

## ENTMLGY 2400H: Evaluating Evidence in Biology & Medicine

Instructor: Dr. Joe Raczkowski  
Prerequisite: Honors standing or permission of instructor  
GE category: Natural Science/Biological Science  
Credits: 3 hrs  
Time/Location: T & R 3:55-5:15 PM/ Howlett Hall 116  
Office Hours: By appointment: email raczkowski.@osu.edu

### Course Overview

Do you ever wonder about medical and biological news in the media and wish you had more information? This course will take a closer look at science in the news and will strengthen three important skills for life: the ability to think critically about scientific findings; to procure additional, credible information as needed; and to work cooperatively and effectively with others.

### OSU General Education Category: Natural Science

ENTMLGY 2400H has these Learning Goals: Students understand the principles, theories, and methods of modern science, the relationship between science and technology, the implications of scientific discoveries and the potential of science and technology to address problems of the contemporary world. Expected Learning Outcomes are below.

### Expected Learning Outcomes: Biological Science

Students understand the basic facts, principles, theories and methods of modern science.

Students understand key events in the development of science and recognize that science is an evolving body of knowledge.

Students describe the inter-dependence of scientific and technological developments. Students recognize social and philosophical implications of scientific discoveries and understand the potential of science and technology to address problems of the contemporary world.

### Expected Learning Outcomes: Information Literacy

Students locate, contextualize and assess information and content from different sources (e.g. scholarly, Open Educational Resources (OER), user-generated)

Students contrast nature of scientific information found in textbooks vs review articles vs primary articles; evaluate sources & authors

Students locate a current, primary source and a related, "classic" source, and explain how technology has advanced current understanding of the subject area

Students obtain and evaluate information from various reliable sources (e.g., newspapers, government websites, primary and secondary research articles)

### Meeting Expected Learning Outcomes:

To gain the skills needed to reach informed decisions about science-related reports we will discuss hypotheses and methodologies, interpret scientific data and claims, evaluate sources and scientists' credentials, consider science vis-à-vis health and well being, and weigh evidence for various scientific findings. We will apply these skills throughout the semester as we practice science as a "way of knowing," examining recent studies that use insects or other organisms as research models. The unifying framework for these studies is modern evolutionary theory, which recognizes the shared ancestry of all life on earth, from about 3.8 billion years ago to the present day. Countless advances in biology and medicine owe much to evolution as a utilitarian, predictive, evidence-based theory. In a final case study we'll examine a contemporary issue that concerns people at the personal level and as global citizens.

### Required Course Materials

Textbook: How Science Works: Evaluating Evidence in Biology and Medicine. 2004. S.H. Jenkins. Oxford University Press, New York. 227 pp.

Newspaper: The New York Times Tuesday Science Section

Essays and articles: Selected by instructor, posted on Carmen.

Podcasts, YouTube videos: Links posted on Carmen

### Required Assignments & Point Allocations

|  |            |
|--|------------|
| Response to Discussion Prompts (written)     | 10%        |
| Case Study #1 (group work)                   | 8%         |
| Attendance, participation, team (group) work | 10%        |
| Group Take-home Exam #1                      | 15%        |
| Group Take-home Exam #2                      | 15%        |
| Final Case Study (group work)                | 15%        |
| New York Times Article Report (three total)  | 12%        |
| <u>Final Exam (cumulative, closed-book)</u>  | <u>15%</u> |
| TOTAL  | 100%       |

### Grading Scale

|          |         |          |       |
|----------|---------|----------|-------|
| A .....  | 93-100% | C .....  | 74-76 |
| A-.....  | 90-92   | C- ..... | 70-73 |
| B+.....  | 87-89   | D+.....  | 67-69 |
| B .....  | 84-86   | D .....  | 64-66 |
| B- ..... | 80-83   | E .....  | < 64  |
| C+.....  | 77-79   |          |       |

### Course Outline: Readings, Assignments, etc.

Every effort will be made to adhere to our Course Outline, particularly deadlines for exams and case studies. If unforeseen events cause a change in the syllabus, you will be alerted via Carmen Announcements.

Course Outline:

| <u>Date</u>                                  | <u>Topic</u>   | <u>Readings</u>           |
|--|--|---------------------------|
| 25 August<br>27 August                       | Welcome<br>Key Concepts, Debunking Mistrust<br>of Science                                    | Chapter 1                 |
| September 1<br>September 3                   | Do Vitamin C and other antioxidants<br>benefit health?                                       | Chapter 2                 |
| Sept 8<br>Sept 10                            | Police dogs smelling criminals?<br>Police dogs smelling criminals?                           | Chapter 3 &<br>Gawande    |
| September 15<br>September 17                 | Why are frogs in trouble?<br>Why are frogs in trouble?                                       | Chapter 4                 |
| September 22<br>September 24<br>September 26 | Information Literacy<br>Case Study 1<br><b>Exam 1 posted on Carmen</b>                       | Gibson, Holt              |
| September 29                                 | Evaluating credibility and authority<br>of scientists  |                           |
| October 1                                    | <b>Case Study 1 due</b> , Evolution theory as<br>paradigm                                    | Nesse, Shubin,<br>Mindell |
| October 6                                    | <b>Post Exam 1 Answers by 1 PM</b><br>Discussion of Exam 1 Answers in class                  |                           |
| October 8                                    | New York Times#1 Discussion  | NYT                       |
| October 13<br>October 15                     | How do animals find stored food?<br>How do animals find stored food?                         | Chapter 5                 |
| October 20<br>October 22                     | What causes cancer?<br>Research misconduct   | Chapter 6,<br>Gawande     |
| October 27<br>October 29<br>October 31       | Case Study 2: Evaluate Data<br>Case Study 2: Produce Draft<br><b>Exam 2 Posted on Carmen</b> | Constible                 |
| November 3<br>November 5                     | Case Study 2: Peer Review<br>New York Times #2 Discussion                                    | NYT                       |

|             |   |            |
|-------------|---|------------|
| November 10 | <b>Post Exam 2 Answers by 1 PM</b><br>Discussion of Exam 2 Answers in class |            |
| November 12 | <b>Case Study 2 Due</b> , Bigger, Stronger, Faster                          |            |
| November 17 | Bigger, Stronger, Faster; How does coffee affect health?                    |            |
| November 19 | How does coffee affect health?  | Chapter 8  |
| November 24 | How will climate change affect the spread of human disease?                 | Chapter 9  |
| December 1  | How Science Works   | Chapter 10 |
| December 3  | New York Times #3 Discussion  |            |
| Finals Week | <b>Final Exam</b>   |            |

#### Group take-home exams

Prior to release of the first group take-home exam, guidance will be given in class and posted at Carmen regarding 1) expectations for answers and 2) functioning of group members as a team. Answers to group take-home exams will be discussed in the class period immediately following the deadline for posting of the exam answers by the groups (see Course Outline for dates).

#### New York Times Article Reports and Case Studies

NYT Article Reports are graded per the template (posted at Carmen with model report). Expectations for case studies will be discussed in class and posted on Carmen. Submissions for the final case study will be graded for accuracy and completeness.

Significant group work (two midterm, group take-home exams plus two case studies) will be evaluated on quality of answers as well as teamwork. We will discuss teamwork expectations in class. For key elements of good teamwork, see forms for self and peer evaluation (posted on Carmen). These must be completed for all significant group work.

#### Group Assignments

Dr. Raczkowski will assign student groups, each to comprise no more than 4 students. Each group will complete a Group Contract, i.e., a written plan for the assignment, which will be signed by all group members and submitted to the instructor. By signing the Contract, group members indicate their intention to adhere to the written plan and to act in accord with the behaviors and responsibilities stated in the Contract.

#### Dissension Document for Group take-home exams

Any student may opt to disagree with his/her group's answer to a given exam question. If a student disagrees with the group's answer and provides the CORRECT ANSWER,

said student will earn the appropriate points (and the group will not). If a student dissents and provides an INCORRECT answer, the student will lose points accordingly.

#### How to dissent from a group exam answer

A student will provide his/her dissent in a document with a brief but complete justification for an alternate answer. The student will post the dissent document to the group's Carmen site, indicating his/her name with the word "DISSENT." If more than two students decide to dissent and wish to provide the same answer, it may be posted as a single dissension, but the document must indicate clearly the names of the dissenting students.

#### New York Times (NYT) Article Reports

We will discuss current NYT articles from the Tuesday Science Section in class three times during the semester; students will summarize three NYT articles (article selection is the choice of each student) per the NYT Article Report template posted at Carmen. Dr. Raczkowski will discuss and model this assignment in-class.

#### Attendance, Participation, and Late Work Policy

Please plan to attend all classes. If a class is missed, notify Dr. Raczkowski (raczkowski.2) before class and provide a reason for the absence. If you miss class, please accept the responsibility to meet with an informed, engaged student (not Dr. Raczkowski) to learn what occurred in class, what assignments may have been discussed, etc.

All assignments are due as indicated in the syllabus; late work is subject to grade reduction of 10% each day it is late. Please post completed assignments to the ENTMLGY 2400H Carmen site. For case studies and take-home exams, each group will be assigned online space that is accessible only to members of a given group.

Late exams are subject to grade reduction of 5% for each 30 minutes it is late.

#### Academic Misconduct

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

The Ohio State University's Code of Student Conduct (Section 3335-23-04) defines academic misconduct as: Any activity that tends to compromise the academic integrity

of the University, or subvert the educational process. Examples of academic misconduct include (but are not limited to) plagiarism, collusion (unauthorized collaboration), copying the work of another student, and possession of unauthorized materials during an examination. Ignorance of the University's Code of Student Conduct is never considered an excuse for academic misconduct, so I recommend that you review the Code of Student Conduct and, specifically, the sections dealing with academic misconduct.

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

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

#### Health and safety requirements:

All students, faculty and staff are required to comply with and stay up to date on all university safety and health guidance (<https://safeandhealthy.osu.edu>), which includes wearing a face mask in any indoor space and maintaining a safe physical distance at all times. Non-compliance will result in a warning first, and disciplinary actions will be taken for repeated offenses.

#### Disability Accommodations

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

#### Counseling and Consultation Services/Mental Health

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

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

### Creating an environment free of harassment, discrimination, and sexual misconduct

The Ohio State University is committed to building and maintaining a community to reflect diversity and to improve opportunities for all. All Buckeyes have the right to be free from harassment, discrimination, and sexual misconduct. Ohio State does not discriminate on the basis of age, ancestry, color, disability, ethnicity, gender, gender identity or expression, genetic information, HIV/AIDS status, military status, national origin, pregnancy (childbirth, false pregnancy, termination of pregnancy, or recovery therefrom), race, religion, sex, sexual orientation, or protected veteran status, or any other bases under the law, in its activities, academic programs, admission, and employment. Members of the university community also have the right to be free from all forms of sexual misconduct: sexual harassment, sexual assault, relationship violence, stalking, and sexual exploitation.

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

1. Online reporting form at [equity.osu.edu](http://equity.osu.edu),
2. Call 614-247-5838 or TTY 614-688-8605,
3. Or Email [equity@osu.edu](mailto:equity@osu.edu)

The university is committed to stopping sexual misconduct, preventing its recurrence, eliminating any hostile environment, and remedying its discriminatory effects. All

university employees have reporting responsibilities to the Office of Institutional Equity to ensure the university can take appropriate action:

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

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