop sections will be led by either a faculty member or TA. The proposed setup will allow for scalability, as we intend to use the workshop as an active learning discussion or seminar component and not just a 'review session', benefiting from the smaller class size than what will be anticipated in the lecture. The workshop section will therefore justify its own credit hour. Future offerings of the course may have Distance Learning sections, but currently we are not submitting for approval to offer the course as an online GE.

Appendix A: Biology 2750 Course Learning Objectives and Alignment
(*See Attached*)

Appendix B: Sample Course Syllabus
(*See Attached*)

Appendix C: Sample Writing Assignment
(*See Attached*)

Appendix D: Sample Workshop Activity
(*See Attached*)

Appendix A: Biology 2750 Course Learning Objectives and Alignment

Goals	Expected Learning Outcomes	GE ELO Alignment (GT = General Themes, LE = Lived Environments)
Goal 1: Students will develop science literacy skills and the ability to construct a scientifically literate argument.	<ul style="list-style-type: none"> □ 1.1 Students will evaluate both controversies in biology as well as biological topics viewed as controversial by parts of society. 	<ul style="list-style-type: none"> □ GT 1.1 Engage in critical and logical thinking about the topic or idea of the theme. □ GT 1.2 Engage in an advanced, in-depth, scholarly exploration of the topic or idea of the theme. □ LE 2.1 Analyze how humans' interactions with their environments shape or have shaped attitudes, beliefs, values and behaviors. □ LE 2.2 Describe how humans perceive and represent the environments with which they interact. □ LE 2.3 Analyze and critique conventions, theories, and ideologies that influence discourses around environments.
	<ul style="list-style-type: none"> □ 1.2 Students will use critical thinking skills to evaluate the validity of biological claims presented as scientific in social media and the popular press. 	<ul style="list-style-type: none"> □ GT 1.1 Engage in critical and logical thinking about the topic or idea of the theme. □ GT 1.2 Engage in an advanced, in-depth, scholarly exploration of the topic or idea of the theme.
	<ul style="list-style-type: none"> □ 1.3 Students will synthesize evidence-based arguments to diverse audiences using knowledge and skills from other coursework explaining how biology and technology address problems of the contemporary world. 	<ul style="list-style-type: none"> □ GT 2.1 Identify, describe, and synthesize approaches or experiences as they apply to the theme. □ GT 2.2 Demonstrate a developing sense of self as a learner through reflection, self-assessment, and creative work, building on prior experiences to respond to new and challenging contexts.
Goal 2: Students will develop critical thinking skills through and exploration of logical fallacies and their use in arguments.	<ul style="list-style-type: none"> □ 2.1 Students will differentiate biological science from pseudoscience and non-science. 	<ul style="list-style-type: none"> □ GT 1.1 Engage in critical and logical thinking about the topic or idea of the theme. □ GT 1.2 Engage in an advanced, in-depth, scholarly exploration of the topic or idea of the theme.

	<p>□ 2.2 Students will identify examples of logical fallacies used in biological misinformation.</p>	<p>GT 1.2 Engage in an advanced, in-depth, scholarly exploration of the topic or idea of the theme.</p> <p>□ LE 2.3 Analyze and critique conventions, theories, and ideologies that influence discourses around environments.</p>
	<p>□ 2.3 Students will use logical fallacies to evaluate examples of biological research as well as biological misinformation.</p>	<p>GT 1.1 Engage in critical and logical thinking about the topic or idea of the theme.</p> <p>GT 1.2 Engage in an advanced, in-depth, scholarly exploration of the topic or idea of the theme.</p> <p>□ LE 2.2 Describe how humans perceive and represent the environments with which they interact.</p> <p>□ LE 2.3 Analyze and critique conventions, theories, and ideologies that influence discourses around environments.</p>
	<p>□ 2.4 Students will compare anecdotal thought and experiences to biological data and reasoning.</p>	<p>GT 1.1 Engage in critical and logical thinking about the topic or idea of the theme.</p> <p>□ LE 2.2 Describe how humans perceive and represent the environments with which they interact.</p>
<p>Goal 3: Students understand the scientific process in both modern and historical contexts.</p>	<p>□ 3.1 Students will differentiate between hypotheses, predictions, theories, laws, and facts.</p>	<p>□ LE 1.2 Describe examples of human interaction with and impact on environmental change and transformation over time and across space.</p> <p>□ LE 2.2 Describe how humans perceive and represent the environments with which they interact.</p>
	<p>□ 3.2 Students will synthesize the contributions of various scientific philosophers in the age of scientific reasoning from both eastern and western culture.</p>	<p>□ GT 2.1 Identify, describe, and synthesize approaches or experiences as they apply to the theme.</p> <p>□ LE 1.2 Describe examples of human interaction with and impact on environmental change and transformation over time and across space.</p> <p>□ LE 2.1 Analyze how humans' interactions with their environments</p>

		<p>shape or have shaped attitudes, beliefs, values and behaviors.</p> <ul style="list-style-type: none"> □ LE 2.2 Describe how humans perceive and represent the environments with which they interact.
	<ul style="list-style-type: none"> □ 3.3 Students will recognize that interpretation of data is a regular part of methodology in the natural sciences. 	<ul style="list-style-type: none"> □ GT 1.1 Engage in critical and logical thinking about the topic or idea of the theme. □ GT 1.2 Engage in an advanced, in-depth, scholarly exploration of the topic or idea of the theme. □ LE 1.1 Engage with the complexity and uncertainty of human-environment interactions. □ LE 2.2 Describe how humans perceive and represent the environments with which they interact. □ LE 2.3 Analyze and critique conventions, theories, and ideologies that influence discourses around environments.
	<ul style="list-style-type: none"> □ 3.4 Students will analyze the inherent risk of bias as a product of biological research being a human endeavor. 	<ul style="list-style-type: none"> □ GT 1.1 Engage in critical and logical thinking about the topic or idea of the theme. □ GT 1.2 Engage in an advanced, in-depth, scholarly exploration of the topic or idea of the theme. □ LE 1.1 Engage with the complexity and uncertainty of human-environment interactions. □ LE 2.2 Describe how humans perceive and represent the environments with which they interact. □ LE 2.3 Analyze and critique conventions, theories, and ideologies that influence discourses around environments.
	<ul style="list-style-type: none"> □ 3.5 Students will synthesize sound scientific explanations grounded in the scientific process. 	<ul style="list-style-type: none"> □ GT 1.2 Engage in an advanced, in-depth, scholarly exploration of the topic or idea of the theme. □ GT 2.1 Identify, describe, and synthesize approaches or experiences as they apply to the theme.

	<ul style="list-style-type: none"> □ 3.6 Students will summarize the process of peer review and publication commonly used in the natural sciences. 	<ul style="list-style-type: none"> □ GT 1.2 Engage in an advanced, in-depth, scholarly exploration of the topic or idea of the theme. □ LE 2.3 Analyze and critique conventions, theories, and ideologies that influence discourses around environments.
	<ul style="list-style-type: none"> □ 3.7 Students will explain the self-correcting nature of science using examples from the history of biological research. 	<ul style="list-style-type: none"> □ GT 1.2 Engage in an advanced, in-depth, scholarly exploration of the topic or idea of the theme. □ LE 2.3 Analyze and critique conventions, theories, and ideologies that influence discourses around environments.
<p>Goal 4: Students will describe the interdependence of scientific and technological developments.</p>	<ul style="list-style-type: none"> □ 4.1 Students will compare and differentiate between theoretical biology and applied biology. 	<ul style="list-style-type: none"> □ GT 1.1 Engage in critical and logical thinking about the topic or idea of the theme. □ GT 1.2 Engage in an advanced, in-depth, scholarly exploration of the topic or idea of the theme. □ GT 2.1 Identify, describe, and synthesize approaches or experiences as they apply to the theme. □ LE 1.2 Describe examples of human interaction with and impact on environmental change and transformation over time and across space.
<p>Goal 5: Students will analyze and interpret major forms of human thought, culture, and expression.</p>	<ul style="list-style-type: none"> □ 5.1 Students will compare knowledge in the biological sciences to other forms of knowledge. 	<ul style="list-style-type: none"> □ GT 2.1 Identify, describe, and synthesize approaches or experiences as they apply to the theme. □ LE 1.1 Engage with the complexity and uncertainty of human-environment interactions. □ LE 1.2 Describe examples of human interaction with and impact on environmental change and transformation over time and across space. □ LE 2.1 Analyze how humans' interactions with their environments shape or have shaped attitudes, beliefs, values and behaviors. □ LE 2.2 Describe how humans perceive and represent the

		environments with which they interact.
	<input type="checkbox"/> 5.2 Students will contrast the questions applicable to the scientific process and those that cannot be answered by science.	<input type="checkbox"/> GT 1.1 Engage in critical and logical thinking about the topic or idea of the theme. <input type="checkbox"/> GT 1.2 Engage in an advanced, in-depth, scholarly exploration of the topic or idea of the theme. <input type="checkbox"/> GT 2.1 Identify, describe, and synthesize approaches or experiences as they apply to the theme.
<p>Goal 6: Students evaluate how ideas influence the character of human beliefs, the perception of reality, and the norms which guide human behavior.</p>	<input type="checkbox"/> 6.1 Students will assess uncertainty and its role in biological literacy and agenda-driven interpretation in the media.	<input type="checkbox"/> GT 1.1 Engage in critical and logical thinking about the topic or idea of the theme. <input type="checkbox"/> GT 1.2 Engage in an advanced, in-depth, scholarly exploration of the topic or idea of the theme. <input type="checkbox"/> GT 2.1 Identify, describe, and synthesize approaches or experiences as they apply to the theme. <input type="checkbox"/> LE 1.1 Engage with the complexity and uncertainty of human-environment interactions. <input type="checkbox"/> LE 1.2 Describe examples of human interaction with and impact on environmental change and transformation over time and across space. <input type="checkbox"/> LE 2.1 Analyze how humans' interactions with their environments shape or have shaped attitudes, beliefs, values and behaviors. <input type="checkbox"/> 2.2 Describe how humans perceive and represent the environments with which they interact. <input type="checkbox"/> 2.3 Analyze and critique conventions, theories, and ideologies that influence discourses around environments.
	<input type="checkbox"/> 6.2 Students will construct and deliver sound arguments appealing to different ways of thinking in specified environments.	<input type="checkbox"/> GT 1.1 Engage in critical and logical thinking about the topic or idea of the theme.

		<ul style="list-style-type: none"> □ GT 1.2 Engage in an advanced, in-depth, scholarly exploration of the topic or idea of the theme. □ GT 2.1 Identify, describe, and synthesize approaches or experiences as they apply to the theme. □ GT 2.2 Demonstrate a developing sense of self as a learner through reflection, self-assessment, and creative work, building on prior experiences to respond to new and challenging contexts. □ LE 1.1 Engage with the complexity and uncertainty of human-environment interactions.
	<ul style="list-style-type: none"> □ 6.3 Students will apply critical thinking skills to assess human willingness or susceptibility to accept claims without evidence. 	<ul style="list-style-type: none"> □ GT 1.1 Engage in critical and logical thinking about the topic or idea of the theme. □ GT 2.1 Identify, describe, and synthesize approaches or experiences as they apply to the theme. □ GT 2.2 Demonstrate a developing sense of self as a learner through reflection, self-assessment, and creative work, building on prior experiences to respond to new and challenging contexts. □ LE 1.1 Engage with the complexity and uncertainty of human-environment interactions. □ LE 2.1 Analyze how humans' interactions with their environments shape or have shaped attitudes, beliefs, values and behaviors. □ LE 2.2 Describe how humans perceive and represent the environments with which they interact. □ LE 2.3 Analyze and critique conventions, theories, and ideologies that influence discourses around environments.
	<ul style="list-style-type: none"> □ 6.4 Students will reflect on the ways their personal experiences have influenced 	<ul style="list-style-type: none"> □ GT 2.2 Demonstrate a developing sense of self as a learner through reflection, self-assessment, and creative work, building on prior

	<p>their own thought or perceptions.</p>	<p>experiences to respond to new and challenging contexts.</p> <ul style="list-style-type: none"> □ LE 2.1 Analyze how humans' interactions with their environments shape or have shaped attitudes, beliefs, values and behaviors.
	<ul style="list-style-type: none"> □ 6.5 Students will analyze scientific misconduct in the biological sciences and the conditions that encourage intentional and unintentional malfeasance. 	<ul style="list-style-type: none"> □ GT 1.1 Engage in critical and logical thinking about the topic or idea of the theme. □ GT 1.2 Engage in an advanced, in-depth, scholarly exploration of the topic or idea of the theme. □ GT 2.1 Identify, describe, and synthesize approaches or experiences as they apply to the theme. □ LE 1.2 Describe examples of human interaction with and impact on environmental change and transformation over time and across space. □ LE 2.1 Analyze how humans' interactions with their environments shape or have shaped attitudes, beliefs, values and behaviors. □ LE 2.3 Analyze and critique conventions, theories, and ideologies that influence discourses around environments.
	<ul style="list-style-type: none"> □ 6.6 Students will analyze the misrepresentation of biological data by individuals and groups within the biological sciences. 	<ul style="list-style-type: none"> □ GT 1.1 Engage in critical and logical thinking about the topic or idea of the theme. □ GT 1.2 Engage in an advanced, in-depth, scholarly exploration of the topic or idea of the theme. □ GT 2.1 Identify, describe, and synthesize approaches or experiences as they apply to the theme. □ LE 1.2 Describe examples of human interaction with and impact on environmental change and transformation over time and across space. □ LE 2.1 Analyze how humans' interactions with their environments shape or have shaped attitudes, beliefs, values and behaviors.

		<input type="checkbox"/> LE 2.3 Analyze and critique conventions, theories, and ideologies that influence discourses around environments.
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Appendix B: Sample Course Syllabus



THE OHIO STATE UNIVERSITY

Biology 2750
Biological Reasoning
for Informed Citizenship
Autumn 2024
3 Credit Hours

Lecturers: **James Chiucchi, Ph.D.**
Samantha Herrmann, Ph.D.
Center for Life Sciences Education
Jennings Hall

Course Coordinator:

Teaching Associates: TAs and other personnel will be listed here.

Class Meeting Schedule

Lecture: TU/TH (55-minute lectures)

Workshop: 80 minutes, once weekly

Course Materials

Required: *The Scientific Endeavor: A Primer on Scientific Principles and Practice Edition 2.0* by Jeffrey A. Lee; ISBN: 9781536893830.

Assigned Readings Provided to Students:

Carroll, S. B. (2019). *The Story of Life: Great Discoveries in Biology (First Edition)*. Chapter 2. W. W. Norton & Company, Inc.

Cook, J., Ecker, U. K. H., Trecek-King, M., Schade, G., Jeffers-Tracy, K., Fessmann, J., Kim, S. C., Kinkead, D., Orr, M., Vraga, E., Roberts, K., & McDowell, J. (2022). The cranky uncle game—combining humor and gamification to build student resilience against climate misinformation. *Environmental Education Research, 4*, 1–17. <https://doi.org/10.1080/13504622.2022.2085671>

Idso, C. D., Carter, R. M., S Fred Singer, Nongovernmental International Panel On Climate Change, & Heartland Institute (Chicago, Ill. (2016). *Why scientists disagree about global warming: the NIPCC report on scientific consensus*. NIPCC By The Heartland Institute.

Loss, S. R., Will, T., Longcore, T., & Marra, P. P. (2018). Responding to misinformation and criticisms regarding United States cat predation estimates. *Biological Invasions, 20*(12), 3385–3396. <https://doi.org/10.1007/s10530-018-1796-y>

Mammola, S., Malumbres-Olarte, J., Arabesky, V., Barrales-Alcalá, D. A., Barrion-Dupo, A. L., Benamú, M. A., Bird, T. L., Bogomolova, M., Cardoso, P., Chatzaki, M., Cheng, R.-C., Chu, T.-A., Classen-Rodríguez, L. M., Čupić, I., Dhiya'ulhaq, N. U.,

Drapeau Picard, A.-P., El-Hennawy, H. K., Elverici, M., Fukushima, C. S., & Ganem, Z. (2022). The global spread of misinformation on spiders. *Current Biology*, 32(16), R871–R873. <https://doi.org/10.1016/j.cub.2022.07.026>

National Academies of Sciences, E. (2019). Reproducibility and Replicability in Science. In *nap.nationalacademies.org*.
<https://nap.nationalacademies.org/catalog/25303/reproducibility-and-replicability-in-science>

Osborne, J., Pimentel, D., Alberts, B., Allchin, D., Barzilai, S., Bergstrom, C., Coffey, J., Donovan, B., Kivinen, K., Kozyreva, A., & Wineburg, S. (2022). *Science Education in an Age of Misinformation*. Stanford University, Stanford, CA.

West, J. D., & Bergstrom, C. T. (2021). Misinformation in and about science. *Proceedings of the National Academy of Sciences*, 118(15), e1912444117. <https://doi.org/10.1073/pnas.1912444117>

Internet Access: Your access to Carmen is an integral and necessary part of this course. You must activate your OSU email account to have access to Carmen. The Carmen URL is <http://carmen.osu.edu> and Biology 2750 should be listed under My Courses on your Carmen homepage. The username to log on is your OSU name.# and the password is the one you use with all OSU email and registration systems. If you have a problem logging in or using Carmen, contact 688-HELP or carmen@osu.edu. IMPORTANT: The CLSE and its course staff will send email ONLY to your official OSU email account.

Prerequisites: GE Foundational coursework in Natural Sciences.

Course Description: *Study of historical and contemporary biological methodology, and philosophy with a focus on identification of validated biological discovery and comparison with misinformation and misconduct in the biological sciences.*

General Education Natural Science Goals & Objectives

Students who successfully complete this course will fulfill the following General Education goals and objectives:

Themes: General	
Goals	Expected Learning Outcomes
GOAL 1: Successful students will analyze an important topic or idea at a more advanced and in-depth level than the foundations.	Successful students are able to ...
	<p>1.1 Engage in critical and logical thinking about the topic or idea of the theme.</p> <p>1.2 Engage in an advanced, in-depth, scholarly exploration of the topic or idea of the theme.</p>
GOAL 2: Successful students will integrate approaches to the theme	2.1 Identify, describe, and synthesize approaches or experiences as they apply to the theme.

<p>by making connections to out-of-classroom experiences with academic knowledge or across disciplines and/or to work they have done in previous classes and that they anticipate doing in future.</p>	<p>2.2 Demonstrate a developing sense of self as a learner through reflection, self-assessment, and creative work, building on prior experiences to respond to new and challenging contexts.</p>
<p>Theme: Lived Environments</p>	
<p>GOAL 1: Successful students will explore a range of perspectives on the interactions and impacts between humans and one or more types of environments (e.g., agricultural, built, cultural, economic, intellectual, natural) in which humans live.</p>	<p>Successful students are able to ...</p> <p>1.1 Engage with the complexity and uncertainty of human-environment interactions.</p> <p>1.2 Describe examples of human interaction with and impact on environmental change and transformation over time and across space.</p>
<p>GOAL 2: Successful students will analyze a variety of perceptions, representations and/or discourses about environments and humans within them.</p>	<p>2.1 Analyze how humans' interactions with their environments shape or have shaped attitudes, beliefs, values and behaviors.</p> <p>2.2 Describe how humans perceive and represent the environments with which they interact.</p> <p>2.3 Analyze and critique conventions, theories, and ideologies that influence discourses around environments.</p>

Successful students in Biology 2750 will analyze the processes central to scientific endeavors specifically within the biological sciences, and the effect of these processes in the context of current and historical social responses, evaluating the validity of biological research and biology misinformation, and demonstrating ability to apply the skills learned to evaluate these claims to novel circumstances they will encounter in our modern world.

Biology 2750 Goals and Learning Outcomes

Upon successful completion of Biology 2750, students will demonstrate the ability to:

Goals	Expected Learning Outcomes
<p>Goal 1: Students will develop science literacy skills and the ability to construct a scientifically literate argument.</p>	<p><input type="checkbox"/> 1.1 Students will evaluate both controversies in biology as well as biological topics viewed as controversial by parts of society.</p> <p><input type="checkbox"/> 1.2 Students will use critical thinking skills to evaluate the validity of biological claims presented as scientific in social media and the popular press.</p>

	<input type="checkbox"/> 1.3 Students will synthesize evidence-based arguments to diverse audiences using knowledge and skills from other coursework explaining how biology and technology address problems of the contemporary world.
Goal 2: Students will develop critical thinking skills through and exploration of logical fallacies and their use in arguments.	<input type="checkbox"/> 2.1 Students will differentiate biological science from pseudoscience and non-science.
	<input type="checkbox"/> 2.2 Students will identify examples of logical fallacies used in biological misinformation.
	<input type="checkbox"/> 2.3 Students will use logical fallacies to evaluate examples of biological research as well as biological misinformation.
	<input type="checkbox"/> 2.4 Students will compare anecdotal thought and experiences to biological data and reasoning.
Goal 3: Students understand the scientific process in both modern and historical contexts.	<input type="checkbox"/> 3.1 Students will differentiate between hypotheses, predictions, theories, laws, and facts.
	<input type="checkbox"/> 3.2 Students will synthesize the contributions of various scientific philosophers in the age of scientific reasoning from both eastern and western culture.
	<input type="checkbox"/> 3.3 Students will recognize that interpretation of data is a regular part of methodology in the natural sciences.
	<input type="checkbox"/> 3.4 Students will analyze the inherent risk of bias as a product of biological research being a human endeavor.
	<input type="checkbox"/> 3.5 Students will synthesize sound scientific explanations grounded in the scientific process.
	<input type="checkbox"/> 3.6 Students will summarize the process of peer review and publication commonly used in the natural sciences.
	<input type="checkbox"/> 3.7 Students will explain the self-correcting nature of science using examples from the history of biological research.
Goal 4: Students will describe the inter-dependence of scientific and technological developments.	<input type="checkbox"/> 4.1 Students will compare and differentiate between theoretical biology and applied biology.
Goal 5: Students will analyze and interpret major forms of human thought, culture, and expression.	<input type="checkbox"/> 5.1 Students will compare knowledge in the biological sciences to other forms of knowledge.
	<input type="checkbox"/> 5.2 Students will contrast the questions applicable to the scientific process and those that cannot be answered by science.

Goal 6: Students evaluate how ideas influence the character of human beliefs, the perception of reality, and the norms which guide human behavior.	<input type="checkbox"/> 6.1 Students will assess uncertainty and its role in biological literacy and agenda-driven interpretation in the media.
	<input type="checkbox"/> 6.2 Students will construct and deliver sound arguments appealing to different ways of thinking in specified environments.
	<input type="checkbox"/> 6.3 Students will apply critical thinking skills to assess human willingness or susceptibility to accept claims without evidence.
	<input type="checkbox"/> 6.4 Students will reflect on the ways their personal experiences have influenced their own thought or perceptions.
	<input type="checkbox"/> 6.5 Students will analyze scientific misconduct in the biological sciences and the conditions that encourage intentional and unintentional malfeasance.
	<input type="checkbox"/> 6.6 Students will analyze the misrepresentation of biological data by individuals and groups within the biological sciences.

Credit hour and work expectation: This is a 3-credit-hour course. According to Ohio State policy, students should expect around 3 hours per week of time spent on direct instruction (instructor content, labs, and Carmen activities, for example) in addition to 6 hours of homework (reading and assignment preparation, for example) to receive a grade of (C) average. [ASC Honors](#) provides an excellent guide to scheduling and study expectations.

Grading and Evaluation

Graded assignments may come in three forms, and students should note the expectations for each in the descriptions of our class assignments below.

- Independent Work (👤):** Strictly non-collaborative, original-individual work. You may discuss this assignment only with your instructor. Discussions with other individuals, either in person or electronically, are strictly prohibited.
- Collaboration Required (👥):** An explicit expectation for collaboration among students either in-class or outside (i.e., group work).
- Optional-Collaboration (👥👉):** Students are permitted, but not required, to discuss the assignment or ideas with each other. However, all submitted work must be one's original and individual creation.

Assignment	Points	Assignment Type
Workshop Assignments (10 x 20 pts each)	200 pts.	👥
Writing Assignments (4 x 20 pts each)	80 pts.	💬
Lecture Quizzes (5 x 50 pts each)	250 pts	↑
Final Project	50 pts.	↑
Misinformation Inventory	30 pts	↑
In-class Activities (including TopHat)	50 pts.	💬
SALG	5 pts.	↑
TOTAL COURSE POINTS	665	

Workshop Assignments 👥: During workshop, cooperative groups will apply knowledge gained in lecture to analyze relevant case studies. These case studies will vary each week but will primarily consist of short answer responses, graph and figure analysis, and some multiple-choice questions. Groups will submit their work at the beginning of workshop the following week. Examples of topics discussed will include Climate change research and climate change denial, COVID -19 and vaccine misinformation, GMO's, misinformation on invasive species, nutrition misinformation, alternative medicine, Conservation Biology, Evolution misinformation, and genetic engineering techniques. Examples of these assignments are designed to help students 1) better understands credible biology sources, 2) use lateral reading to determine source credibility, 3) discuss the role of expertise in biological fields, and 4) parse conflicting credible information within the field of biology itself.

Writing Assignments 💬: These assignments will be a mix of writing assignments asking students to synthesize content from lecture, reading assignments, and individual research of articles in the popular and primary literature (we have included an example assignment at the end of this document – *Appendix C: Sample Writing Assignment Debunk the Bunk*).

Lecture Quizzes ↑ : These brief quizzes will serve as checkpoints for students to keep up with objective components of lecture. They will be held at the beginning of lecture and consist of multiple choice and short answer questions reflective of lecture material. There will be 5 progressive quizzes throughout the semester.

Final Project ↑ : This final paper will ask students to research an example of pseudoscience and provide a scientific counterargument aimed at winning a “Thanksgiving debate with your uncle.”

Misinformation Inventory: You will keep track of all misinformation you encounter for a week as well as the misinformation you create and/or try to debunk for an entire week. This data will then be turned into a visual representation of your choice. Be creative here and think of ways you might want to display this data. Examples will be shown during class to help give you some ideas.

In-Class Activities 🗨️: Active learning opportunities in lecture will include group case studies as well as TopHat questions.

SALG 📊: The Student Assessment of Learning Gains is a survey taken during the final week of the course and will be worth 5 points for completion.

Final Grades:

Your final grade will be based on the percentage of the 665 points that you earn during the semester, as indicated below. Please note that we do not grade the course on a curve and *Carmen* does not round scores up to the next nearest percentage point, so 92.11% and 92.97% both earn the grade of A-.

Grade Scale

A	A-	B+	B	B-	C+	C	C-	D+	D	E
100 – 93.0%	92.9 – 90.0%	89.9 – 87.0%	86.9 – 83.0%	82.9 – 80.0%	79.9 – 77.0%	76.9 – 73.0%	72.9 – 70.0%	69.9 – 67.0%	66.9 – 60.0%	59.9 – 0%

Posting Of Grades:

All grades will be posted on Carmen. After grades are posted you have 10 working days to challenge any grade or inquire regarding an unposted or missing grade. **After that time, grades are final as posted or zero if missing.** To challenge or inquire about a grade, contact your TA. IMPORTANT: Make sure that all of your grades are properly posted on Carmen as you receive them. Challenges about grades, particularly after the end of the semester, cannot be entertained after the 10-day grace period.

Late Assignments Policy:

All written assignments are due by 11:59 pm on the assigned dates. A late assignment (except exams) will be subject to a 25% deduction for each day late. This corresponds to 100% point deduction if assignments are turned in after 4 days of the due date.

Instructor Feedback and Response Expectations:

- ❑ **Email Response:** The CLSE's expectation of instructors is that emails will be responded to within one business day. If your email is sent during the evening or over the weekend, you may not receive a response until the next business day.
- ❑ **Class announcements:** We will send all important class-wide messages through the Announcements tool in CarmenCanvas. Please check [your notification preferences](#) (go.osu.edu/canvas-notifications) to ensure you receive these messages.
- ❑ **Graded Assignments** will be graded and returned to you within one week after they were turned in. All scores are posted on Carmen no later than the day the graded assignment is returned.

Absences:

If you are unable to take a quiz at the regularly scheduled time, you must contact the course coordinator within 24 hours to schedule a makeup. If your absence is excused

for a university-sanctioned event, if you are ill and have been seen by a medical practitioner on the day of the quiz, or have other documentable reasons for missing, you may be offered a makeup quiz without penalty. If you have no documentation to support your absence, or your absence from an quiz is not for an excused reason, you will still be offered the opportunity for a makeup quiz, with a 25% overall deduction on your exam score. There will not be an opportunity to make up unexcused quiz absences. Lack of transportation, loss of electricity, travel plans, etc. will not be considered as valid excuses. Arrivals to the quiz after the first student has turned in an exam will be considered an unexcused absence, and the policy above will apply. The format for makeup assignments is at the discretion of the instructor.

The final quiz is scheduled for (insert University scheduled exam time). Make sure that this time does not conflict with your future plans. No early quizzes will be given. The only makeup quiz will be held on (date to be determined) and is available only for emergency situations and with pre-approval from the course coordinator.

Religious Accommodations

Our inclusive environment allows for religious expression. Students requesting accommodations based on faith, religious or a spiritual belief system in regard to examinations, other academic requirements or absences, are required to provide the instructor with written notice of specific dates for which the student requests alternative accommodations at the earliest possible date. For more information about religious accommodations at Ohio State, visit <https://odi.osu.edu/religious-accommodations>.

Section changes:

All section changes and adds are done by the Course Coordinator. Due to the need to keep up-to-minute availability of seats in each workshop, the lecturer and the workshop instructors are unable to sign any permission forms.

Copyrighted Class Materials:

©The Instructor's lectures and course materials, including power point presentations, tests, outlines, and similar materials, are protected by copyright. You may take notes and make copies of course materials for your own use. You may not and may not allow others to reproduce or distribute lecture notes and course materials publicly whether or not a fee is charged without the express written consent of the Course Instructor or Course Coordinator.

Accommodation of Special Needs:

The University strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability (including mental health, chronic or temporary medical conditions), please let the course

coordinator know immediately so that we can privately discuss options. To establish reasonable accommodations, we may request that you register with Student Life Disability Services. Only the course coordinator is authorized to complete SLDS accommodations. This will help us ensure that your individual needs will be met appropriately and fairly. **SLDS contact information: slds@osu.edu; 614-292-3307; slds.osu.edu; 098 Baker Hall, 113 W. 12th Avenue.**

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 are or someone you know is 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.

If you are thinking of harming yourself or need a safe, non-judgmental place to talk, or if you are worried about someone else and need advice about what to do, 24-hour emergency help is also available through the Suicide Prevention Hotline 1-- 800-273-TALK or at suicidepreventionlifeline.org

Course Technology:

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.

Carmen:

- Carmen, Ohio State's Learning Management System, will be used to host materials and activities throughout this course. To access Carmen, visit Carmen.osu.edu. Log in to Carmen using your name.# and password. If you have not setup a name.# and password, visit my.osu.edu.
- Help guides on the use of Carmen can be found at <https://resourcecenter.odde.osu.edu/carmen>

- **This course requires use of Carmen (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.**

□ [Carmen accessibility](#)

Secured Media Library

- Some of the videos for this course will be posted in the University's Secured Media Library. The link will be posted on the class Carmen page, and you will be automatically directed to the correct video.
- [Secured Media Library](#) help guide

Turnitin

- Students at The Ohio State University are accountable for the integrity of the work they submit. Therefore, you should be familiar with the guidelines provided by the [Committee on Academic Misconduct \(COAM\)](#) and [Section A of OSU's Code of Student Conduct](#) in order to meet the academic expectations concerning appropriate documentation of sources. In addition, OSU has made Turnitin, a learning tool and plagiarism prevention system, available to instructors. For this class, you will submit your papers to Turnitin from Carmen. When grading your work, we will interpret the originality report, following [Section A of OSU's Code of Student Conduct](#) as appropriate. For more information about Turnitin, please see [the vendor's guide for students](#). Note that submitted final papers become part of the OSU database.
- Please know that we view TurnItIn first and foremost as a teaching tool to make you a better writer. You will see in your individual originality reports exactly what the instructors see. We WANT you to look at this report as soon as you submit your assignments. If you see an issue, please correct it right away, before we start grading the assignment. You can resubmit without penalty as many times as you want prior to the established due date for any assignment. After the due date, the late policy is in effect.

Top Hat

- Top Hat is a web-based response system that allows students to use their own devices provide responses in the classroom. This course uses Top Hat to promote active engagement, allow for synchronous feedback, and monitor attendance.
- [Top Hat](#) help guide

□ **Self-Service and Chat support:** <http://ocio.osu.edu/selfservice>

□ **Phone:** 614-688-HELP (4357)

□ **Email:** 8help@osu.edu

□ **TDD:** 614-688-8743

Necessary software

- Word processor with the ability to save files under .doc, .docx, .rtf, or .pdf. Most popular word processing software programs including Microsoft Word and Mac Pages have these abilities.
 - OSU students have access to Microsoft Office products free of charge. To install, please visit https://osuitsm.service-now.com/selfservice/kb_view.do?sysparm_article=kb04733 Other Course Policies

Discussion and communication guidelines:

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

- **Tone and civility:** Let's maintain a supportive learning community where everyone feels safe and where people can disagree amicably. Remember that sarcasm doesn't always come across online and is not always appreciated in-person. The instructional team work very hard to provide a positive learning experience. Please keep this in mind and remain civilized and respectful in your class communications.
- **Citing your sources:** When we have academic discussions, please cite your sources to back up what you say.

Academic Misconduct:

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 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/>. We will adhere to this policy.

- Unless otherwise specified for a particular assignment, all submitted work should be a student's own unique effort. Collaborative efforts are not permitted unless expressly sanctioned for a particular assignment.
- Unless otherwise specified for a particular assignment, use of AI-generated materials for course submissions is not permitted.
- **Reusing past work:** In general, you are prohibited in university courses from turning in work from a past class to your current class, even if you modify it. If you want to build on past research or revisit a topic you've explored in previous courses, please discuss the situation with the course coordinator.
- Using others' verbatim words without the use of quotation marks *and* citation is plagiarism. Paraphrased work requires citation to denote the use of others' ideas. Copying other's words without quotation while using citations is still considered plagiarism.

- Use of any technology during a quiz or exam (including but not limited to cell phones, smart watches, headphones, electronic dictionaries, etc.) is strictly prohibited.

Diversity and Inclusion:

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.

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 at titleix@osu.edu.

Issue Resolution:

The CLSE believes that student concerns are usually most effectively addressed by the staff closest to the situation. Therefore, students are ordinarily expected to address issues or concerns first with their instructor. If the issue cannot be resolved by your instructor, or for some reason you feel that you absolutely cannot address your concern with your instructor, please feel free to contact the Course Coordinator or Assistant Director Adam Andrews (andrews.171@osu.edu).

Lyft Ride Smart:

Lyft Ride Smart at Ohio State offers eligible students discounted rides, inside the university-designated [service area](#), from 7 p.m. to 7 a.m. Discounted rides will be made available on a first-come, first-served basis with the average cost expected to be \$2 or less. Prices may be impacted by distance, traffic, time of day, special events and prime time surcharges. To qualify for program discounts, users must select "shared ride" when booking in the Lyft app. For more information, visit: <https://ttm.osu.edu/ride-smart>.

Building Emergency Action Plan:

Each building on campus has a Building Emergency Action Plan (BEAP) outlining that specific building's specific procedures to be followed in the event of a range of emergency situations, including fire, weather, terrorism, chemical spills, etc. It is the role of every Buckeye to help keep each other safe and to be aware of these procedures. You can find all of the campus BEAPs at <https://dps.osu.edu/beap>.

Weather or Other Short-Term Closing

Should in-person classes be canceled, students will be notified as to which alternative methods of teaching will be offered to ensure continuity of instruction for this class. Communication will be via Carmen announcements and course-wide email.

Autumn 2024 TENTATIVE SCHEDULE

Information in this syllabus is subject to change with as much notice to students as possible.

Week	Lecture Topic	Assigned Chapters (<i>Scientific Endeavor</i>) and readings	Assignments Due
1	Introduction to Science and Malarkey	1	Workshop Assignment 1: Understanding Sources
2	The Philosophy of Science and the Community of Scientists <input type="checkbox"/> Focus on the unifying theories of modern biology (Cell Theory, Evolution, Central Dogma/Heredit)	2	Workshop Assignment 2: How to read a scientific paper
3	Biological Methodologies: <input type="checkbox"/> Types of research studies in biology <input type="checkbox"/> Qualitative vs Quantitative biology <input type="checkbox"/> Observational studies and clinical trials in Biology <input type="checkbox"/> Pilot Studies	3, 4	Writing Assignment 1 due; Lecture Quiz 1
4	How Biological Research Works <input type="checkbox"/> In the lab/field – what happens? <input type="checkbox"/> Publishing – What are journals? <input type="checkbox"/> Peer Review	3, 4	Workshop Assignment 3: Visit a journal website: How do you submit a paper?
5	Correlation and Causality in Biology <input type="checkbox"/> Storks deliver babies? <input type="checkbox"/> Interpreting correlations <input type="checkbox"/> Common Causes in correlation <input type="checkbox"/> Determining Causality	6	Writing Assignment 2 due; Workshop Assignment 4: Storks Deliver Babies ($p = 0.008$)
6	Statistical Traps in Biological research <input type="checkbox"/> Interpreting p-values in biological research <input type="checkbox"/> Multiple tests and the p-value <input type="checkbox"/> False positives and negatives	6	Lecture Quiz 2
7	Common Data Visualization practices in biology <input type="checkbox"/> Bar Charts <input type="checkbox"/> Line Graphs <input type="checkbox"/> Y-axis values <input type="checkbox"/> Misleading figures and how to spot them	7	Workshop Assignment 5: Data Analysis Skills and reading figures

8	Publication Bias within the natural sciences <ul style="list-style-type: none"> <input type="checkbox"/> What studies get published? <input type="checkbox"/> Negative results are just as interesting? 	National Academies of Sciences, E. (2019); West and Bergstrom (2021)	Writing Assignment 3 due Workshop Assignment 6: Conflicting Information – Vitamin E
9	Predatory Publishers <ul style="list-style-type: none"> <input type="checkbox"/> What are they? <input type="checkbox"/> How do we spot them? <input type="checkbox"/> How do we fight back? 	West and Bergstrom (2021)	Lecture Quiz 3
10	Evaluating Biological Claims <ul style="list-style-type: none"> <input type="checkbox"/> Wakefield et al. controversy surrounding vaccines and autism <input type="checkbox"/> Why are most biological claims you come across false? 	(Idso et al., 2016)	Workshop Assignment 7: Lateral Reading – Determining the credibility of biological claims

11	How to spot biological misinformation <ul style="list-style-type: none"> <input type="checkbox"/> Where do we find this? <input type="checkbox"/> What do we look for? 	3; (Idso et al., 2016); Cook (2022)	Writing Assignment 4 due Workshop Assignment 8: Why scientists disagree about global warming
12	Critical Thinking in Biology <ul style="list-style-type: none"> <input type="checkbox"/> Find the source <input type="checkbox"/> Think about the big picture – linking multiple biological ideas together 	6; Osborne et al. (2022)	Lecture Quiz 4
13	Strategies to correct biological misinformation <ul style="list-style-type: none"> <input type="checkbox"/> Finding correct information <input type="checkbox"/> Methods to correct <input type="checkbox"/> Strategies to engage with misinformation 	Loss et al. (2018); Mammola et al. (2022)	Workshop Assignment 9: Bluff the listener
14	Misconduct in biology <ul style="list-style-type: none"> <input type="checkbox"/> The Legacy of Wakefield <input type="checkbox"/> Spider Misconduct <input type="checkbox"/> Misconduct at OSU 	Chapter 5; (Carroll, 2019)	Final Project Due Friday at 11:59 p.m. Workshop 10: Who can be trusted as a credible scientist?
15	Final Exam Week	No readings	Lecture Quiz 5 on assigned final exam day

Appendix C: Sample Writing Assignment Debunk the Bunk

Learning Outcomes

Successful students will:

- Identify and evaluate misleading or inaccurate biological claims in the media (ELO 1.2, 2.1, 6.3)
- Formulate an argument using logic and tools discussed in lecture that rebukes the misleading claim (ELO 1.1)
- Synthesize an explanation of the same topic that is accurate, logical, and evidence-based (ELO 1.3, 6.2)

As you're learning, misleading headlines and misinformation are all around us. For this assignment, you will find an article or news segment where biological information is either misconstrued or incorrect and formulate an explanation as to why the information is misleading and then correctly explain the topic.

When you do this assignment, you will need to properly cite your work. This includes the article or segment that you are debunking, any information from class or your text, and any other sources you may need in order to synthesize a fact-based explanation in your write-up.

Part A: Find the Bunk (5 points)

You'll need to keep your eyes open for articles or news segments where the information is intentionally or unintentionally misleading or wrong. You will need to be able to submit a copy of this article or a video of the segment along with this assignment. If you cannot obtain a copy to upload into Carmen, then you'll need to find another source. This article or segment should come from main-stream media. This can mean several things, but a good rule of thumb is that it is written for a large audience. Blog articles, for example, are not an appropriate choice for this assignment but an article from The Atlantic or a segment from CBS News would be good choices. If you are unsure if your article is appropriate, just ask your instructor or TA.

Part B: Debunk the Bunk (9 points)

Using the tools and knowledge you have gained in lecture up until this point, you will explain why the information presented in this segment or article is misleading or incorrect. Your description should include key concepts discussed in lecture in order to logically and rationally debunk the argument. For example, if the news segment includes a logical fallacy in its explanation, you will explain what the fallacy is and how the segment is relying on it. This explanation should be comprehensive and concise. You should also include an explanation of why this misleading or incorrect information is problematic.

Part C: Clean up the Bunk (6 points)

Now that you have explained why the article is incorrect, what should the author or presenter have said? In this section, you will briefly explain the facts that were not presented correctly in the article. This section does not need to be argumentative, but rather a simple and complete explanation of the correct information. Please note you do not have to be an expert on the subject to do this. This explanation should simply focus on the basic facts that were not properly represented. You can use external sources in this explanation and should properly cite them.

Your write-up (Parts B and C and your references) should be no longer than one page, single-spaced and should use Times New Roman font size 12 with one-inch margins. You will submit your write-up and article you are debunking to Carmen. These can be uploaded in two separate files, but they both must be uploaded by the due date to receive full credit.

Rubric

Criterion	Excellent	Good	Satisfactory	Unsatisfactory
Part A: Article or segment choice	(Article or segment chosen is viewable and appropriate 5 points	Article or segment chosen is viewable but not the best choice (inaccuracies are missing or it is not a particularly misleading claim and/or has little to do with biology 1-4 Points		Article or segment chosen is either not inaccurate or misleading and/or is not related to a biological topic OR Article or segment is not uploaded or viewable by the instructor 0 Points
Part B: Description of inaccuracies using tools from lecture	Student thoroughly and succinctly describes inaccuracies of article/segment Description utilizes concepts and tools discussed in lecture and 7-9 Points	Student thoroughly and succinctly describes inaccuracies of article/segment Description utilizes concepts and tools discussed in lecture Description may be somewhat incomplete or unclear 5-7 Points	Student description of inaccuracies is missing key points Concepts and tools discussed in lecture are not appropriately used or correctly explained Description is incomplete or unclear 1-4 Points	Article or segment is not uploaded or viewable by instructor OR Write-up fails to debunk article using concepts and tools discussed in lecture 0 Points
Part C: Correct explanation of concept	Student accurately and concisely provides correct explanation Explanation is clear and demonstrates the student is grasping the information from lecture External sources properly cited where appropriate 5-6 Points	Explanation is accurate but description is somewhat incomplete or unclear Student seems to be grasping the information from lecture External sources properly cited where appropriate 4-5 Points	Explanation is inaccurate or unclear Explanation does not demonstrate the student fully understands information from lecture External sources properly cited where appropriate 1-4 Points	Article or segment is not uploaded or viewable by instructor OR Student explanation of correct information is incorrect or missing OR Student fails to properly cite external sources used 0 Points

Appendix D: Sample Workshop Activity

Names: _____

Vitamins and Health – Why Experts Disagree¹

Instructions: You are to complete this activity in your Workshop groups. You can fill in your responses in this document and upload to Carmen. Be sure each of your names is on the document you turn in.

Learning Outcomes

- Evaluate different sources of information on a particular topic
- Infer the health benefits or harmful effects of Vitamin E supplements using seemingly contradicting studies
- Differentiate types of studies and their benefits and limitations
- Analyze figures and results to draw conclusions

Nutritional advice from different sources is often contradictory. Even sources that seem reliable can give opposite advice. In this activity, we will analyze the evidence behind the contradictory advice in one specific case – whether to take vitamin E supplements.

- "Recommended Supplement: Vitamin E, about 200 IU"* a day
 - "Three very large studies found 40% heart disease risk reduction with supplements."
 - "Antioxidant; protects blood fats ... Prevents blood sticking, clots and artery damage." (<http://www.health-heart.org/vitamins.htm>)

vs.

- "Vitamin E: Just say no"
 - "... vitamin E supplements haven't been found to offer any conclusive protection against disease in large clinical trials, and they might even be risky."
 - "Two analyses have linked doses of vitamin E as low as 400 IU a day – and possibly even lower – to a small but statistically significant increase in mortality." (<http://www.consumerreports.org/cro/2012/04/top-selling-vitamin-supplements/index.htm>)

*IU = International Unit = 0.67 mg of the natural form of vitamin E or 0.45 mg of the synthetic form

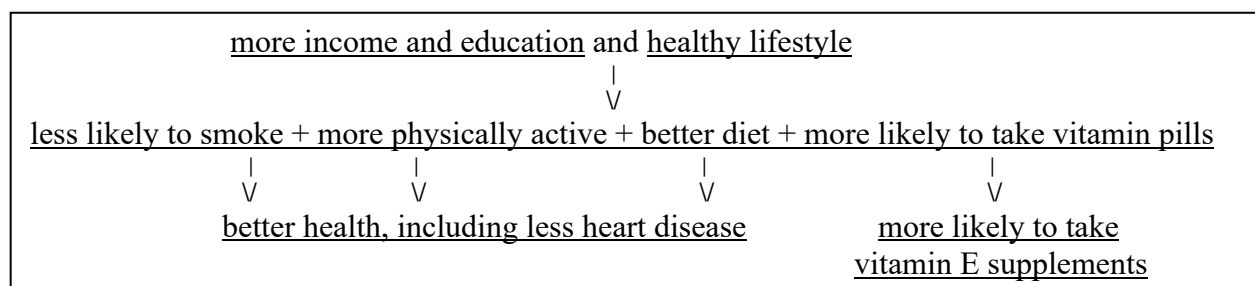
Both websites give accurate descriptions of research evidence, but they argue for opposite advice about whether to take vitamin E supplements. How can the evidence support two opposite conclusions?

To answer this question, we will begin by looking at the evidence behind the opposing claims of "40% heart disease risk reduction" *versus* a "small but statistically significant increase in mortality". Since heart disease is responsible for one-quarter of deaths in

¹ This Workshop is modified from activity by Dr. Ingrid Waldron, Department of Biology, University of Pennsylvania, copyright 2012.

the US, a 40% reduction in heart disease should result in a 10% reduction in mortality, *not* an increase. To understand these seemingly contradictory research results, we need to look at the different types of research studies that produced these results.

The evidence for a lower risk of heart disease comes from observational studies. In an observational study, researchers observe people or nature as they are without any intervention by the researcher. For example, in one type of observational study, researchers ask people whether they take vitamin E supplements, check which of these people develop heart disease during a follow-up period, and then evaluate whether the risk of developing heart disease differs between people who take vitamin E supplements and those who do not. Results from this type of observational study have shown a correlation or association between taking vitamin E supplements and lower risk of heart disease. However, these results do *not* establish that vitamin E *causes* better health, because observational studies cannot eliminate the effects of confounding factors. For example, people who take vitamin supplements tend to have more education and income and a generally healthy lifestyle and these characteristics could be the cause of their better health (see flowchart). Because of confounding factors, vitamin E supplements may be *correlated* with better health, even if they do *not cause* better health.



To evaluate causal effects, researchers use experimental studies. In an experiment, researchers control the conditions for two or more groups of subjects. Ideally, all variables are the same for these groups except for one experimental variable which differs between the groups. In this way, the experimenter can test the causal effect of the experimental variable.

In animal experiments, researchers can test the effect of a vitamin supplement by having two groups of genetically identical animals that live under identical conditions, except that one group receives the vitamin supplement, and one does not. Obviously, researchers cannot do this with people. Instead, they use a kind of experiment called a clinical trial.

Clinical trials are a type of experiment in which participants are randomly assigned to two groups, one of which receives the treatment (e.g., a vitamin supplement), while the other group receives a placebo (a pill that does not contain the vitamin, but tastes, smells and looks like the vitamin supplement, so the participants in both groups have an equal expectation of benefit). Since the participants are assigned at random to either

the treatment group or the placebo group, none of the characteristics of the participants can influence who gets the vitamin supplement and who gets the placebo; therefore, all the participants' characteristics are the same for the vitamin and placebo groups. Thus, the design of a clinical trial eliminates the effects of confounding factors, so any differences in health outcome can be interpreted as a causal effect of the vitamin supplement.

Part 1:

1. To provide persuasive evidence that a vitamin supplement has a causal effect on health, a study should meet the following criterion:

There should be two groups which have identical characteristics except that one group consumes the vitamin supplement and the other does not.

This criterion is *not* fulfilled by an observational study that compares people who choose to take vitamin supplements with people who do not. Explain why not. **(2 points)**

2a. Suppose that a kind-hearted researcher who believes in the benefits of vitamin E decides to help the low-income participants in his clinical trial by putting all of them in the vitamin E group. He plans to put all the high-income participants in the placebo group. Explain why this clinical trial would not be a true experiment that could accurately evaluate the causal effects of vitamin E on health. **(2 points)**

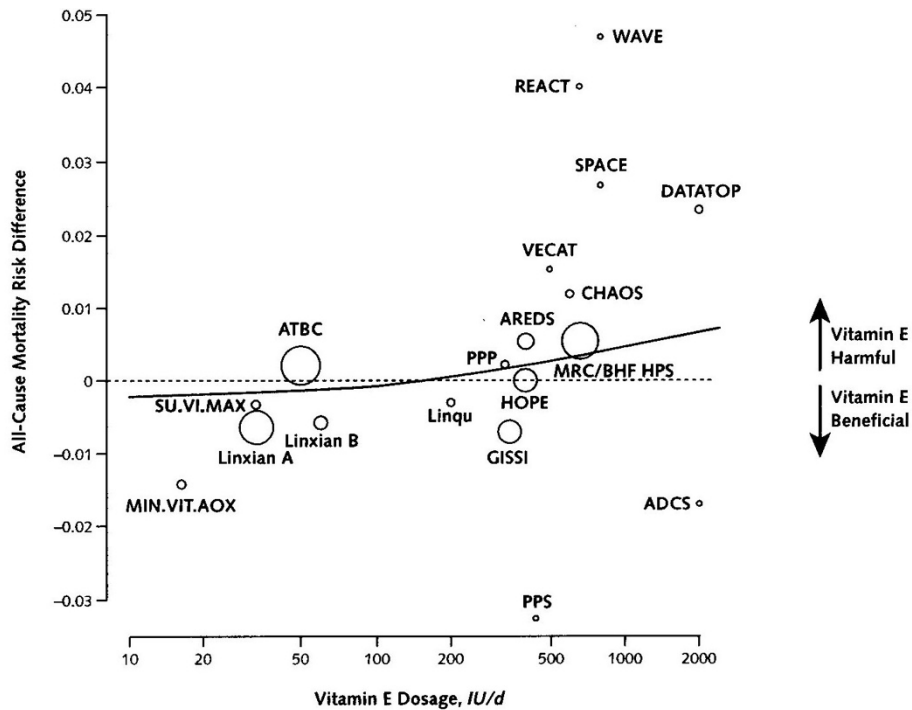
b. Why is it crucial for participants to be randomly assigned to the vitamin E and placebo groups in a clinical trial? **(2 points)**

3. Observational studies have found that people who take vitamin E supplements have a substantially lower risk of heart disease than those who do not. In contrast, clinical trials have not found consistent benefits of vitamin E supplements. What is a likely

explanation for this difference between the findings from observational studies and clinical trials? **(2 points)**

Part 2:

Conflicting results are observed even when different studies of the same type are compared. The figure below shows the findings from different randomized, placebo-controlled clinical trials that have evaluated the effects of vitamin E supplements on mortality. Each circle represents one clinical trial, and larger clinical trials with more participants are represented by larger circles. The Y axis represents the difference in the risk of dying for participants who received vitamin E versus participants who received placebo; the dashed line indicates no difference in mortality risk between the vitamin E and placebo groups.



(From Miller et al., Annals of Internal Medicine 2005; 142:37)

4. The results of the smaller clinical trials show a great deal of random variation, as illustrated by the extreme opposite results of the PPS and WAVE clinical trials (see figure). Fill in the blanks to describe the opposite results of these two clinical trials. In the ___ clinical trial, the vitamin E group had lower mortality than the placebo group, as expected. In contrast, the ___ clinical trial found the opposite result, with higher mortality for the vitamin E group. **(.5 point)**

The only large clinical trial to show a significant beneficial effect of vitamin E (Linxian A) was carried out in an area of China where blood levels of vitamin E tend to be lower

than in more economically developed countries (e.g., the US and European countries where most of the clinical trials were carried out). This result is compatible with the general finding that vitamin supplements are more likely to be beneficial for people with low vitamin intake in their diets.

5. Suppose that an expert argues that people in the US should take vitamin E supplements because two clinical trials (PPS and Linxian A) have found that vitamin E supplements significantly reduced mortality. Would you find this argument persuasive? ___ Yes ___ No **(1 point)**

Explain why or why not. **(2 points)**

When different clinical trials yield different results, researchers can use a statistical technique called meta-analysis to combine the results from the different clinical trials and calculate a best estimate of the true effect based on all the available data. A recent meta-analysis of clinical trial results estimated that the participants who took vitamin E supplements had 3% higher mortality risk than the participants who took a placebo. This result provides the best estimate we have of the effect of vitamin E supplements on mortality in economically developed countries like the US. If vitamin E supplements do cause a 3% increase in mortality risk, this could be considered a relatively small increase in risk for any individual, but it could add up to a lot of deaths if lots of people are taking vitamin E supplements.

In summary, the results from the clinical trials suggest that vitamin E supplements may increase mortality in countries like the US but may decrease mortality in regions with less adequate diets. To understand how vitamin E could have opposite effects in different circumstances, we need to look at the results from laboratory experiments where researchers tested the effects of vitamin E on molecules or cells in a test tube or petri dish. Laboratory experiments have shown a wide variety of beneficial and harmful effects of vitamin E, including the following.

- Laboratory experiments have shown that vitamin E can have antioxidant effects which protect molecules and cells from damage. However, under other experimental conditions, vitamin E can have pro-oxidant effects which can harm molecules and cells.
- Laboratory experiments have also shown that vitamin E can decrease blood clotting. Decreased blood clotting can reduce the risk of some diseases (e.g., heart disease and an Ischemic stroke caused by blood clots which block needed blood flow), but increase the risk of other diseases (e.g., Hemorrhagic stroke caused by bleeding in the brain).

Thus, vitamin E has multiple effects on the molecules and cells in our bodies, and the balance between beneficial and harmful effects of vitamin E supplements may vary depending on factors such as how much vitamin E people are getting from their diet. Because vitamin E has both beneficial and harmful effects, the results of laboratory

studies cannot tell us whether the overall health effect of vitamin E supplements will be beneficial or harmful.

6. An advertisement urges you to take an antioxidant supplement that contains several types of antioxidant molecules that laboratory experiments have shown can prevent damage to other molecules and cells. Before you decide whether to take the antioxidant supplement, what else would you want to know? **(2 points)**

7. Both websites quoted in the box on page 1 give accurate statements concerning the research evidence, but these two websites argue for opposite conclusions. Explain how these two opposite conclusions can both be supported by factually accurate evidence. **(2 points)**

8. Based on all the evidence presented in this activity, which of the following statements best summarizes your conclusion about the health effects of vitamin E supplements for a typical person in the US? **(.5 point)**

- a) Vitamin E is an antioxidant and has other beneficial health effects, so everyone should be encouraged to take vitamin E supplements.
- b) The best evidence suggests that vitamin E supplements may have a small harmful effect on health for people in countries like the US. Therefore, experts should discourage people from taking vitamin E supplements, unless a doctor identifies a specific medical reason for taking these supplements.
- c) The research results are so contradictory and confusing that scientists don't know whether vitamin E has beneficial or harmful effects on health, so people should just ignore the scientific findings and decide for themselves whether to take vitamin E supplements.

Explain your reasoning and the evidence that supports your choice above. **(2 points)**

9. Suppose that you read a newspaper headline, "New Study Shows that Vitamin D Improves Health". State two reasons why you should be skeptical about this headline and find out more before you start taking vitamin D supplements. **(2 points)**

GE THEME COURSES

Overview

Courses that are accepted into the General Education (GE) Themes must meet two sets of Expected Learning Outcomes (ELOs): those common for all GE Themes and one set specific to the content of the Theme. This form begins with the criteria common to all themes and has expandable sections relating to each specific theme.

A course may be accepted into more than one Theme if the ELOs for each theme are met. Courses seeing approval for multiple Themes will complete a submission document for each theme. Courses seeking approval as a 4-credit, Integrative Practices course need to complete a similar submission form for the chosen practice. It may be helpful to consult your Director of Undergraduate Studies or appropriate support staff person as you develop and submit your course. .

Please enter text in the boxes to describe how your class will meet the ELOs of the Theme to which it applies. Please use language that is clear and concise and that colleagues outside of your discipline will be able to follow. You are encouraged to refer specifically to the syllabus submitted for the course, since the reviewers will also have that document. Because this document will be used in the course review and approval process, you should be *as specific as possible*, listing concrete activities, specific theories, names of scholars, titles of textbooks etc.

Accessibility

If you have a disability and have trouble accessing this document or need to receive the document in another format, please reach out to Meg Daly at daly.66@osu.edu or call 614-247-8412.

Course subject & number

General Expectations of All Themes

GOAL 1: Successful students will analyze an important topic or idea at a more advanced and in-depth level than the foundations.

Please briefly identify the ways in which this course represents an advanced study of the 1

In this context, “advanced” refers to courses that are e.g., synthetic, rely on research or cutting-edge findings, or deeply engage with the subject matter, among other possibilities. (50-500 words)

Course subject & number

ELO 1.1 Engage in critical and logical thinking about the topic or idea of the theme. Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. (50-700 words)

ELO 1.2 Engage in an advanced, in-depth, scholarly exploration of the topic or idea of the theme. Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. (50-700 words)

Course subject & number

GOAL 2: Successful students will integrate approaches to the theme by making connections to out-of-classroom experiences with academic knowledge or across disciplines and/or to work they have done in previous classes and that they anticipate doing in future.

ELO 2.1 Identify, describe, and synthesize approaches or experiences as they apply to the theme. Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. (50-700 words)

ELO 2.2 Demonstrate a developing sense of self as a learner through reflection, self-assessment, and creative work, building on prior experiences to respond to new and challenging contexts. Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. (50-700 words)

Course subject & number

Specific Expectations of Courses in Lived Environments

GOAL 1: Successful students will explore a range of perspectives on the interactions and impacts between humans and one or more types of environment (e.g. agricultural, built, cultural, economic, intellectual, natural) in which humans live.

ELO 1.1 Engage with the complexity and uncertainty of human-environment interactions. Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. (50-700 words)

ELO 1.2 Describe examples of human interaction with and impact on environmental change and transformation over time and across space. Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. (50-700 words)

Course subject & number

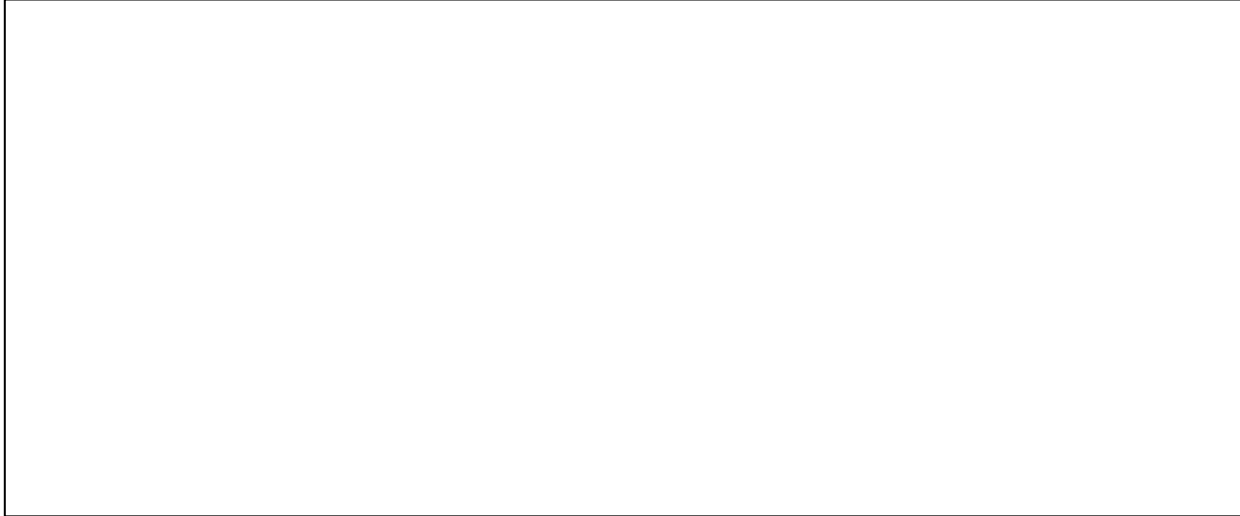
GOAL 2: Successful students will analyze a variety of perceptions, representations and/or discourses about environments and humans within them.

ELO 2.1 Analyze how humans' interactions with their environments shape or have shaped attitudes, beliefs, values and behaviors. Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. (50-700 words)

ELO 2.2 Describe how humans perceive and represent the environments with which they interact. Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. (50-700 words)

Course subject & number

ELO 2.3 Analyze and critique conventions, theories, and ideologies that influence discourses around environments. Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. (50-700 words)



Subject: Concurrence: BIOL 2750
Date: Monday, March 21, 2022 at 11:15:40AM Eastern Daylight Time
From: Hamilton, Ian
To: Andrews, Adam
CC: Vankeerbergen, Bernadette
Attachments: Outlook-uoehoa1g.png
Hi Adam and Bernadette,

EEOB offers concurrence on the proposed course, Biology 2750: Scientific Thought in an Anecdotal World.

Best regards,
Ian



Ian Hamilton
Professor
Vice Chair of Undergraduate Studies, EEOB
College of Arts & Sciences
Department of Evolution, Ecology and Organismal Biology & Department of Mathematics
390 Aronoff Laboratory, 318 W 12th Ave, Columbus, OH 43210
hamilton.598@osu.edu
Pronouns: he/him/his

Subject: Re: Concurrence Request
Date: Thursday, September 14, 2023 at 3:12:32 PM Eastern Daylight Time
From: Garrett, Kelly
To: Andrews, Adam
CC: Vankeerbergen, Bernadette
Attachments: image001.png
Thanks, Adam. We'll review and be in touch.

Kelly

From: Andrews, Adam <andrews.171@osu.edu>
Sent: Thursday, September 14, 2023 3:03 PM
To: Garrett, Kelly <garrett.258@osu.edu>
Cc: Vankeerbergen, Bernadette <vankeerbergen.1@osu.edu>
Subject: Concurrence Request

Dr. Garrett,

Some time back the CLSE requested concurrence for a new course, Biology 2750. You expressed concerns that the course was not sufficiently Biology-centric and overlapped too extensively with courses taught in the School of Communications. We've revised the content of the course with an aim to address those concerns and are re-requesting concurrence on the attached proposal.

We would appreciate your review by September 29. I'm happy to address any questions or concerns you have.

Thank you,
Adam



Adam L. Andrews

Assistant Director for Curriculum & Instruction
College of Arts and Sciences | Center for Life Sciences Education

240D Jennings Hall, 1735 Neil Avenue, Columbus, OH 43210
(614) 247-6345 Office / (614) 292-4390 Fax
andrews.171@osu.edu clse.osu.edu

The Ohio State University College of the Arts and Sciences Concurrence Form
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The purpose of this form is to provide a simple system of obtaining departmental reactions to course requests. **An e-mail may be substituted for this form.**

An academic unit initiating a request should complete Section A of this form and send a copy of the form, course request, and syllabus to each of the academic units that might have related interests in the course. Units should be allowed two weeks to respond to requests for concurrence.

Academic units receiving this form should respond to Section B and return the form to the initiating unit. Overlap of course content and other problems should be resolved by the academic units before this form and all other accompanying documentation may be forwarded to the Office of Academic Affairs.

A. Proposal to review

Initiating Academic Unit	Course Number	Course Title
--------------------------	---------------	--------------

Type of Proposal (New, Change, Withdrawal, or other)	Date request sent
--	-------------------

Academic Unit Asked to Review	Date response needed
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B. Response from the Academic Unit reviewing

Response: include a reaction to the proposal, including a statement of support or non-support (continued on the back of this form or a separate sheet, if necessary).

Signatures

1.	Name	Position	Unit	Date
2.	Name	Position	Unit	Date
3.	Name	Position	Unit	Date

Subject: RE: Concurrence request - New Course Biology (Scientific Thought in an Anecdotal World)
Date: Saturday, September 16, 2023 at 4:48:24 PM Eastern Daylight Time
From: Wegener, Duane
To: Andrews, Adam
Attachments: image003.png, image004.png, image005.png

Ah, this makes sense. I have looked at the new materials.
Psychology concurs.
Best wishes,
Duane



Duane T. Wegener (he/him/his)

College of Arts and Sciences Distinguished Professor of Psychology
Chair, Department of Psychology
Psychology Building, Room 225A, 1835 Neil Avenue, Columbus, OH 43210
614-292-3038 Office
wegener.1@osu.edu

From: Andrews, Adam <andrews.171@osu.edu>
Sent: Friday, September 15, 2023 8:56 AM
To: Wegener, Duane <wegener.1@osu.edu>
Subject: FW: Concurrence request - New Course Biology (Scientific Thought in an Anecdotal World)

Dr. Wegener,

Below, please find our previous correspondence with Dr. Emery regarding concurrence for Biology 2750.

Thank you!
Adam



Adam L. Andrews

Assistant Director for Curriculum & Instruction
College of Arts and Sciences | Center for Life Sciences Education

240D Jennings Hall, 1735 Neil Avenue, Columbus, OH 43210
(614) 247-6345 Office / (614) 292-4390 Fax
andrews.171@osu.edu clse.osu.edu

From: Emery, Charles <emery.33@osu.edu>
Date: Wednesday, March 23, 2022 at 2:01 PM
To: Andrews, Adam <andrews.171@osu.edu>, Vankeerbergen, Bernadette

<vankeerbergen.1@osu.edu>

Subject: RE: Concurrence request - New Course Biology (Scientific Thought in an Anecdotal World)

Yes, that would minimize the potential overlap with courses that we already offer.
Thanks.

Charles

Charles F. Emery, Ph.D.
Professor and Chair
Department of Psychology
Ohio State University
Columbus, OH 43210

Phone: 614-688-3061
Fax: 614-292-6798

Email: emery.33@osu.edu

From: Andrews, Adam <andrews.171@osu.edu>

Sent: Wednesday, March 23, 2022 1:38 PM

To: Emery, Charles <emery.33@osu.edu>; Vankeerbergen, Bernadette <vankeerbergen.1@osu.edu>

Subject: Re: Concurrence request - New Course Biology (Scientific Thought in an Anecdotal World)

Dr. Emery,

I appreciate these concerns. If we adjusted the proposal to make it clear we intend to focus primarily on the methodologies used in the natural sciences and Biology specifically, would this alleviate your concerns about the course?

Thank you,
Adam



Adam L. Andrews

Course Coordinator - Biology 1101, 1102, 1105, & 1110
Transfer Credit Coordinator
College of Arts and Sciences Center for Life Sciences Education

255B Jennings Hall, 1735 Neil Avenue, Columbus, OH 43210
(614) 247-6345 Office / (614) 292-4390 Fax
andrews.171@osu.edu clse.osu.edu

From: Emery, Charles <emery.33@osu.edu>

Date: Monday, March 21, 2022 at 4:00 PM

To: Vankeerbergen, Bernadette <vankeerbergen.1@osu.edu>, Andrews, Adam <andrews.171@osu.edu>

Subject: RE: Concurrence request - New Course Biology (Scientific Thought in an

Anecdotal World)

I've reviewed the course syllabus with my instructional team and we are concerned that the syllabus includes nothing specific to biology. We have two courses in psychology (Psych 4532 and Psych 2301) that address the critical thinking issues that are raised in the syllabus of this course. Therefore, there could be considerable overlap of the proposed course with courses that we currently teach in psychology. Based on the potential for a high degree of overlap, we can not support this proposed course as it is currently described.

Respectfully,

Charles Emery

Charles F. Emery, Ph.D.
Professor and Chair
Department of Psychology
Ohio State University
Columbus, OH 43210

Phone: 614-688-3061

Fax: 614-292-6798

Email: emery.33@osu.edu

From: Vankeerbergen, Bernadette <vankeerbergen.1@osu.edu>

Sent: Friday, March 18, 2022 3:11 PM

To: _ASC NMS Chairs Directors <ASC-nms-chairs-directors@osu.edu>; _ASC SBS-Chairs <ASC-SBS-Chairs@osu.edu>; Downing, Lisa <downing.110@osu.edu>; Armstrong, Philip <armstrong.202@osu.edu>

Cc: Andrews, Adam <andrews.171@osu.edu>

Subject: Concurrence request - New Course Biology (Scientific Thought in an Anecdotal World)

Dear all,

The Center for Life Science Education requests concurrence for a new 2000-level course entitled "Scientific Thought in an Anecdotal World". Please find attached the syllabus for the proposed course & a concurrence form. Could you review the attached syllabus and indicate whether your department provides concurrence?

Please respond by **April 4, 2022**. Please send your responses to *Adam Andrews.171* and *cc me*. You can return the attached [concurrence form](#) or you can simply respond to this e-mail. After this date, concurrence will be assumed.

Many thanks, and please contact me or Adam Andrews if you have questions or concerns.

My best,
Bernadette



Bernadette Vankeerbergen, Ph.D.

Assistant Dean, Curriculum

College of Arts and Sciences

154D Denney Hall, 164 Annie & John Glenn Ave.

Columbus, OH 43210

Phone: 614-688-5679 / Fax: 614-292-6303

<http://ascas.osu.edu>

Subject: Re: Concurrence request - New Course Biology (Scientific Thought in an Anecdotal World)
Date: Monday, March 28, 2022 at 6:31:30 PM Eastern Daylight Time
From: Craigmile, Peter
To: Andrews, Adam
CC: MacEachern, Steven, Vankeerbergen, Bernadette
Attachments: image001.png

Good evening.

The Department of Statistics gives concurrence to the new course Biology 2750, "Scientific Thought in an Anecdotal World". While this course does contain topics in Statistics, we do not offer a course that covers these statistical topics in the way covered by this course.

It might be good to mention to the students in this class that if they want to learn more about statistical methods that the Department of Statistics has many courses that could cater to them. For example, Stat 2480 covers statistical inference in a biological context. A full list of our courses can be found at <https://stat.osu.edu/courses>.

Good evening,
Peter Craigmile

Peter Craigmile, Ph.D.,
Professor, Department of Statistics, The Ohio State University.

From: "MacEachern, Steven" <snm@stat.osu.edu>
Date: Monday, March 28, 2022 at 2:05 PM
To: "Craigmile, Peter" <pfc@stat.osu.edu>
Subject: Fw: Concurrence request - New Course Biology (Scientific Thought in an Anecdotal World)

Hi Peter.

This one asks for concurrence - not much Stat content and no real overlap with our courses from the look of it.

My best,

Steve

From: Vankeerbergen, Bernadette <vankeerbergen.1@osu.edu>
Sent: Friday, March 18, 2022 3:10 PM
To: _ASC NMS Chairs Directors <ASC-nms-chairs-directors@osu.edu>; _ASC SBS-Chairs <ASC-SBS-Chairs@osu.edu>; Downing, Lisa <downing.110@osu.edu>; Armstrong, Philip <armstrong.202@osu.edu>
Cc: Andrews, Adam <andrews.171@osu.edu>
Subject: Concurrence request - New Course Biology (Scientific Thought in an Anecdotal World)

Dear all,

The Center for Life Science Education requests concurrence for a new 2000-level course entitled "Scientific Thought in an Anecdotal World". Please find attached the syllabus for the proposed course & a concurrence form. Could you review the attached syllabus and indicate whether your department provides concurrence?

Please respond by **April 4, 2022**. Please send your responses to *Adam Andrews.171* and *cc me*. You can return the attached concurrence form or you can simply respond to this e-mail. After this date, concurrence will be assumed.

Many thanks, and please contact me or Adam Andrews if you have questions or concerns.

My best,
Bernadette



Bernadette Vankeerbergen, Ph.D.
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<http://ascas.osu.edu>