

Term Information

Effective Term

General Information

Course Bulletin Listing/Subject Area	Entomology
Fiscal Unit/Academic Org	Entomology - D1130
College/Academic Group	Food, Agric & Environ Science
Level/Career	Undergraduate
Course Number/Catalog	1351
Course Title	Experimentally Evaluating the Biology of Hope and Belief
Transcript Abbreviation	Exp Eval Biol Hope
Course Description	This course provides an introduction to and foundation for the study of Natural Science by allowing us to explore the experimental evidence that supports whether the human capacity to hope and believe in a higher power is hardwired into our biology and could have been acted upon by Natural Selection as humans evolved.
Semester Credit Hours/Units	Fixed: 1

Offering Information

Length Of Course	14 Week
Flexibly Scheduled Course	Never
Does any section of this course have a distance education component?	Yes
Is any section of the course offered	100% at a distance
Grading Basis	Letter Grade
Repeatable	No
Course Components	Laboratory
Grade Roster Component	Laboratory
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	1350, or concurrent enrollment.
Exclusions	
Electronically Enforced	Yes

Cross-Listings

Cross-Listings

Subject/CIP Code

Subject/CIP Code	26.0702
Subsidy Level	General Studies Course
Intended Rank	Freshman, Sophomore, Junior, Senior

Requirement/Elective Designation

Natural Sciences

Course Details

Course goals or learning objectives/outcomes

- Understand the biological basis of hope and belief among humans and other animals
- Become scientifically literate and learn how science is done and how to interpret and analyze scientific results
- Gain an abiding appreciation for the importance of hope and belief to humans and our societies

Content Topic List

- Quantitative and qualitative data
- Scientific hypotheses
- Linear regression, t-tests, correlation and causation
- Phylogeny and taxonomy
- Meditation
- Animals and hope
- Effects of hope on the brain
- Evidence of hope and belief in early humans
- Central dogma of biology
- God gene

Sought Concurrence

No

Attachments

- 2022.12.14_ENTMLGY 1351 Syllabus_ODEE template_Revised 5.docx: Revised Syllabus
(Syllabus. Owner: Klinger, Ellen G)
- 2022.12.14_Response to GE Nat Science Committee.docx: Response to Panel
(Cover Letter. Owner: Klinger, Ellen G)
- 2022.12.14_ENTMLGY 1351 Laboratory Descriptions.Final.docx: Revised Laboratory Descriptions
(Other Supporting Documentation. Owner: Klinger, Ellen G)
- 2022.11.30_ENTMLGY 1350_GE-foundations-submission form_REVISIED.4.pdf: GE Foundations Submission Document
(Other Supporting Documentation. Owner: Klinger, Ellen G)
- 2022.12.20_Distance Approval Cover Sheet ENTMLGY 1351_Final.docx: Distance Approval
(Other Supporting Documentation. Owner: Klinger, Ellen G)

Comments

- Syllabus, laboratory activities revised in response to ASC panel suggestions; other supporting documents also revised. *(by Klinger, Ellen G on 12/20/2022 01:15 PM)*
- Please see Panel feedback e-mail sent 10/13/22. *(by Cody, Emily Kathryn on 10/13/2022 12:58 PM)*
- Revise as per COAA via email message 14 June 2022

Revise as per email message 2 June 2022 *(by Osborne, Jeanne Marie on 06/14/2022 02:03 PM)*

Workflow Information

Status	User(s)	Date/Time	Step
Submitted	Klinger, Ellen G	05/09/2022 02:00 PM	Submitted for Approval
Approved	Strange, James P	05/12/2022 01:21 PM	Unit Approval
Revision Requested	Osborne, Jeanne Marie	06/02/2022 02:26 PM	College Approval
Submitted	Klinger, Ellen G	06/08/2022 01:37 PM	Submitted for Approval
Approved	Strange, James P	06/08/2022 05:09 PM	Unit Approval
Revision Requested	Osborne, Jeanne Marie	06/14/2022 02:03 PM	College Approval
Submitted	Klinger, Ellen G	06/29/2022 10:53 AM	Submitted for Approval
Approved	Klinger, Ellen G	06/29/2022 10:53 AM	Unit Approval
Approved	Osborne, Jeanne Marie	06/29/2022 04:25 PM	College Approval
Revision Requested	Cody, Emily Kathryn	10/13/2022 12:58 PM	ASCCAO Approval
Submitted	Klinger, Ellen G	12/20/2022 04:36 PM	Submitted for Approval
Approved	Strange, James P	12/21/2022 11:36 AM	Unit Approval
Approved	Osborne, Jeanne Marie	12/21/2022 11:46 AM	College Approval
Pending Approval	Cody, Emily Kathryn Jenkins, Mary Ellen Bigler Hanlin, Deborah Kay Hilty, Michael Vankeerbergen, Bernadette Chantal Steele, Rachel Lea	12/21/2022 11:46 AM	ASCCAO Approval



December 14, 2022
Natural and Mathematical Sciences Panel
Arts and Sciences Curriculum Committee
The Ohio State University

Dear Panel Members,

I sincerely thank you for the time and care that you have taken to review my proposal for ENTMLGY 1350 and ENTMLGY 1351: The Biology of Hope and Belief to fulfill the Natural Sciences Foundation requirements in the newly modified General Education Curriculum. I have carefully considered and done my best to implement all the valuable feedback you have offered. I sincerely believe that the lecture and laboratory courses are greatly improved. I specifically highlight the changes that I have made in response to the Panel's feedback here.

First, I have substantially modified ENTMLGY 1351, the laboratory course, to incorporate additional elements of experimental design, data generation, as well as data analysis and interpretation. Specifically, I have added a laboratory where students learn how biologists observe, measure and quantify different animal behaviors so that students can apply these skills to assess whether animals show evidence of hope (Laboratory 3: Do animals have hope?). I have also added elements to several labs to encourage students to engage with the natural world (e.g., go for a walk or admire a flower/sunset in Lab 4: Physiological benefits of meditation to modern and early humans; consider the benefits and limitations of using animal vs. human models in Lab 6: Genetic Basis of Belief in Humans). Finally, I have created a document with detailed descriptions of each laboratory exercise to specifically highlight the types of data that students will generate, and how that data will be analyzed using linear regression analysis, T-tests, Chi-squared analyses and relative allele frequencies.

Second, in response to the Panel's recommendations to consider how ENTMLGY 1350 and 1351 will be experienced by students who are taking the courses simultaneously, I have re-organized the labs so that they better align with the lecture content. Additionally, I list the course units that the labs fall into within the laboratory course syllabus. Finally, within the Laboratory Descriptions document, I clearly describe how the ENTMLGY 1351 lab will allow students to apply and expand upon the knowledge that they have acquired within the lecture course. I greatly appreciate this recommendation and feel that the changes you have recommended have substantially improved both courses and will further enhance student learning and engagement.

Third, I appreciate the Panel's concern that the optional online discussion boards should not be the only way in which students interact with one another in the ENTMLGY 1351 laboratory course. I have replaced these optional online discussions with required posts each week using an interactive course white board. Students will now post and critique their peers' hypotheses, experimental designs and interpretation of their data. A description of what the students will post each week is provided in the laboratory description document. Additionally, two laboratory exercises (Lab 1: Evaluating our understanding of evolution and Lab 4: Physiological benefits of meditation to modern and



early humans) will require students to pool their data together to achieve larger and more robust sample sizes for subsequent statistical analyses.

Fourth, although it was mentioned by the Panel, I have included hyperlinks to each of the background readings in the laboratory course syllabus so that you can now assess the quality and rigor of the reading assignments, as well as their disciplinary focus.

I believe that these modifications have addressed the major concern of the Panel that these courses engage more robustly and dynamically with the principles and methodologies at the core of the natural sciences. As these courses assess the human capacity for hope and belief, they do touch on elements of cognitive psychology, neuroscience and anthropology. However, I have done this strategically to help students better understand the similarities and differences between the social/behavioral sciences and the natural sciences, and in so doing, to help students to appreciate the similarities and differences between humans and other animals. Admittedly, the first laboratory exercise (Lab 1: Evaluating our understanding of evolution) does use a tool unique to the social sciences (e.g., a carefully designed and validated survey instruments). However, I have designed the lab and use these instruments so that students can assess their own understanding and acceptance of a key scientific principle: Darwin's theory of evolution by means of Natural Selection, which is foundational to the study of biology and the course as a whole. Notably, students will use linear regression to analyze the data, a method that is used by both natural and social scientists. Further, the remaining five laboratory exercises allow students to design and conduct experiments with animals, analyze physiological data, design a neuroscientific experiment and acquire simulated data from brain scans, and mine and compare genetic sequences, all of which very much employ key principles and methodologies that natural scientists use.

Once again, I sincerely thank the Panel for their time, insight, and advice as you reviewed these courses and for each of your very helpful recommendations. I hope that I have now provided enough information so that you are able to assess the readiness of ENTMLGY 1350 and 1351 for consideration as a GEN Foundation Natural Science Requirement, and that you will find the courses fully appropriate for this designation. I also am happy to make any additional changes and modifications that you believe would further improve these courses.

Very respectfully,

Dr. Megan E. Meuti
Assistant Professor
The Ohio State University
Department of Entomology
Columbus, OH 43210
216-215-4889
meuti.1@osu.edu

Syllabus

ENTMLGY 1351

Experimentally Evaluating the Biology of Hope and Belief

Spring Semester 2023

GE Foundations, Natural Science

All Semesters: Online Sections

Course Information

- **Course times and location:** This is a fully asynchronous online course.
- **Credit hours:** 1 credit hour
- **Mode of delivery:** Distance Learning

Instructor

- **Name:** Dr. Megan Meuti
- **Email:** meuti.1@osu.edu
- **Office location:** 232C Howlett Hall
- **Office hours:** Times are posted on Carmen; we will meet by Zoom
- **Office phone:** 614-688-2829
- **Preferred means of communication:**
 - My preferred method of communication for questions is **email**.
 - My class-wide communications will be sent through the Announcements tool in CarmenCanvas. Please check your [notification preferences](https://go.osu.edu/canvas-notifications) (go.osu.edu/canvas-notifications) to be sure you receive these messages.

Course Prerequisites and/or co-requisite:

- **ENTMLGY 1350: The Biology of Hope and Belief (3 credit hour lecture)** should be taken concurrently (in the same semester) or previously.
- Together the ENTMLGY 1350 Lecture (3 credits) and ENTMLGY 1351: Experimentally Evaluating The Biology of Hope and Belief (1 credit) fulfill the 4-credits of the General Education (GE) Foundations, Natural Science course requirement.



Course Description

Welcome to this fully online, asynchronous course! This course, along with the required pre-requisite or co-requisite (ENTMLGY 1350: The Biology of Hope and Belief), provides an introduction to and foundation for the study of Natural Science by allowing us to explore the experimental evidence that supports whether the human capacity to hope and believe in a higher power is hardwired into our biology and could have been acted upon by Natural Selection as humans evolved. In this fully asynchronous, online lab, you will interact with the natural world and fully employ the methods used by modern natural scientists/biologists to generate hypotheses, collect and analyze data, read and critique scientific literature and thereby fully engage in the process of science, and use the scientific method to make new collaborative discoveries through modeling and data analysis. In short, this is where we will get to “play” and explore together!

General Education Goals & Expected Learning Outcomes

This course and ENTMLGY 1350: The Biology of Hope and Belief fulfill the General Education (GE) rationale for the GE Foundations: Natural Sciences category. Specifically, ENTMLGY 1351 (this course) primarily fulfills Natural Sciences Goal 1 and Expected Learning Outcome (ELO) 1.3, although Goal 2 and other ELOs are also partially fulfilled by this course. When this 1-credit ENTMLGY 1351 laboratory is taken in combination with the 3-credit ENTMLGY 1350 lecture, together these 4 credits (e.g. 3-credit lecture + 1-credit laboratory) fulfill ALL Goals (Goals 1 and 2) and ALL Expected Learning Outcomes (ELOs 1.1, 1.2, 1.3, 2.1, 2.2 and 2.3) for the GE Foundations, Natural Science category. Therefore, these courses are designed to prepare students to be able to do the following:

- GOAL 1: engage in theoretical and empirical study within the natural sciences, gaining an appreciation of the modern principles, theories, and modes of inquiry used generally across the natural sciences.
- 1.1 explain basic facts, principles, theories and methods of modern natural sciences; describe and analyze the process of scientific inquiry.
 - 1.2 identify how key events in the development of science contribute to the ongoing and changing nature of scientific knowledge and methods.
 - 1.3 employ the processes of science through exploration, discovery, and collaboration to interact directly with the natural world when feasible, using appropriate tools, models, and analysis of data.
- GOAL 2: discern the relationship between the theoretical and applied sciences, while appreciating the implications of scientific discoveries and the potential impacts of science and technology.
- 2.1 analyze the inter-dependence and potential impacts of scientific and technological developments.
 - 2.2 evaluate social and ethical implications of natural scientific discoveries.
 - 2.3 critically evaluate and responsibly use information from the natural sciences.

- This course fulfills both the Natural Science GE and course-specific (see-below) learning goals and outcomes by allowing students to fully engage with the scientific process by formulating hypotheses, designing experiments, collaboratively collecting and analyzing, and interpreting scientific data. We will also discuss the merits and limitations of the information so that they can critically evaluate and responsibly use scientific information on the biological basis of hope and belief in humans. This is largely done by allowing students to complete weekly laboratory exercises/ assignments.
- To clearly see how these course goals and learning objectives are assessed, and how they relate to the above Natural Science GE goals, please see the alignment table on pgs.10 and 11.

Course-specific Learning Goals

- I. understand the biological basis of hope and belief among humans and other animals.
- II. become scientifically literate and learn how science is done and how to interpret and analyze scientific results.
- III. gain an abiding appreciation for the importance of hope and belief to humans and our societies.

Course-specific Learning Outcomes

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

1. articulate how the process of evolution by the means of natural selection could have contributed to the human capacity for hope and belief.
2. compare and contrast human neurobiology and behavior with those of other animals.
3. distinguish between scientific and religious epistemological frameworks, identify when each are useful and how they can coexist.
4. examine neurobiological, behavioral, genetic and social evidence supporting the biological basis for hope and belief.
5. articulate how new scientific ideas and technological advancements have contributed to our understanding of hope and belief.
6. integrate biological information and other forms of data to evaluate the impact of hope and belief on human well-being
7. evaluate the social and ethical implications of understanding hope/belief in animals and humans.
8. understand how science is done.



- This course fulfills both the Natural Science GE and course-specific learning goals and outcomes by allowing students to fully engage with the scientific process by formulating hypotheses, designing experiments, collaboratively collecting and analyzing, and interpreting scientific data, as well as discussing the merits and limitations of the information so that they can critically evaluate and responsibly use scientific information on the biological basis of hope and belief in humans. This is largely done by allowing students to complete weekly laboratory exercises/assignments.
- To clearly see how these course goals and learning objectives are assessed, and how they relate to the above GE goals, please see the alignment table on pgs. 10 and 11.

How this course works

Mode of delivery: This course is 100% online. There are no required sessions when you must be logged in to Carmen at a scheduled time.

Pace of online activities: This course is divided into **weekly modules** that are released one week ahead of time. Students are expected to keep pace with weekly deadlines but may schedule their efforts freely within that time frame.

Credit hours and work expectations: This is a 1 credit-hour course. According to [Ohio State bylaws on instruction](http://go.osu.edu/credithours) (go.osu.edu/credithours), students should expect around 1 hour per week of time spent on direct instruction (reading assigned articles and watching instructor-generated videos) in addition to 2 hours of homework (completing laboratory assignments) to receive a grade of C average. Those who do typically earn an “A” in my courses.

Attendance and participation requirements: Research shows regular participation is one of the highest predictors of success. With that in mind, I have the following expectations for everyone’s participation:

- **Participating in online activities for attendance: at least once per week**
You are expected to log in to the course in Carmen every week. During most weeks you will probably log in many times. If you have a situation that might cause you to miss an entire week of class, discuss it with me *as soon as possible*.
- **Regularly post data and responses to the course whiteboard: at least once per wk**
To earn the participation component of your grade, you must post data, hypotheses/predictions or answer questions on a group white board and/or respond to questions related to that week’s specific activity.
- **Zoom meetings and office hours: optional**
All live, scheduled events for the course, including my office hours, are optional. I will post recordings of synchronous sessions for those who cannot attend.

Course Materials, Fees and Technologies

Required Materials

- All required readings and video lectures will be freely provided on the Carmen website

Required Equipment

- **Computer:** current Mac (MacOS) or PC (Windows 10) with high-speed internet connection
- **Webcam:** built-in or external webcam, fully installed and tested
- **Microphone:** built-in laptop or tablet mic or external microphone
- **Other:** a mobile device (smartphone or tablet) to use for BuckeyePass authentication

If you do not have access to the technology you need to succeed in this class, review options for technology and internet access at go.osu.edu/student-tech-access.

Required Software

Microsoft Office 365: All Ohio State students are now eligible for free Microsoft Office 365. Visit the [installing Office 365](https://go.osu.edu/office365help) (go.osu.edu/office365help) help article for full instructions.

Microsoft Whiteboard. Create a free account using your osu email account. [Link here](#).

CarmenCanvas Access

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

- Register multiple devices in case something happens to your primary device. Visit the [BuckeyePass - Adding a Device](https://go.osu.edu/add-device) (go.osu.edu/add-device) help article for step-by-step instructions.
- Request passcodes to keep as a backup authentication option. When you see the Duo login screen on your computer, click **Enter a Passcode** and then click the **Text me new codes** button that appears. This will text you ten passcodes good for 365 days that can each be used once.
- [Install the Duo Mobile application](https://go.osu.edu/install-duo) (go.osu.edu/install-duo) on all of your registered devices for the ability to generate one-time codes in the event that you lose cell, data, or Wi-Fi service.

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

Technology Skills Needed for This Course

- Basic computer and web-browsing skills
- [Navigating CarmenCanvas](https://go.osu.edu/canvasstudent) (go.osu.edu/canvasstudent)
- [CarmenZoom virtual meetings](https://go.osu.edu/zoom-meetings) (go.osu.edu/zoom-meetings)
- [Recording a slide presentation with audio narration and recording, editing and uploading video](https://go.osu.edu/video-assignment-guide) (go.osu.edu/video-assignment-guide)

Technology Support

For help with your password, university email, CarmenCanvas, or any other technology issues, questions or requests, contact the IT Service Desk, which offers 24-hour support, seven days a week.

- **Self Service and Chat:** go.osu.edu/it
- **Phone:** [614-688-4357 \(HELP\)](tel:614-688-4357)
- **Email:** servicedesk@osu.edu

Grading and Faculty Response

How Your Grade is Calculated

Assignment Category	Points	Percentage of final grade
Syllabus Assessment	10	2%
Course participation on Microsoft Whiteboards	50	10%
Laboratory Assignments (1 per week for 13 weeks)	30 pts each = 390 total	78%
Laboratory Final	50	10%

See Course Schedule for due dates.

Descriptions of Major Course Assignments

Syllabus Assessment

Description: This assessment is used to ensure that you have read and understand the policies, expectations and course format described in the syllabus. You must complete this by **Friday January 14th at 11:59 pm Eastern Time** so that you can unlock and access other course content.

Academic integrity and collaboration: This quiz is open-book and untimed. Students must complete the syllabus quiz on their own, but they will have multiple untimed opportunities to take the quiz.

Course Participation on Microsoft Whiteboards

Description: This assessment is used to allow you to engage with your peers as you collaboratively generate data, formulate hypotheses and ask and respond to each others questions. You will be required to post at least one sticky note to your group's Microsoft Whiteboard by 11:59 PM on each Friday.

Academic integrity and collaboration: You are welcome to use your notes and outside information from reliable sources as you formulate your posts. As the goal of these assessments are to work together to collaborate with your peers through the

scientific process, you are welcome and encouraged to discuss your posts with your classmates and/or revise them after you have posted them.

Laboratory Assignments

Description: You will be asked to complete an assignment each week for 13 weeks. These will allow you to fully engage with the scientific process by either formulating hypotheses, designing experiments, critiquing existing studies as well as gathering, analyzing and interpreting scientific data. *Unless otherwise stated, all responses must be typed and submitted as a PDF file to the TurnItIn dropbox on the Carmen course website.* Each assignment is worth 30 points and will be **due by 11:59 pm Eastern Time on the Tuesday following the week it is posted.**

Academic integrity and collaboration: Each student must turn in a lab report that is their own work. While in some laboratory cases we will use shared data, all your responses to the questions and analyses should be your own. Students may work with other students on specific areas that will be clearly designated by the instructor within the Carmen assignment.

Laboratory Final

Description: At the end of the semester you will write an informed critique of a scientific study that claimed to find “The God Gene,” and design a novel experiment that will allow you to uncover the genetic basis for hope and/or belief.

Academic integrity and collaboration: Each student must turn in Final Reflection Paper that represents their own work. This assignment will be submitted to a “TurnItIn” dropbox on Carmen, which will check your submission against other students’ work and published information on the internet. You will be able to see your similarity score and can revise and resubmit your final reflection if TurnItIn identifies specific areas that are potentially problematic.

Extra Credit Opportunities

Up to 25 pts = 5% of your final grade

- **Midterm feedback survey:** This anonymous survey will allow you to provide valuable feedback on what is helping or hindering your learning in this course so that I can improve it this the semester and in future offerings. This survey will be available during the 7th week of classes (*Due Friday February 17th*) and will be worth 5 points.
- **Extra Credit on laboratory assignments:** Each laboratory assignment will have an extra credit question on it. I strongly encourage you to answer these so that if you miss points elsewhere, you can recoup some of them.

- **Attending Zoom office hours/study sessions:** Participation in these sessions will be worth up to 5 pts/session (maximum of 15 extra credit points).

Alignment Table

GE Goal	GE ELO	Course ELOs	Course Assessments	How assessments support GE ELO
GOAL I: Successful students will engage in theoretical and empirical study within the natural sciences, gaining an appreciation of the modern principles, theories, methods, and modes of inquiry used generally across the natural sciences.	1.1: Successful students are able to explain basic facts, principles, theories and methods of modern natural sciences; describe and analyze the process of scientific inquiry.	1. Articulate how the process of evolution by the means of natural selection could have contributed to the human capacity for hope & belief. 2. Compare and contrast human neurobiology and behavior with those of other animals. 3. Distinguish between scientific and religious epistemological frameworks, identify when each are useful & how they can coexist.	Laboratory 3: Do animals have hope? Design an experiment and observe animals for evidence of hopefulness Laboratory 4: Physiological benefits of meditation to modern and early humans	These assessments will allow students to <i>describe and analyze the process of scientific inquiry</i> by allowing students to formulate and test hypotheses on what behaviors would be indicative of hope in animals and conduct experiments to determine how prayer/meditation and spending time admiring nature impacts their physiology (e.g., resting heart rate).
	1.2: Successful students are able to identify how key events in the development of science contribute to the ongoing and changing nature of scientific knowledge and methods.	4. Examine neurobiological, behavioral, genetic and social evidence supporting the biological basis for hope and belief. 5. Articulate how new scientific ideas and technological advancements have contributed to our understanding of hope and belief.	Laboratory 2: Phylogenetic basis for hope and belief Laboratory 6: Genetic basis of belief in humans	These assessments will allow students to <i>identify how key events in the development of science</i> (e.g., Theory of Evolution, increased understanding of human/animal brain, sequencing of the human genome) contribute to <i>ongoing and changing nature of scientific knowledge</i> (e.g. which animals are good/bad models for hope and belief) and <i>methods used by natural scientists</i> (e.g. constructing phylogenetic trees; searching publicly available databases).
	1.3: Successful students will employ the processes of science through exploration, discovery, and collaboration to interact directly with the natural world when feasible, using appropriate tools, models and analysis of data.	1. Articulate how the process of evolution by the means of natural selection could have contributed to the human capacity for hope and belief. 8. Describe how science is done and what makes for credible science	All laboratory exercises will fulfil this ELO and course learning objectives Final Reflection Paper: Did Hamer responsibly use scientific information when he wrote the God Gene?	These assessments will allow students to employ the <i>process of science</i> by <i>developing hypotheses</i> (e.g., Lab 1: how religious beliefs affect acceptance of evolution), <i>designing experiments</i> (e.g., Lab 5: design an experiment to show how beliefs affect the brain), and <i>exploring scientific literature and other credible sources</i> (e.g., Final Reflection Paper/Critique of the "God Gene" hypothesis).

GE Goal	GE ELO	Course ELOs	Course Assessments	How assessments support GE ELO
GOAL II: Successful students will discern the relationship between the theoretical and applied sciences, while appreciating the implications of scientific discoveries and the potential impacts of science and technology.	2.1 Successful students are able to analyze the inter-dependence and potential impacts of scientific and technological developments.	5. Articulate how new scientific ideas and technological advancements have contributed to our understanding of hope and belief. 6. Integrate biological information and other forms of data to evaluate the impact of hope and belief on human well-being.	Laboratory 4: Physiological benefits of meditation to modern and early humans Laboratory 5: Design an experiment to evaluate the neurobiological basis of belief	These assignments will allow students to analyze the <u>inter-dependence of science and technology</u> (e.g. how advancements in brain imaging technology are improving our understanding of hope/belief) and the <u>potential impacts of scientific and technological advancements</u> (e.g. how science/technology can demonstrate the benefits of hope/belief on human physiology).
	2.2. Successful students are able to evaluate social and ethical implications of natural scientific discoveries.	5. Articulate how new scientific ideas and technological advancements have contributed to our understanding of hope and belief. 7. Evaluate the social and ethical implications of understanding hope/belief in animals and humans.	Lab 2: Phylogenetic basis of hope and belief Laboratory 6: Genetic basis of belief in humans	These assignments will allow students to examine <u>natural scientific discoveries</u> (e.g., shared evolutionary relationships among humans and other animals; changes that took place in the human anatomy and physiology as we evolved) and evaluate their <u>social and ethical implications</u> (e.g., what are the social and ethical implications of saying that a single gene is responsible for religious belief).
	2.3 Successful students are able to critically evaluate and responsibly use information from the natural sciences.	3. Distinguish between scientific and religious epistemological frameworks, identify when each are useful and how they can coexist 4. Examine neurobiological, behavioral, genetic and social evidence supporting the biological basis for hope and belief. 6. Integrate biological information and other forms of data to evaluate the impact of hope and belief on human well-being.	Laboratory 1: Evaluating our understanding of evolution Laboratory 6: Genetic basis of hope and belief in humans Final Reflection Paper: Did Hamer responsibly use scientific information when he wrote the God Gene?	These assessments will allow students to <u>critically evaluate information from the natural sciences</u> (e.g. Lab 1 describe the difference between correlation and causation; Lab 6: how variations in gene sequence affect us) and <u>use this information responsibly</u> (e.g. Final Reflection Paper).

Late Assignments

- Please refer to Carmen for due dates. Due dates are set to help you stay on pace and to allow timely feedback that will help you complete subsequent assignments. Meeting deadlines is an important aspect of *professionalism in ALL future careers*. Please plan carefully. Deadlines for submitting assigned work are firm, and extensions will NOT be granted for conflicts with the work or other courses, or technological difficulties with Carmen.
 - *Accommodations due to illness or other personal situations are granted only with appropriate documentation (doctor's note, obituary, etc.).* If you need an extension for a family emergency or medical reason, please email me before 5:00 pm on the day the assignment/unit assessment is due, or within 24-hours of an emergency or illness. Whenever possible, please provide the documentation.
 - *Advanced accommodations:* If you need to have an adjusted schedule (e.g., military duty prevents you from opening or submitting assignments during posted window, etc.), please email Dr. Meuti at least 2 weeks prior to requested schedule changes.
 - *Late work:* To ensure that we all stay on track and that your work does not pile up, assignments/Unit Assessments that are submitted late will receive a 10% penalty for every day they are late, up to 3 days late. After that time, your assignment will not be graded for credit.

Instructor Feedback and Response Time

I am providing the following list to give you an idea of my intended availability throughout the course. Remember that you can call [614-688-4357 \(HELP\)](tel:614-688-4357) at any time if you have a technical problem.

- **Preferred contact method:** If you have a question, please contact me first through my Ohio State email address. I will reply to emails within **24 hours on days when class is in session at the university**, or **36 hours on the weekend/university holiday**. *If you have not heard back within this timeframe, you can and should send an additional email.* Please do NOT send multiple emails within a 24 hr period or use Canvas to contact me.
- **Class announcements:** I will send all important class-wide messages through the Announcements tool in CarmenCanvas. Please check [your notification preferences](https://go.osu.edu/canvas-notifications) (go.osu.edu/canvas-notifications) to ensure you receive these messages.
- **Course Whiteboard:** I will check and reply to posts on the course Microsoft Whiteboards boards once mid-week and once at the end of the week.



- **Grading and feedback:** For assignments submitted before the due date, I will try to provide feedback and grades within **seven days**. Assignments submitted after the due date may have reduced feedback, and grades may take longer to be posted.
- **Grading philosophy:** Your weekly laboratory assignments will be graded by a team of students who previously took the course. I will grade your Final Reflection Paper. Please note that the graders and I do NOT give you points, nor do we take away points away from you. *You either earn or do not earn points on assignments.* The graders and I want you to earn the highest grade possible on every assignment and assessment! I am here to help you by clarifying any instructions and answering questions that you have. 😊 However, ultimately your grade is up to you.
- **Grade Disputes:** Graded material will be made available to you on Carmen. I encourage you to carefully look over the feedback on your assignments. Please be sure to see me during office hours (preferred) or email me if you do not understand why any of your answers were incorrect/did not earn full credit. If you feel that a mistake was made on an assignment, you have the right to dispute the grade. You must discuss your dispute with me no later than **two weeks after the graded assignment has been made available to you**. After that time, the grade will be final.

Grading Scale

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

Other Course Policies

General Policies and Expectations

- **Class participation:** I expect you to complete the assigned readings and watch the lab tutorials each week so that you can thoughtfully complete laboratory assignments. I expect you to be respectful of your peers, graders and me.
- **Notetaking:** As I want you to earn the highest grade possible, and because full participation in class activities is crucial for success, I expect you to treat this class with the same respect, attention and planning as you treat your other, in-person classes. Therefore, you *should take notes both when reading the course articles and when watching the lectures*. You should complete your readings and watch the recorded lectures in a quiet place, free from other distractions. Research shows that students learn best and retain the most information when they take notes by hand ([Bonner and Holliday, 2006 J. Research in Science Teaching](#)). ☺
- **Staying informed:** We will closely follow the schedule on the syllabus and will provide updates and reminders to ensure that you are staying on track. If I have to make modifications or adjustments to the course, provide further details or clarification, and/or schedule review sessions, I will post a **course announcement**. Students are responsible for all information communicated via email and course announcements. Therefore, I expect you to *check the course website and your OSU email at least once per week*.
- **Managing class data:** Consider composing your academic posts in a word processor or using a program like Excel/Google sheets to save your work, ideally to a cloud-based system. This will allow you to then copy responses into Carmen discussions, and more easily submit your assignments to their associated dropboxes within Carmen. Additionally, this will protect against data loss if your computer malfunctions or gets lost or stolen.
- **Scientific rigor:** I understand that most of you are NOT scientists and are likely intimidated by a science GE course, and especially math/data analysis. However, while this course is a biology class and will require you to learn important scientific concepts, *this course is not designed to be difficult or onerous*. You will have to think critically and connect course concepts. You are all bright, capable and enthusiastic Buckeyes who belong to be here! *I have every confidence that you will succeed in this course and earn the grade that you want.*

- **Scheduling:** I will post the module for each week on Tuesdays at 12:00 am Eastern Time. The module page will contain the overview describing the week's tasks, readings, lab tutorial and laboratory activity/assignment. Laboratory assignments will be due the following Sunday by 11:59 PM Eastern Time, giving you 10 days to complete the assignment.
- **Synchronous sessions:** During optional extra credit, synchronous Zoom sessions, I ask you to use your real name and a clear photo of your face. Please also use a clear picture of your face in your Carmen profile. When in breakout rooms or other small-group discussions, having cameras and mics on as often as possible will help you get the most out of activities. You are always welcome to use the [free, Ohio State-themed virtual backgrounds](https://go.osu.edu/zoom-backgrounds) (go.osu.edu/zoom-backgrounds). Remember that Zoom and the Zoom chat are our classroom space where respectful interactions are expected.
- **Specific expectations for online discussions**
 - **Writing style:** While there is no need to complete your laboratory reports as if you were writing a research paper, you should remember to write using good grammar, spelling, and punctuation. A more conversational tone is fine for non-academic topics, and especially on the course whiteboard.
 - **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. I will provide specific guidance for discussions on controversial or personal topics.
 - **Citing your sources:** When we have academic discussions, please cite your sources to back up what you say. For the textbook or other course materials, list at least the title and page numbers. For online sources, include a link.
- **Statement of Intent:** By remaining in this course, you are agreeing to abide by the guidelines outlined in this syllabus. As instructors, we reserve the right to update and/or correct this syllabus. We will notify you should there be a necessary change to the syllabus.

Academic Integrity Policy

See [Descriptions of Major Course Assignments](#) for specific guidelines about collaboration and academic integrity in the context of this online class.

Ohio State's Academic Integrity Policy

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

the rules and guidelines established in the university's *Code of Student Conduct* and this syllabus may constitute "Academic Misconduct."

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

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

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

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

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

Copyright for Instructional Materials

The materials used in connection with this course may be subject to copyright protection and are only for the use of students officially enrolled in the course for the educational purposes associated with the course. All PowerPoints and other instructional materials in this course are the intellectual property of the presenter and/or instructor. They are not to be shared beyond the course without the expressed written consent of the instructor(s). Recognizing that your work is also your intellectual property, we will not share or distribute your work without your permission.

Creating an Environment Free from Harassment, Discrimination, and Sexual Misconduct

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

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

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

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

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

Your Mental Health

As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce a student's ability to participate in daily activities. No matter where you are engaged in distance learning, The Ohio State University's Student Life Counseling and Consultation Service (CCS) is here to support you. If you find yourself feeling isolated, anxious or overwhelmed, [on-demand mental health resources](https://go.osu.edu/ccsondemand) (go.osu.edu/ccsondemand) are available. You can reach an on-call counselor when CCS is closed at [614- 292-5766](tel:614-292-5766). **24-hour emergency help** is available through the [National Suicide Prevention Lifeline website](https://suicidepreventionlifeline.org) (suicidepreventionlifeline.org) or by calling [1-800-273-8255\(TALK\)](tel:1-800-273-8255). [The Ohio State Wellness app](https://go.osu.edu/wellnessapp) (go.osu.edu/wellnessapp) is also a great resource.

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

Accessing the Writing Center

Many students struggle to clearly express their ideas in writing. Fortunately, the Writing Center offers free help with writing at any stage of the writing process for all students. During their sessions, consultants can work with you on anything from research papers to lab reports, from dissertations to résumés. Appointments are available in-person at 4120 Smith Lab, as well as for online. You may schedule an in-person or online appointment by visiting WC Online or by calling 614-688-4291. Please note that the Writing Center also offers daily walk-in hours—no appointment necessary—in Thompson Library. You do not have to bring in a piece of writing in order to schedule a writing center appointment. Many students report that some of their most productive sessions entail simply talking through ideas.

Diversity Statement

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

To learn more about diversity, equity, and inclusion and/or to get involved, please visit:

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

Principles of Community Statement

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

Accessibility Accommodations for Students with Disabilities

Requesting Accommodations

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 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 \(SLDS\)](#). After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. 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.

Disability Services Contact Information

- Phone: [614-292-3307](tel:614-292-3307)
- Website: slds.osu.edu
- Email: slds@osu.edu
- In person: [Baker Hall 098, 113 W. 12th Avenue](#)

Accessibility of Course Technology

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

- [CarmenCanvas accessibility](http://go.osu.edu/canvas-accessibility) (go.osu.edu/canvas-accessibility)
- Streaming audio and video
- [CarmenZoom accessibility](http://go.osu.edu/zoom-accessibility) (go.osu.edu/zoom-accessibility)

Laboratory Schedule

Refer to the CarmenCanvas course for up-to-date due dates.

Course Theme	Course Week	Reading	Watching	Doing (Assignments)
Orientation/ Expectations	1	Laboratory Syllabus	Orientation video	Laboratory Syllabus Assessment
How do we know what we know?	2	Article on types of data and how to convert them. Sandelowski et al. 2009. J. Mixed Methods Res.	Lab 1a: Quantitative and qualitative understanding of evolution	Assignment 1a: Form hypotheses and administer surveys
	3	Article comparing metrics of assessing knowledge of Natural selection Nehm & Schonfeld. 2022. J. Res. In Sci. Teaching	Lab 1b: How to score your survey results	Assignment 1b: Take the survey and reflect on the results; share individual and simulated data
	4	Readings on sample size, and linear regression Sharp & Gahlinger. 1988. Med Sci. Sports Exerc.	Lab 1c: Introduction to linear regression and how to interpret data	Assignment 1c: Create a graph of your individual data and class data Interpretation of data and reflection
Humans and Animals: Hopefully we aren't so different	5	Readings on how to build and interpret a phylogenetic tree Kahn Academy tutorial for AP Biology.	Lab 2a: Introduction to phylogenetics and taxonomy	Assignment 2a: Observe and take pictures of 10 animals and arrange them in a phylogenetic tree
	6	Article on experimental evidence of sentience in animals Proctor et al. 2013. Animals.	Lab 2b: Elements of experimental design	Assignment 2b: Design an experiment to test which animals are most hopeful
	7	How to observe, measure and describe animal behavior Khan Academy tutorial for AP Biology.	Lab 3a: How to develop unbiased metrics to assess hope in animals	Assignment 3a: Create your own criteria of hope in animals and observe an animal of your choice for 30 minutes
	8	Process and importance of peer-review LaFlamme. 2019. Microbiology Community of Nature Portfolio.	Lab 3b: How to perform a Chi-squared test and provide a strong and reasoned critique	Assignment 3b: Use Chi-squared analyses to assess hope in your animal(s) and critique/debate the assessment of hope in animals by one of your peers.

Course Theme	Course Week	Reading	Watching	Doing (Assignments)
Were hope and belief crucial elements during early human evolution?	9	Article on physiological benefits of mindfulness meditation Buttle 2013. BioMed Res. Intl.	Lab 4a: Tutorial on how to collect heart rate and assess your mental state	Assignment 4a: Experimental evidence on how hope and belief affect you personally
	10	Article on t-tests in natural science research Biology for life.	Lab 4b: Tutorial on how to conduct a Student's T-test	Assignment 4b: Analyze and interpret class data on the effects of meditation, and debate evidence that meditation helped early humans
What are the benefits of hope and belief to modern humans and our society?	11	Types of brain imaging technologies available to medical researchers Xue et al. 2010. Acta Psychologica Sinica.	Lab 5a: Regions of the brain involved in self-awareness, focus and reward	Assignment 5a: Formulate a testable hypothesis on the relationship between brain activity and a specific mental state
	12	Article on scientific research budgets Pain. 2017. Science	Lab 5b: Balancing experimental design with budgetary restrictions	Assignment 5b: Design an experiment to test your hypothesis within budgetary constraints
	13	Article on the 1000 genomes project Clarke et al. 2012. Nature Methods.	Lab 6a: Tutorial on how to use GenBank and 100,000 human genomes project	Assignment 6a: Compare the genomic variation of "the God gene"
	14	Article about polygenic traits and environmental influences Libre Texts Biology.	Lab 6b: Why many genes are involved in complex traits	Assignment 6b: Compare genomic variation of a gene involved in hope/belief and one that isn't
	15	Excerpts from the God Gene (to be posted to Carmen) and a critique of the study by Goldman. 2004. Nature Genetics.	Final Tutorial: Putting it all together	Laboratory Final: Critique Dean Hamer's "God Gene" study (is it a responsible use of scientific information?) and evaluate the potential of genetics to understand hope & belief

ENTMLGY 1351 Laboratory Descriptions and Alignment with ENTMLGY 1350

1. **Evaluating our understanding of evolution**: As part of the initial unit of the class “How do we know what we know?” students will practice formulating and identifying null and alternative hypotheses. They will then develop hypotheses on how a person’s religion/spirituality, education or age affects their understanding and acceptance of evolution (Week 2). They will post their hypotheses on the class Microsoft Whiteboard, and have the opportunity to revise and refine their hypotheses after considering those of their peers.

Next, students will consider the differences between qualitative data (e.g., intensity of feeling, familiarity with a concept) and quantitative data implement strategies that scientists use to convert qualitative data into quantitative measures to facilitate easier analysis. Specifically, students will do this by use validated scales/metrics to assess their own understanding and acceptance of evolution. Students will then apply what they discovered about their own understanding and acceptance of evolution to predict how 4 friends and/or family members might score on these metrics given their age, highest level of education achieved and frequency of religious attendance (Week 3). In doing so, students will be introduced to concepts of codependence vs. independent data and will reflect on whether the social and/or genetic relationships between their subjects are likely to influence their understanding and/or acceptance of evolution. Students will also post and respond to their peers’ on what they discovered about their own knowledge and acceptance of evolution, what factors in their lives they feel have personally influenced these, and whether these same or different factors were at play in their friends/family members.

Students will be introduced to the concept of data management and the importance of using large sample sizes in scientific studies (Week 4). This will be achieved by first allowing students to analyze their own dataset (N = 5 people) using linear regressions to analyze the correlation between either acceptance or understanding of evolution with one predictor variable that they choose (e.g., level of education, frequency of religious attendance or age). Students will then complete the same analyses again using class data (N = 5 X number of students in the course). Note that all student data and the simulated/predicted data will be submitted to a OneDrive Excel file administered by the instructor; the data will then be anonymized before it is released to the students. Students will then perform linear regressions on the entire class dataset. Students will post the results of their regressions to the course whiteboard. They will also provide feedback to their peers who did different analyses. Students will then reflect on the merits and limitations of this data given what was previously discussed in the lecture course (e.g., “Lecture Assignment 1: Apply what you’ve learned about information literacy to assess the credibility of an article on hope” where students are introduced to the difference between correlation and causation, “Lecture Assignment 2: Differences between scientific and religious epistemologies”). Students will then reflect what this data might tell us about the relationship between science, education, religion and age in their lab reports.

- 2. Phylogenetic basis of hope and belief:** Students will learn concepts of phylogeny and how to read and interpret phylogenetic trees, and how convergent evolution can reveal what factors are associated with the emergence of new traits (Week 5). Students will then take pictures of 10 animals in and around their homes and build a phylogenetic tree based on the similarities that they see between these animals and humans. Students will post their pictures and phylogenies to the course whiteboard and provide feedback to their peers on the phylogenetic trees that they have created. After doing this, students will complete individual assignments to compare their predicted phylogenetic trees to current, accurate phylogenies and reflect on where and why there were differences.

Next (Week 6), students will apply what they have learned in the ENTMLGY 1350 lectures (e.g., Lecture 4: How Natural Selection works, Lecture 5: Pre-requisites for the biological basis of hope and belief) to make predictions as to which animals might be the best models to understand the biological basis of hope and belief in humans. Students will consider both shared elements of human and animal biology (e.g., having complex nervous systems, similarities in neurotransmitters) and/or similar evolutionary pressures (e.g., living in complex social groups, having to care for young for extended periods). Students will post their predictions on what animals are the most hopeful and what underlying morphological and physiological systems are required for hope on whiteboards. Students will also provide feedback to their peers' posts. Finally, students will apply information on what they have learned in lecture on how scientists measure animals' ability to understand and respond to music (Lecture Assignment 5: Evolutionary basis of music in humans and animals) to design an experiment that they would use to test the evolutionary basis for hope in animals.

Accessibility accommodations: The instructor will provide a repository of open-source images of several animals that students who do not have cameras and/or the ability to be around animals can use to create their phylogenetic trees. Students can also share the images that they took with one another using the course whiteboard.

- 3. Do animals have hope?** Students will further explore the topics that are being explored in the lecture course (Lectures 10 and 11) on concerns of anthropomorphism when assessing complex behaviors and emotional states in animals (Week 7). After reading how biologists measure animal behavior, students will develop their own criteria for what behaviors they would consider to be illustrative of hope in another animal (e.g., looking for food, seeking companionship). Students will post the criteria that they have developed on the course whiteboard and critique the criteria their peers developed before finally revising what criteria they will use to assess whether an animal of their choosing exhibits hope. Students will then create a datasheet to record behaviors, and spend 30 minutes closely observing an animal and recording every behavior that they see. After the thirty-minute observation period students will review their data to determine whether the animal has or has not demonstrated evidence of hope and justify their conclusions using data.

The following week (Week 8), students will learn how to conduct Chi-squared analyses and will learn about the importance of peer review. Students will post a description, picture or short video of their animal observation to the course whiteboard as well as the results of their Chi-

squared analysis to justify whether or not this is evidence of hope. For their laboratory assignment, students will critique a classmate's assessment of whether the animal their classmate observed did or did not display evidence of hope.

Accessibility accommodations: The instructor will provide videos of several animals that students who do not have cameras and/or the ability to be around animals can use for their observations.

- 4. Physiological benefits of meditation to modern and early humans:** Students will have the opportunity to collect, analyze and evaluate the connection between their mental states and underlying physiology (Week 9). Students will be asked to reflect on a particularly stressful time in their lives (3-5 minutes), and immediately afterward rate their overall mental state (ranging from stressed/anxious to perfectly content) and take their heartrate. Next the students will complete a guided meditation exercise for 3-5 minutes, and take their pulse and rate their happiness afterwards. Finally, students will be asked to take a leisurely walk outdoors or to focus deeply on an element of the natural world (e.g., a beautiful flower, a sunset or sunrise, etc.) for 3-5 minutes and take their heartrate again. Students will post general descriptions of what they found to the course whiteboards, and comment on similarities and differences between their own experiences and those of their peers. Students will also submit their data to an Excel Spreadsheet on OneDrive.

The following week (Week 10), the compiled, anonymized data will be provided to the students, and they will *learn how to conduct a student's T-test*. Students will then use T-tests to evaluate whether prayer/meditation and/or experiences with the natural world had a statistically significant impact on the physiological and emotional well-being of the class. Students will post their initial hypotheses and their rationale for why this might occur on the course whiteboard. In their laboratory assignment, students will apply what they have been learning in lecture (e.g., Lecture 13: Evolution of the human brain and bipedalism, Lecture 14: Advantages of morality and a sacred narrative; Lecture Assignment 7: Analysis of Becoming Human) to consider whether it is likely that early humans engaged in meditation and if this would have offered them an evolutionary benefit.

- 5. Visualizing the Brain:** Students will apply what they have learned in lecture on neuronal communication (Lecture 6: How neurons communicate; Lecture 7: Neurobiology basics; Lecture 8: Neurobiology of love and other emotions) to further investigate how brain imaging works and how it can be used to evaluate the neurological basis of love, depression and transcendence (Week 11). Specifically, students will read an article describing the different types of brain imaging technologies that are available to natural scientists and medical researchers. Students will also review which areas of the brain are involved in different mental and emotional states, and then post their prediction on how brain activity will be affected by a specific mental state (e.g., religious transcendence, drug addiction, depression), and critique the predictions offered by their peers.

The following week (Week 12), students will how natural scientists create a research budget and the limited funding that is available to biologists. Students will apply what they have learned in lecture about how the Benedetti experiments uncovered the neurochemical basis of the placebo effect as well as neurotransmitters that are involved in euphoria/depression, and what they learned the previous week about the quality and cost of different brain imaging technologies to design an experiment to test their specific hypothesis. Notably, students will act like real researchers to execute their experiment within a limited budget (\$100,000 maximum). Students will post on the course whiteboard how they balanced elements of sound scientific design (e.g. large sample sizes) with financial and logistical constraints, and whether this lab has influenced their views on funding scientific research, and use the whiteboard to simulate how scientific research proposals are reviewed by grant panelists by critiquing each other's proposed experiments.

Furthermore, students will learn how to use [The Virtual Brain project](#) to simulate how the brain would behave under different kinds of mental states to generate data and test their hypotheses. For their lab report, students will articulate their hypothesis, design, and budget. They will also take screenshots of the images generated by the Virtual Brain simulations to demonstrate whether their data supported or did not support their hypotheses. Students will also apply what they have learned previously in the lab and lecture (e.g. Lecture 12: Morality in great apes, Lecture 15: Evolution of religion) to consider whether they could use an animal model (e.g., mouse, rat or chimpanzee) to address their proposed research question, and what the benefits and limitations of animal models and virtual simulations might be.

- 6. Genetic Basis of Belief in Humans:** Students will review concepts of the Central Dogma of Biology (DNA is transcribed into RNA that is translated into Protein; Lecture 4: How Natural Selection works) to assess whether the human capacity for hope and belief are hardwired into our genome (Week 13). Specifically, students will be introduced to how to access the sequences of specific genes on GenBank to create unique datasets of previously sequenced genes. Students will also learn how to use other bioinformatic tools and technologies to compare the sequences of the a gene from multiple people through the 1,000 genomes project. Initially, students will compare the sequences of the VMAT2 gene, misnamed as "God gene," that was implicated in being associated with transcendence and spirituality (Lecture 19: The genetic basis of belief). Students will post their reactions to Hamer's claims that a single gene is responsible for hope and belief on the course whiteboards and share their thoughts and reactions on the amount of data and information that scientists freely share with one another and the world.

The following week (Week 14), students will then use a similar approach to compare the sequences of two additional genes; one that they think will be associated with hope, depression and/or religious belief and another that they do not based on their functional roles. Students will select the genes of choice using information that they have learned in the lecture course (Lecture 17: The neurobiology of hope and hopelessness; Lecture 18: The balance between hope and despair). Students will post the genes that they have selected and why on the course whiteboards. For their lab reports, students will use bioinformatic tools to measure the relative

allele frequencies of each gene that they selected and use linear regressions to determine whether these genes are more or less correlated with the self-transcendence measure that Dr. Hamer used.

In their final Reflection Paper (Week 15) students will discuss the results of this suite of experiments as well as apply what they have learned about science and the scientific method throughout the entire laboratory course to critique Dr. Hamer's work.

GE Foundation Courses

Overview

Courses that are accepted into the General Education (GE) Foundations provide introductory or foundational coverage of the subject of that category. Additionally, each course must meet a set of Expected Learning Outcomes (ELO). Courses may be accepted into more than one Foundation, but ELOs for each Foundation must be met. It may be helpful to consult your Director of Undergraduate Studies or appropriate support staff person as you develop and submit your course.

This form contains sections outlining the ELOs of each Foundation category. You can navigate between them using the Bookmarks function in Acrobat. Please enter text in the boxes to describe how your class meets the ELOs of the Foundation(s) to which it applies. Because this document will be used in the course review and approval process, you should use language that is clear and concise and that colleagues outside of your discipline will be able to follow. Please be as specific as possible, listing concrete activities, specific theories, names of scholars, titles of textbooks etc. Your answers will be evaluated in conjunction with the syllabus submitted for the course.

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.

GE Rationale: Foundations: Race, Ethnicity, and Gender Diversity (3 credits)

Requesting a GE category for a course implies that the course fulfills **all** the expected learning outcomes (ELOs) of that GE category. To help the reviewing panel evaluate the appropriateness of your course for the Foundations: Race, Ethnicity, and Gender Diversity, please answer the following questions for each ELO.

A. Foundations

Please explain in 50-500 words why or how this course is introductory or foundational for the study of Race, Ethnicity and Gender Diversity.

Course Subject & Number: _____

B. Specific Goals of Race, Ethnicity, and Gender Diversity

GOAL 1: Successful students will engage in a systematic assessment of how historically and socially constructed categories of race, ethnicity, and gender, and possibly others, shape perceptions, individual outcomes, and broader societal, political, economic, and cultural systems.

Expected Learning Outcome 1.1: Successful students are able to describe and evaluate the social positions and representations of categories including race, gender, and ethnicity, and possibly others. Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. (50-700 words)

Expected Learning Outcome 1.2: Successful students are able to explain how categories including race, gender, and ethnicity continue to function within complex systems of power to impact individual lived experiences and broader societal issues. 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: _____

Expected Learning Outcome 1.3: Successful students are able to analyze how the intersection of categories including race, gender, and ethnicity combine to shape lived experiences. Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. (50-700 words)

Expected Learning Outcome 1.4: Successful students are able to evaluate social and ethical implications of studying race, gender, and ethnicity. 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 recognize and compare a range of lived experiences of race, gender, and ethnicity.

Expected Learning Outcome 2.1: Successful students are able to demonstrate critical self- reflection and critique of their social positions and identities. Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. (50-700 words)

Expected Learning Outcome 2.2: Successful students are able to recognize how perceptions of difference shape one’s own attitudes, beliefs, or 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)

Course Subject & Number: _____

Expected Learning Outcome 2.3: Successful students are able to describe how the categories of race, gender, and ethnicity influence the lived experiences of others. Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met.

GE Rationale: Foundations: Social and Behavioral Sciences (3 credits)

Requesting a GE category for a course implies that the course **all** expected learning outcomes (ELOs) of that GE category. To help the reviewing panel evaluate the appropriateness of your course for the Foundations: Social and Behavioral Sciences, please answer the following questions for each ELO.

A. Foundations

Please explain in 50-500 words why or how this course is introductory or foundational in the study of Social and Behavioral Sciences.

Course Subject & Number: _____

B. Specific Goals of Social and Behavioral Sciences

GOAL 1: Successful students will critically analyze and apply theoretical and empirical approaches within the social and behavioral sciences, including modern principles, theories, methods, and modes of inquiry.

Expected Learning Outcome 1.1: Successful students are able to explain basic facts, principles, theories and methods of social and behavioral science. Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. (50-700 words)

Expected Learning Outcome 1.2: Successful students are able to explain and evaluate differences, similarities, and disparities among institutions, organizations, cultures, societies, and/or individuals using social and behavioral science. 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 recognize the implications of social and behavioral scientific findings and their potential impacts.

Expected Learning Outcome 2.1: Successful students are able to analyze how political, economic, individual, or social factors and values impact social structures, policies, and/or decisions. Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. (50-700 words)

Expected Learning Outcome 2.2: Successful students are able to evaluate social and ethical implications of social scientific and behavioral research. 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: _____

Expected Learning Outcome 2.3: Successful students are able to critically evaluate and responsibly use information from the social and behavioral sciences. Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. (50-700 words)

GE Rationale: Foundations: Historical or Cultural Studies (3 credits)

Requesting a GE category for a course implies that the course fulfills the expected learning outcomes (ELOs) of that GE category. To help the reviewing panel evaluate the appropriateness of your course for the Foundations: Historical and Cultural Studies, please answer the following questions for each ELO. Note that for this Foundation, a course need satisfy either the ELOs for Historical Studies or the ELOs for Cultural Studies.

A. Foundations

Please explain in 50-500 words why or how this course is introductory or foundational in the study of History **or** Cultures.

Course Subject & Number: _____

B. Specific Goals of Historical *or* Cultural Studies

Historical Studies (A) Goal: Successful students will critically investigate and analyze historical ideas, events, persons, material culture and artifacts to understand how they shape society and people.

Expected Learning Outcome 1.1A: Successful students are able to identify, differentiate, and analyze primary and secondary sources related to historical events, periods, or ideas. Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. (50-700 words)

Expected Learning Outcome 1.2A: Successful students are able to use methods and theories of historical inquiry to describe and analyze the origin of at least one selected contemporary issue. 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: _____

Expected Learning Outcome 1.3A: Successful students are able to use historical sources and methods to construct an integrated perspective on at least one historical period, event or idea that influences human perceptions, beliefs, 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)

Expected Learning Outcome 1.4A: Successful students are able to evaluate social and ethical implications in historical studies. 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: _____

Cultural Studies (B) Goal: Successful students will evaluate significant cultural phenomena and ideas to develop capacities for aesthetic and cultural response, judgment, interpretation, and evaluation.

Expected Learning Outcome 1.1B: Successful students are able to analyze and interpret selected major forms of human thought, culture, ideas or expression. Please link this ELO to the course goals and topics and identify the *specific* activities/assignments through which it will be met. (50-700 words)

Expected Learning Outcome 1.2B: Successful students are able to describe and analyze selected cultural phenomena and ideas across time using a diverse range of primary and secondary sources and an explicit focus on different theories and methodologies. 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: _____

Expected Learning Outcome 1.3B: Successful students are able to use appropriate sources and methods to construct an integrated and comparative perspective of cultural periods, events or ideas that influence human perceptions, beliefs, 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)

Expected Learning Outcome 1.4B: Successful students are able to evaluate social and ethical implications in cultural studies. Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met.

GE Rationale: Foundations: Writing and Information Literacy (3 credits)

Requesting a GE category for a course implies that the course fulfills **all** expected learning outcomes (ELOs) of that GE category. To help the reviewing panel evaluate the appropriateness of your course for the Foundations: Writing and Information Literacy, please answer the following questions for each ELO.

Course Subject & Number: _____

A. Foundations

Please explain in 50-500 words why or how this course is introductory or foundational in the study of Writing and Information Literacy.

B. Specific Goals of Writing and Information Literacy

GOAL 1: Successful students will demonstrate skills in effective reading, and writing, as well as oral, digital, and/or visual communication for a range of purposes, audiences, and context.

Expected Learning Outcome 1.1: Successful students are able to compose and interpret across a wide range of purposes and audiences using writing, as well as oral, visual, digital and/or other methods appropriate to the context. Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. Explain how the course includes opportunities for feedback on writing and revision. Furthermore, please describe how you plan to insure sufficiently low instructor-student ratio to provide efficient instruction and feedback. (50-700 words)

Course Subject & Number: _____

Expected Learning Outcome 1.2: Successful students are able to use textual conventions, including proper attribution of ideas and/or source, as appropriate to the communication situation. Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. Is an appropriate text, writing manual, or other resource about the pedagogy of effective communication being used in the course? (50-700 words)

Expected Learning Outcome 1.3: Successful students are able to generate ideas and informed responses incorporating diverse perspectives and information from a range of sources, as appropriate to the communication situation. 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: _____

Expected Learning Outcome 1.4: Successful students are able to evaluate social and ethical implications in writing and information literacy practices. Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. (50-700 words)

GOAL 2: Successful students will develop the knowledge, skills, and habits of mind needed for information literacy.

Expected Learning Outcome 2.1: Successful students are able to demonstrate responsible, civil, and ethical practices when accessing, using, sharing, or creating information. 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: _____

Expected Learning Outcome 2.2: Successful students are able to locate, identify and use information through context appropriate search strategies. Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. (50-700 words)

Expected Learning Outcome 2.3: Successful students are able to employ reflective and critical strategies to evaluate and select credible and relevant information sources. 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: _____

GE Rationale: Foundations: Literary, Visual, or Performing Arts (3 credits)

Requesting a GE category for a course implies that the course fulfills **all** expected learning outcomes (ELOs) of that GE category. To help the reviewing panel evaluate the appropriateness of your course for the Foundations: Literary, Visual, and Performing Arts, please answer the following questions for each ELO.

A. Foundations

Please explain in 50-500 words why or how this course is introductory or foundational in the study of Literary, Visual, or Performing Arts.

B. Specific Goals

Goal 1: Successful students will analyze, interpret, and evaluate major forms of human thought, cultures, and expression; and demonstrate capacities for aesthetic and culturally informed understanding.

Expected Learning Outcome 1.1: Successful students are able to analyze and interpret significant works of design or visual, spatial, literary or performing arts. 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: _____

Expected Learning Outcome 1.2: Successful students are able to describe and explain how cultures identify, evaluate, shape, and value works of literature, visual and performing art, and design. Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. (50-700 words)

Expected Learning Outcome 1.3: Successful students are able to evaluate how artistic ideas influence and shape human beliefs and the interactions between the arts and human perceptions and behavior. 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: _____

Expected Learning Outcome 1.4: Successful students are able to evaluate social and ethical implications in literature, visual and performing arts, and design. Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. (50-700 words)

Goal 2: Successful students will experience the arts and reflect on that experience critically and creatively.

Expected Learning Outcome 2.1: Successful students are able to engage in informed observation and/or active participation within the visual, spatial, literary, or performing arts and design. 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: _____

Expected Learning Outcome 2.2: Successful students are able to critically reflect on and share their own experience of observing or engaging in the visual, spatial, literary, or performing arts and design.

Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. (50-700 words)

GE Rationale: Foundations: Natural Science (4 credits)

Requesting a GE category for a course implies that the course fulfills **all** expected learning outcomes (ELOs) of that GE category. To help the reviewing panel evaluate the appropriateness of your course for the Foundations: Natural Sciences, please answer the following questions for each ELO.

A. Foundations

Please explain in 50-500 words why or how this course is introductory or foundational in the study of Natural Science.

Course Subject & Number: _____

B. Specific Goals for Natural Sciences

GOAL 1: Successful students will engage in theoretical and empirical study within the natural sciences, gaining an appreciation of the modern principles, theories, methods, and modes of inquiry used generally across the natural sciences.

Expected Learning Outcome 1.1: Successful students are able to explain basic facts, principles, theories and methods of modern natural sciences; describe and analyze the process of scientific inquiry. Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. (50-700 words)

Expected Learning Outcome 1.2: Successful students are able to identify how key events in the development of science contribute to the ongoing and changing nature of scientific knowledge and methods. 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: _____

Expected Learning Outcome 1.3: Successful students are able to employ the processes of science through exploration, discovery, and collaboration to interact directly with the natural world when feasible, using appropriate tools, models, and analysis of data. Please explain the 1-credit hour equivalent experiential component included in the course: e.g., traditional lab, course-based research experiences, directed observations, or simulations. Please note that students are expected to analyze data and report on outcomes as part of this experiential component. *(50-1000 words)*

Course Subject & Number: _____

GOAL 2: Successful students will discern the relationship between the theoretical and applied sciences, while appreciating the implications of scientific discoveries and the potential impacts of science and technology.

Expected Learning Outcome 2.1: Successful students are able to analyze the inter-dependence and potential impacts of scientific and technological developments. Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. (50-700 words)

Expected Learning Outcome 2.2: Successful students are able to evaluate social and ethical implications of natural scientific discoveries. 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: _____

Expected Learning Outcome 2.3: Successful students are able to critically evaluate and responsibly use information from the natural sciences. 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: _____

GE Rationale: Foundations: Mathematical and Quantitative Reasoning (or Data Analysis) (3 credits)

Requesting a GE category for a course implies that the course fulfills **all** expected learning outcomes (ELOs) of that GE category. To help the reviewing panel evaluate the appropriateness of your course for the Foundations: Mathematical and Quantitative Reasoning (or Data Analysis), please answer the following questions for each ELO.

A. Foundations

Please explain in 50-500 words why or how this course is introductory or foundational in the study of Mathematical & Quantitative Reasoning (or Data Analysis).

B. Specific Goals for Mathematical & Quantitative Reasoning/Data Analysis

Goal: Successful students will be able to apply quantitative or logical reasoning and/or mathematical/statistical analysis methodologies to understand and solve problems and to communicate results.

Expected Learning Outcome 1.1: Successful students are able to use logical, mathematical and/or statistical concepts and methods to represent real-world situations. 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: _____

Expected Learning Outcome 1.2: Successful students are able to use diverse logical, mathematical and/or statistical approaches, technologies, and tools to communicate about data symbolically, visually, numerically, and verbally. Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. (50-700 words)

Expected Learning Outcome 1.3: Successful students are able to draw appropriate inferences from data based on quantitative analysis and/or logical reasoning. 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: _____

Expected Learning Outcome 1.4: Successful students are able to make and evaluate important assumptions in estimation, modeling, logical argumentation, and/or data analysis. Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. (50-700 words)

Expected Learning Outcome 1.5: Successful students are able to evaluate social and ethical implications in mathematical and quantitative reasoning. Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. (50-700 words)

Distance Approval Cover Sheet

For Permanent DL/DH Approval

Course Number and Title: **ENTMGLY 1351: Experimentally Evaluating the Biology of Hope and Belief**

Faculty Preparer Name and Email: **Megan Meuti; meuti.1@osu.edu**

Carmen Use

For more on use of Carmen: <https://teaching.resources.osu.edu/teaching-topics/carmen-common-sense-best-practices>

A Carmen site will be created for the course, including a syllabus and gradebook at minimum. **Yes**

If no: **N/A**

Syllabus

Proposed syllabus uses the ODEE distance learning syllabus template (or own college distance learning syllabus template based on ODEE model), includes boilerplate language where required, as well as a clear description of the technical and academic support services offered, and how learners can obtain them. **Yes**

Syllabus is consistent and is easy to understand from the student perspective. **Yes**

Syllabus includes a schedule with dates and/or a description of what constitutes the beginning and end of a week or module. **Yes**

If there are required synchronous sessions, the syllabus clearly states when they will happen and how to access them. **N/A**

Additional comments (optional):

Weekly lab modules will have the students turn in their lab reports on Carmen.

Instructor Presence

For more on instructor presence: <https://teaching.resources.osu.edu/teaching-topics/online-instructor-presence>

Students should have opportunities for regular and substantive academic interactions with the course instructor. Some ways to achieve this objective:

- Regular instructor communications with the class via announcements or weekly check-ins
- Instructional content, such as video, audio, or interactive lessons, that is visibly created or mediated by the instructor



- Regular participation in class discussion, such as in Carmen discussions or synchronous sessions
- Regular opportunities for students to receive personal instructor feedback on assignments

Please comment on this dimension of the proposed course (or select/explain methods above):

The instructor will create online videos and tutorials that provide clear instructions for the students so they know how to complete assignments. The instructor will also hold regularly-scheduled video office hours on Zoom where students can ask specific questions. To facilitate greater engagement between students, they will post data, videos and interpretations weekly to Microsoft White Boards and comment on their peers' work each week. The instructor will also offer video and/or written feedback on lab reports either individually or to the entire course (e.g. via Course Announcements).

Delivery Well-Suited to DL/DH Environment

Technology questions adapted from the [Quality Matters](#) rubric. For information about Ohio State learning technologies: <https://teaching.resources.osu.edu/toolsets>

The tools used in the course support the learning outcomes and competencies. **Yes**

Course tools promote learner engagement and active learning. **Yes**

Technologies required in the course are current and readily obtainable. **Yes**

Links are provided to privacy policies for all external tools required in the course. **Yes**

Additional technology comments:

Students will use the Microsoft 365 suite primarily to complete most tasks. Occasionally they will use internet based programs (no downloads needed) and in this case the instructor will provide direct links to the application so students can access relevant information for these web-based programs from the syllabus and/or course Assignment webpage.

Which components of this course are planned for synchronous delivery and which for asynchronous delivery? (For DH, address what is planned for in-person meetings as well.)

There is no synchronous or in person component planned- all activities are asynchronous.

If you believe further explanation would be helpful, please comment on how course activities have been adjusted for distance learning:

N/A

Workload Estimation

For more information about calculating online instruction time: [ODEE Credit Hour Estimation](#)

Course credit hours align with estimated average weekly time to complete the course successfully. **Yes**

Course includes direct (equivalent of "in-class") and indirect (equivalent of "out-of-class") instruction at a ratio of about 1:2. **Yes**

Provide a brief outline of a typical course week, categorizing course activities and estimating the approximate time to complete them or participate:

Students will first access the carmen Module and read a short article (estimated reading time ~20 minutes) view short overview videos (1-2 at 10 min max, depending upon week; total time ≥ 20 min)

Each lab activity is meant to take students approximately 60-90 minutes to complete, including generating data, posting data/videos/comments to course whiteboards and responding to specific questions in the lab report.

In the case of course delivery change requests, the course demonstrates comparable rigor in meeting course learning outcomes. **Yes**

Accessibility

For more information or a further conversation, contact the [accessibility coordinator](#) for the College of Arts and Sciences. For tools and training on accessibility: [Digital Accessibility Services](#)

Instructor(s) teaching the course will have taken Digital Accessibility training (starting in 2022) and will ensure all course materials and activities meet requirements for diverse learners, including alternate means of accessing course materials when appropriate. **Yes**

Information is provided about the accessibility of all technologies required in the course. All third-party tools (tools without campus-wide license agreements) have their accessibility statements included. **Yes**

Description of any anticipated accommodation requests and how they have been/will be addressed. Some students may need flexible deadlines on assignments and/or extra time on assessments because of existing accommodations with SLDS. In these cases, the Instructor will work with students to ensure that all of their necessary accommodations are in place. If students have mobility or other issues that would impair their ability to work with our observe live animals (Labs 2 and 3), students will have the option of watching freely available videos online and/or access a repository of videos and images that are curated by the instructor. Additionally, closed captioning will be provided on all videos and other materials for students that are hearing impaired.

Additional comments:

The instructor will happily work with ODEE and/or the Drake Institute of Teaching and Learning to ensure that this course is accessible to all learners at OSU.

Academic Integrity

For more information: <https://go.osu.edu/teaching-resources-academic-integrity>

The course syllabus includes online-specific policies about academic integrity, including specific parameters for each major assignment: **Yes**

Assignments are designed to deter cheating and plagiarism and/or course technologies such as online proctoring or plagiarism check or other strategies are in place to deter cheating: **Yes**

Additional comments:

Students will be turning in original laboratory work that will include unique datasets, figures, drawings and text-based responses. This uniqueness will alert the instructor/graders in the event students are turning in the same work. If we are concerned about plagiarism, assignments submitted to Carmen will be run through Turnitin, such that students can see their similarity scores and re-submit or edit their work if their assignments are flagged. In addition, random Google image searches may be utilized to ensure students are not plagiarizing images from the internet, and a specific video will address they types of activities that would be considered cheating.

Frequent, Varied Assignments/Assessments

For more information: <https://teaching.resources.osu.edu/teaching-topics/designing-assessments-student>

Student success in online courses is maximized when there are frequent, varied learning activities. Possible approaches:

- Opportunities for students to receive course information through a variety of different sources, including indirect sources, such as textbooks and lectures, and direct sources, such as scholarly resources and field observation
- Variety of assignment formats to provide students with multiple means of demonstrating learning
- Opportunities for students to apply course knowledge and skills to authentic, real-world tasks in assignments

Comment briefly on the frequency and variety of assignment types and assessment approaches used in this course (or select methods above):

This lab will encompass different types of assignments that will allow them to fully engage with the scientific process, including developing hypotheses and designing experiments, collecting and analyzing data, and interpreting scientific findings and discussing their real world applications and implications. Students will be required to use course whiteboards to post original material and comment on their peers' work each week. Students will also be responsible for submitting weekly assignments/laboratory reports/data on Carmen. Descriptions with clear rubrics that describe the number of points and the kinds of information that we are seeking on both lab reports and posts to the course white board will be provided to the students each week. When grading the assignments, students will be provided with clear explanations of where and why they did not earn full credit so that they know how to improve their submissions in the future.

Community Building

For more information: <https://teaching.resources.osu.edu/teaching-topics/student-interaction-online>

Students engage more fully in courses when they have an opportunity to interact with their peers and feel they are part of a community of learners. Possible approaches:

- Opportunities for students to interact academically with classmates through regular class discussion or group assignments
- Opportunities for students to interact socially with classmates, such as through video conference sessions or a course Q&A forum
- Attention is paid to other ways to minimize transactional distance (psychological and communicative gaps between students and their peers, instructor, course content, and institution)

Please comment on this dimension of the proposed course (or select methods above):

Students will interact with one another weekly through posting original material (e.g., written comments, audio and/or video files, images) to course white boards and commenting on the posts that their peers make. Students will also work together to generate class datasets that they will analyze. Students will be encouraged to attend office hours via Zoom where multiple students can interact with one another and the instructor via breakout rooms to discuss course content and analyze data. Additionally, students will be encouraged to participate in synchronous study sessions that are offered through the concurrent ENTMLGY 1350 lecture-based course. Allowing students multiple modalities for communication (e.g., written posts, pre-recorded video or audio files, images, and live interaction with peers and the instructor) should minimize the psychological and communication gaps between peers, instructors, course content and the university.

Transparency and Metacognitive Explanations

For more information: <https://teaching.resources.osu.edu/teaching-topics/supporting-student-learning-your>

Students have successful, meaningful experiences when they understand how the components of a course connect together, when they have guidance on how to study, and when they are encouraged to take ownership of their learning. Possible approaches:

- Instructor explanations about the learning goals and overall design or organization of the course
- Context or rationale to explain the purpose and relevance of major tasks and assignments
- Guidance or resources for ancillary skills necessary to complete assignments, such as conducting library research or using technology tools
- Opportunities for students to take ownership or leadership in their learning, such as by choosing topics of interest for an assignment or leading a group discussion or meeting
- Opportunities for students to reflect on their learning process, including their goals, study strategies, and progress
- Opportunities for students to provide feedback on the course

Please comment on this dimension of the proposed course (or select methods above):

Every course page will include information about the overview and rationale for the week's activities. This information will be repeated and expanded in all assignment descriptions so that students can clearly see how the assignments align with the course learning goals and objectives as well as those for Natural Science ELOs. Students will have access to all articles and video tutorials on how to conduct experiments and analyze data. If students need additional assistance with some skills such as searching primary scientific literature or organizing, analyzing and interpreting data, they can attend Zoom office hours, request an additional meeting with the instructor and/or ask questions over email. To further support metacognition and reflection on their learning, students will earn 1 extra credit point by providing feedback on how long it took them to complete each laboratory assignment, what they liked and didn't like, and how the activity supported their learning. The instructor will also offer midterm and end of term surveys for students to provide additional feedback on the course and reflect on what they could be doing for themselves to better support or facilitate their own learning.

Additional Considerations



Comment on any other aspects of the online delivery not addressed above:

N/A.