## Term Information

| | |
|---|---|
| **Effective Term** | Autumn 2022 |
| ***Previous Value*** | *Autumn 2021* |

## Course Change Information

**What change is being proposed? (If more than one, what changes are being proposed?)**

Updates to learning outcomes to fulfill new GE requirements; minor updates to topic list for clarity

**What is the rationale for the proposed change(s)?**

To align this course with the new GE. Topic list updates do not represent a change in content. Terms were changed to better connect with our students by using terminology that they use and are familiar with.

**What are the programmatic implications of the proposed change(s)?**

**(e.g. program requirements to be added or removed, changes to be made in available resources, effect on other programs that use the course)?**

n/a

**Is approval of the requrest contingent upon the approval of other course or curricular program request?** Yes

**Please identify the pending request and explain its relationship to the proposed changes(s) for this course (e.g. cross listed courses, new or revised program)**

A new course request for ENR 2101 will be submitted concurrently to make 2100 and 2101 3+1 courses for the new GE Foundations: Natural Science.

**Is this a request to withdraw the course?** No

## General Information

| | |
|---|---|
| **Course Bulletin Listing/Subject Area** | Environment & Natural Resource |
| **Fiscal Unit/Academic Org** | Sch of Enviro&Natural Res - D1173 |
| **College/Academic Group** | Food, Agric & Environ Science |
| **Level/Career** | Undergraduate |
| **Course Number/Catalog** | 2100 |
| **Course Title** | Introduction to Environmental Science |
| **Transcript Abbreviation** | Intro Envrnmntl Sc |
| **Course Description** | Introduction to environmental science, the ecological foundation of environmental systems, the ecological impacts of environmental degradation by humans, and strategies for sustainable management of environment and natural resources. |
| **Semester Credit Hours/Units** | Fixed: 3 |

## Offering Information

| | |
|---|---|
| **Length Of Course** | 14 Week, 12 Week, 8 Week, 7 Week, 6 Week, 4 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** | Lecture |
| **Grade Roster Component** | Lecture |
| **Credit Available by Exam** | Yes |

| | |
|---|---|
| **Exam Type** | Advanced Placement Program, EM Tests via Office of Testing |
| **Admission Condition Course** | No |
| **Off Campus** | Never |
| **Campus of Offering** | Columbus, Lima, Mansfield, Marion, Newark, Wooster |

## Prerequisites and Exclusions

| | |
|---|---|
| **Prerequisites/Corequisites** | |
| **Exclusions** | |
| **Electronically Enforced** | No |

## Cross-Listings

**Cross-Listings**

## Subject/CIP Code

| | |
|---|---|
| **Subject/CIP Code** | 03.0101 |
| **Subsidy Level** | General Studies Course |
| **Intended Rank** | Freshman, Sophomore, Junior, Senior |

## Requirement/Elective Designation

Required for this unit's degrees, majors, and/or minors
General Education course:
Biological Science; Natural Sciences

***Previous Value***

*Required for this unit's degrees, majors, and/or minors*
*General Education course:*
*Biological Science*

## Course Details

**Course goals or learning objectives/outcomes**

- 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.
- explain basic facts, principles, theories and methods of modern natural sciences; describe and analyze the process of scientific inquiry.
- identify how key events in the development of science contribute to the ongoing and changing nature of scientific knowledge and methods.
- discern the relationship between the theoretical and applied sciences, while appreciating the implications of scientific discoveries and the potential impacts of science and technology.
- analyze the inter-dependence and potential impacts of scientific and technological developments.
- evaluate social and ethical implications of natural scientific discoveries.
- critically evaluate and responsibly use information from the natural sciences.

***Previous Value***

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

**Content Topic List**

- Introduction
- Scientific Process, Persistent Pollutants
- Energy, Ecosystems, and Population Ecology
- Human Populations
- Biomes & Biodiversity, Water Resources & Food production
- Protecting Earth's Freshwater, Protecting Earth's Atmosphere
- Nonrenewable Energy, Fossil Fuels and Climate Change
- Renewable & Alternative Energy
- Community Ecology
- Sustainable Living

***Previous Value***

- *Introduction, Basic Math, Metric & Elements*
- *Scientific Process, Persistent Pollutants*
- *Energy & Ecosystems, Population Ecology*
- *Human Populations*
- *Earth's Climate & Major Biomes, Freshwater Resources*
- *Protecting Earth's Freshwater, Protecting Earth's Atmosphere*
- *Environmental Cost of Coal & Petroleum*
- *Renewable & Alternative Energy*

**Sought Concurrence**

No

## Attachments

- Responses to Panel Recommendations.docx: Responses to Panel

  *(Other Supporting Documentation. Owner: Fries,Sara Nicholson)*
- ENR2100+ENR2101 GE Proposal.docx: GE Application

  *(Other Supporting Documentation. Owner: Fries,Sara Nicholson)*
- Lecture Syllabus ENR2100_final.docx: ENR 2100

  *(Syllabus. Owner: Fries,Sara Nicholson)*

## Comments

- ENR2100:

  1. Contingency - Yes, as panel requested, SENR altered GE Proposal Document to reflect the changes to the syllabi regarding the poster project (moving the project from 2101 to 2100.)

  2. Recommendation - Yes, as panel recommended, SENR updated the syllabus to include most up-to-date Title IX statement *(by Fries,Sara Nicholson on 11/01/2021 11:46 PM)*
- Please see feedback to department sent 10/28/21 RLS *(by Steele,Rachel Lea on 10/28/2021 10:11 AM)*
- Please see Panel feedback email sent 09/21/2021. *(by Hilty,Michael on 09/21/2021 02:55 PM)*
- This is an existing Natural Science GE Course. There is no change to the course other than adjusting the GE Learning Goals and Outcomes to those of the new Natural Science GE, and minor changes to the topic list to improve clarity. This course is grandfathered into the new GE; and combined with ENR 2101 that is submitted as a new course request, will be a 3 + 1 credit hour Natural Science GE. Both courses must be taken to satisfy the Natural Science GE requirement. *(by Osborne,Jeanne Marie on 06/24/2021 04:29 PM)*

## Workflow Information

| Status | User(s) | Date/Time | Step |
|---|---|---|---|
| Submitted | Fries,Sara Nicholson | 06/08/2021 09:58 PM | Submitted for Approval |
| Revision Requested | Osborne,Jeanne Marie | 06/09/2021 03:49 PM | Unit Approval |
| Submitted | Fries,Sara Nicholson | 06/15/2021 03:15 PM | Submitted for Approval |
| Approved | Osborne,Jeanne Marie | 06/24/2021 04:29 PM | Unit Approval |
| Approved | Osborne,Jeanne Marie | 06/24/2021 04:29 PM | SubCollege Approval |
| Approved | Osborne,Jeanne Marie | 06/24/2021 04:31 PM | College Approval |
| Revision Requested | Hilty,Michael | 09/21/2021 02:55 PM | ASCCAO Approval |
| Submitted | Fries,Sara Nicholson | 10/11/2021 09:18 PM | Submitted for Approval |
| Approved | Osborne,Jeanne Marie | 10/13/2021 10:46 AM | Unit Approval |
| Approved | Osborne,Jeanne Marie | 10/13/2021 10:47 AM | SubCollege Approval |
| Approved | Osborne,Jeanne Marie | 10/13/2021 10:47 AM | College Approval |
| Revision Requested | Steele,Rachel Lea | 10/28/2021 10:11 AM | ASCCAO Approval |
| Submitted | Fries,Sara Nicholson | 11/01/2021 11:46 PM | Submitted for Approval |
| Revision Requested | Osborne,Jeanne Marie | 11/02/2021 01:05 PM | Unit Approval |
| Submitted | Fries,Sara Nicholson | 11/02/2021 01:45 PM | Submitted for Approval |
| Approved | Osborne,Jeanne Marie | 11/02/2021 02:01 PM | Unit Approval |
| Approved | Osborne,Jeanne Marie | 11/02/2021 02:01 PM | SubCollege Approval |
| Approved | Osborne,Jeanne Marie | 11/02/2021 02:02 PM | College Approval |
| Pending Approval | Cody,Emily Kathryn<br>Jenkins,Mary Ellen Bigler<br>Hanlin,Deborah Kay<br>Hilty,Michael<br>Vankeerbergen,Bernadette Chantal<br>Steele,Rachel Lea | 11/02/2021 02:02 PM | ASCCAO Approval |

THE OHIO STATE UNIVERSITY

# SYLLABUS
# ENR 2100

Introduction to Environmental Science Lecture
AU22
GE Foundations, Natural Science: 3 credits
All Semesters: In-Person Sections and Online Sections

## COURSE OVERVIEW

ENR 2100 fulfills 3-credits of the General Education (GE) Category Foundations: Natural Science. It is intended to be taken with the 1-credit GE Foundations: Natural Science laboratory titled "Introduction to Environmental Science Laboratory" (ENR2101). Together the ENR2100 lecture (3 credits) and ENR2101 laboratory (1 credit) fulfill 4-credits of the General Education (GE) Category: Foundations, Natural Science.

ENR 2100 will be offered all semesters as both:

1. In-person section that will be taught as a synchronous class that meets 2 to 3 times each week of the semester in a classroom on the campus of Ohio State.

2. Online section that will be taught as an asynchronous self-paced virtual class (100% online) using Carmen.

Students will be able to select the section (i.e., in-person or online) that works best for them. Course content, quizzes, assignments, homework, exams, lectures, expectations, grading will be identical for both the in-person and online sections.

ENR 2100 will utilize multiple online platforms supported by Ohio State. All content, including lectures, slides, demonstrations, presentations, notes, videos, readings will be delivered through Carmen (https://carmen.osu.edu) or Ohio State Libraries (https://library.osu.edu/). Students will have free access to all course content for the entire semester.

ENR 2100 is self-paced to give students the ability to access and satisfy requirements within a flexible time frame. Lectures are broken down into weekly modules and students are given 1 week (7 days) to complete each module. All assignments are open book. However, all course requirements must be completed independently by the enrolled student. All assignments, quizzes and exams must be completed using Carmen.

A free open-textbook, free readings (e.g., journal articles, newspaper articles) and free documentaries will be provided through Carmen, Ohio State PressBooks, Ohio State Libraries, YouTube, academic institutions, professional organizations, and governmental agencies.

## Instructor

Instructor: Dr. Brian H. Lower, PhD

Teaching Associate: Ms. Ella M. Weaver, MENR

Course Email: ENR2100@osu.edu

Phone: 614-292-2265 (SENR front desk)

Office Hours: Times posted on Carmen, can meet in-person or by Zoom

## Course description

ENR 2100 fulfills 3-credits of the General Education (GE) Category Foundations: Natural Science. Students will engage in theoretical and empirical study within the natural sciences. Students will gain an appreciation of modern principles, theories, methods and modes of inquiry used generally across the natural sciences. Students will discern the relationship between science and technology, while appreciating the implications of scientific discoveries and the potential impacts of science and technology to address problems of the contemporary world.

## Course Prerequisites

There are no required prerequisites for enrolling in ENR 2100. Upon enrolling in this introductory college-level course, students are expected to have basic knowledge of the natural sciences as commonly taught at the pre-University level. This course is a prerequisite to several higher-level ENR courses offered by the School of Environment and Natural Resources. Please speak to your academic advisor for more information.

## Expected learning outcomes

### NEW GENERAL EDUCATION CURRICULUM

This course fulfills the General Education (GE) rational for the Foundations, Natural Science category. ENR 2101 fulfills Specific Goals 1 and 2 Natural Science and Expected Learning Outcome 1.1, 1.2, 2.1, 2.2 and 2.3.

When this 3-credit ENR 2100 lecture is taken in combinations with the 1-credit ENR 2101 laboratory, together these 4-credits (i.e., 1-credit laboratory + 3-credit lecture) fulfills ALL Goals (i.e., Goals 1 and

2) and ALL Expected Learning Outcomes (i.e., ELOs 1.1, 1.2, 1.3, 2.1, 2.2, 2.3) for the Foundations, Natural Science GE category.

## ENR 2100 FULFILLS

GOAL 1: Successful students will engage in theoretical and empirical study withing 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.

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.

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.

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

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

## PRIOR GENERAL EDUCATION CURRICULUM

The course fulfils 3-credits of the General Education (GE) category Natural Science, Biological Science. Natural Science coursework fosters students' understanding of the principles, theories, and methods of modern science, the relationship between science and technology, the implications of scientific discoveries and the potential of science and technology to address problems of the contemporary world.

# HOW THIS COURSE WORKS

**Mode of delivery:** ENR 2100 will be offered all semesters as both in-person section and online section. Students will be able to select the section (i.e., in-person or online) that works best for them.

1. The in-person section will be taught as a synchronous class that meets 2 to 3 times each week of the semester in a classroom on the campus of Ohio State.

2. The online section is a 100% asynchronous online course. There are no required sessions when students must be logged in to Carmen at a scheduled time.

**Pace of online activities:** This course is divided into **weekly modules**. Students are expected to keep pace with weekly deadlines but may schedule their efforts freely within that time frame. Course content, quizzes, assignments, homework, exams, lectures, expectations, grading will be identical for both the in-person and online sections.

**Credit hours and work expectations:** This is a **3-credit-hour course**. According to Ohio State policy, students should expect to spend 9 hours per week of the average student's time required to earn the average grade of "C" in this lab. A student's 9-hour-workweek includes direct instruction, watching videos, taking notes, studying, readings, assignments, quizzes and exams.

**Attendance and participation requirements:** Attendance is based on your online activity and participation in Carmen. You are expected to log in to the course in Carmen every week. During most weeks you will probably log in many times. Students who are enrolled in the in-person section of ENR 2100 are expected to attend in-person lectures each week. If you have a situation that might cause you to miss an entire week of class, please email ENR2100@osu.edu to discuss adjusted timelines.

# COURSE MATERIALS AND TECHNOLOGIES

## Textbook

### RECOMMENDED/OPTIONAL

**Environmental Science for a Changing World**, 1st Edition (2013) or 2nd Edition (2014) or 3rd edition (2018), by Houtman, Karr, and Interlandi, published by W.H. Freeman. Any edition is acceptable for class. We recommend renting or purchasing the textbook from any online textbook site if you feel that this will enhance your learning experience. Exam, assignment, and quiz questions are NOT directly based on material from the textbook.

**Scientific Posters: A Learner's Guide**, this is a free textbook for our class and available at https://ohiostate.pressbooks.pub/scientificposterguide/

## Course technology

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

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

- **Phone:** 614-688-HELP (4357)
- **Email:** 8help@osu.edu
- **TDD:** 614-688-8743

### BASELINE TECHNICAL SKILLS FOR ONLINE COURSES

- Basic computer and web-browsing skills
- Basic skills with Microsoft Word, Excel and PowerPoint
- Navigating Carmen: for questions about specific functionality, see the Canvas Student Guide.

### REQUIRED EQUIPMENT

- Computer: current Mac (OS X) or PC (Windows 7+) with high-speed internet connection
- Other: a mobile device (smartphone or tablet) or landline to use for BuckeyePass authentication

### REQUIRED SOFTWARE

- Microsoft Office 365: All Ohio State students are now eligible for free Microsoft Office 365 ProPlus through Microsoft's Student Advantage program. Full instructions for downloading and installation can be found at go.osu.edu/office365help.

### CARMEN ACCESS

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

- Register multiple devices in case something happens to your primary device. Visit the BuckeyePass - Adding a Device help article for step-by-step instructions.
- 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.
- Download the Duo Mobile application to all of your registered devices for the ability to generate one-time codes in the event that you lose cell, data, or Wi-Fi service.

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

# GRADING AND FACULTY RESPONSE

## How your grade is calculated

| ASSIGNMENT CATEGORY | POINTS |
|---|---|
| 6 Poster Assignments (each worth 4.17%) | 25% |
| 6 Quizzes (each worth 4.17%) | 25% |
| 1 Midterm Exam | 25% |
| 1 Final Exam | 25% |
| Total | **100%** |

**See course schedule for due dates. Everything is due by 11:59PM on Sundays.*

**A. Poster Assignments** (6 assignments per semester, 4.17% each, 25% total): Students will work throughout the semester to complete a scientific poster and give a poster presentation. The poster will be broken into 6 smaller assignments, all of which will be submitted on Carmen. Each assignment will be unique and worth 4.17% of a student's Final Grade in ENR 2100. Assignments will be open on Carmen for 14 days to accommodate all students. Readings, journal articles, data sets, documentaries that are required to complete poster assignments will all be free through Ohio State Libraries or links to these materials will be provided on Carmen. These assignments are open-book, however, a student must complete the work on their own without help from peers.

**Academic integrity and collaboration:** Your written poster assignments should be your own original work. Formatting should follow what is provided in Carmen and the Scientific Posters: A Learner's Guide. You are encouraged to ask a trusted person to proofread your assignments before you turn them in but no one else should revise or rewrite your work. Plagiarized work will result in a grade of 0% and may be reported to Ohio State Academic Affairs.

ENR 2100 - Objectives of poster assignments:

1. Locate primary source journal article using Ohio State Libraries, Web of Science, PubMed or another search engine.
2. Understand how journal articles are organized (e.g., abstract, introduction, results) and how to read an article, find information, interpret data and become proficient at reading and understanding figures, graphs and tables.
3. To make informed decisions and develop potential solutions to environmental issues based on published scientific articles, results and data.
4. Develop skills and gain experience in scientific writing and how to effectively present data using figures and tables and verbal communication.
5. Gain an appreciation for how discoveries in natural science often require collaboration between many scientists from many different specializations.

ENR 2100 - For each poster assignment, students will be required to:

1. Answer short-answer and essay-style questions. These questions will be based on readings, documentaries or data provided by academic or governmental institutions. Some questions will require students to use formulas and equations, complete calculations, calculate statistical values, plot data, produce tables, and describe procedures and experimental approaches.
2. Use reasoning skills to propose method, protocol or technique that could be utilized to solve an environmental problem.
3. Evaluate the economic, social and ethical implications of scientific discoveries and new technologies.

**B. Quizzes** (5 quizzes per semester, 4.17% each, 25% total): Students will complete a total of 5 quizzes each semester, all of which will be completed using Carmen. Quizzes will be open for 7 days to accommodate all students. Each quiz will contain 10-20 questions that focus on 1-2 weekly course modules. Students will have two attempts and we will keep the highest score between both attempts. Each attempt will contain new questions and answers. Each quiz will be unique and worth 4.17% of the Final Grade for ENR 2100. These quizzes are open-book, however, students must complete the work on their own without help from peers. Quizzes will focus on readings and course materials.

ENR 2100 - Objectives of quizzes:

1. Understand how data is collected by scientists, why replication is important in experiments. Analyze the process of scientific inquiry, principles, theories and methods of natural science.
2. Critically evaluate and responsibility use information from the natural sciences. Analyze data using statistics.
3. Learn how our knowledge and understanding about a scientific discipline has changed over time through the generation of testable explanations and predictions, newfound knowledge, new techniques and new instrumentation.
4. Recognize social and ethical implications of scientific discoveries and understand the potential of science and technology to address problems of the contemporary world.

ENR 2100 - For each quiz, students will be required to:

1. Read articles, book chapters and/or technical reports provided by instructor on Carmen or Ohio State Libraries. Watch short documentaries or instructional videos. There will be no cost to the student, all readings and videos will be free.
2. Answer multiple-choice, true/false, matching and fill-in-the-blank questions. These questions will be based on the articles and book chapters that students read, documentaries and instructional videos that students watch and data that students collect and analyze.

**C. Exams (2 exams per semester, 25% each, 50% total)**: Students will complete a total of 2 exams each semester. Each exam will consist of 50 questions that focus on 7 weekly course modules. Exams will be completed using Carmen and open for 7 days to accommodate all students. Each

exam will be unique and worth 25% of a student's Final Grade for ENR 2100. Students will have two attempts and we will keep the highest score between both attempts. Each attempt will contain new questions and answers. Exams will focus on readings, lecture slides and lecture presentations. Exams are open-book, however, students must complete the work on their own without help from peers.

ENR 2100 - Objectives of exams:

1. Evaluate student learning at the end of weekly course modules.
2. Assess reading comprehension, problem solving skills, critical thinking and vocabulary usage.
3. Assess understanding of key concepts, principles, theories, and methods.

ENR 2100 - For each exam, students will be required to:

1. Answer multiple-choice, true/false, matching and fill-in-the-blank questions. These questions will be based on lecture slides and lecture presentations given by the instructor.
2. Analyze and interpret data presented in figures, graphs and tables.
3. Use reasoning skills to solve problems using mathematics and statistics.
4. Make quantitative comparisons of data presented in graphs and tables

# Late policy

### Poster Assignments and Quizzes:

Assignments and quizzes will be submitted or completed through Carmen within a flexible time frame of 1 week for quizzes and 2 weeks for poster assignments. These can be completed at any time within the 1-week submission window. Students will be permitted to work 1-week ahead if they choose to do so. Submission after the due date for assignments will result in a **10% deduction per day from the overall grade. The submission window will automatically close after 10 days from the due date and will not reopen.** Submissions that are sent by email will not be accepted. All assignments must be submitted on Carmen. All quizzes must be taken on Carmen. Students will be given 2 attempts to take a quiz during these 7 days. We will keep the highest grade between both attempts.

### Exams:

Exams will be taken on Carmen within a flexible time frame of approximately 7 days. Exams can be taken at any time within these 7 days. Students will be given 2 attempts to take an exam during these 7 days. We will keep the highest grade between both attempts. **Late submissions will not be**

**accepted and will result in a grade of 0%. Missed exams will result in a grade of 0%.** All exams must be taken on Carmen. We will not accept exams that are sent by email.

Extenuating circumstances sometimes occur. Students who miss an assessment due to a legitimate reason (e.g., emergency, hospital visit, extended illness) should contact their instructor at ENR2100@osu.edu to request permission to make-up an assignment. The instructor will determine if an excuse is acceptable. If approved, the student will not be penalized -10% per day. If approved, the student must make up the missed assessment within a time frame specified by the instructor. Since this course has flexible due dates with assignments open for a period of days to weeks on Carmen, acceptable excuses typically entail lengthy illness, extended hospitalization or other serious issues with official documentation.

The due date for each assignment is provided on Carmen on the very first day of the semester to help students plan their semester. It is the responsibility of the student to know the due date for all assignments. We do this to accommodate students' busy schedules. Students are expected to plan their semester accordingly. Technical glitches such as a bad internet connection, faulty internet browser, a computer that "crashes", a battery that runs out of power, an obnoxious roommate, software malfunction, a flat tire, etc. are not acceptable excuses for missing a deadline. The instructor does not accept assignments by e-mail, and these will be deleted and not graded. Assignments should always be completed and/or submitted using Carmen.

## Grading scale

| Letter Grade | % | Mastery |
|---|---|---|
| A | 93.00–100.0 | Demonstrates complete mastery of all learning outcomes as demonstrated on assessments; participates in all aspects of the lab in a positive and timely manner. |
| A- | 90.00–92.99 | |
| B+ | 87.00–89.99 | Demonstrates mastery of at least two learning outcomes as demonstrated on assessments; participates in all aspects of the lab in a positive and timely manner. |
| B | 83.00–86.99 | |
| B- | 80.00–82.99 | |
| C+ | 77.00–79.99 | Demonstrates mastery of at least one learning outcome as demonstrated on assessments; participates in some aspects of the lab in a positive and timely manner. A minimum grade of "C-" will be earned by a student making a good faith effort on all aspects of the lab and demonstrated engagement. |
| C | 73.00–76.99 | |
| C- | 70.00–72.99 | |
| D+ | 67.00–69.99 | Fails to meet mastery of any learning outcome such that student will not be successful in higher-level course; did not complete assessments; demonstrated lack of engagement, did not |
| D | 60.00–66.99 | |

| | | |
|---|---|---|
| E | 00.00–59.99 | participate in lab, did not complete assessment in a timely fashion. |

## Instructor feedback and response time

- **Grading and feedback:** Multiple-choice quizzes and exams will be graded immediately, and students will know their grade immediately after they submit a quiz or exam. For written assignments, these will be graded by hand, and you can expect a grade and feedback within **7-10 days**.
- **Email (preferred contact method):** Instructors check and reply to emails daily. Please email ENR2100@osu.edu as this is the email dedicated to the course. Please use your OSU email account to send emails to this account. We will reply to emails within **24 hours on days when class is in session at the university**.

## Fair assessment practices

We understand that grades are important to our students, and we strive to have clearly stated learning outcomes. We work hard to ensure that student grades are calculated in a fair and accurate manner. Things that we do to ensure that the assessments we administer are fair and accurate:

1. We use grading rubrics to score all poster assignments. These rubrics provide clear grading expectations for varying levels of mastery. Students are able to see a grading rubric before they start working on an assignment so that performance expectations are clearly understood.

2. We evaluate the outcomes of assignments by checking all questions and all answers after an assignment closes to check for mistakes. Typically, we want to see that each question was answered correctly approximately 80% of the time. This 80% threshold indicates that a question was a fair assessment of the course material. If this threshold is not met, we do not count the question or we provide students with another opportunity to answer a new question.

3. We use different kinds of assessments, and each assessment type is weighted equally. We use written poster assignments, quizzes and exams to calculate a student's grade, and each is worth the same value for a student's Final Grade for the course. This has the impact of increasing a student's course grade by not weighing one assignment more than another.

4. We encourage students to do well on assessments by making all assignments, quizzes and exams open-book and allowing students to complete all assignments from anywhere.

5. We encourage students to do well on assessments by providing students an extended period of time (e.g., 7 days) to complete assignments.

6. We accept late assignments with a small penalty of -10% deduction per day late. This ensures that a student would not receive an automatic grade of 0% for missing an assignment.

7. We provide clearly stated learning outcomes for our modules that are aligned to course content and assessments so that students better understand why they are completing an activity.

If you have questions about these practices or how your grade is calculated throughout the semester, please contact your instructor at ENR2100@osu.edu.

# OTHER COURSE POLICIES

## Academic integrity policy

### POLICIES FOR THIS ONLINE COURSE

- **Quizzes and exams**: All quizzes and exams are open book. You can use notes, lecture slides, videos, documentaries, the Internet, Google, calculators, books, articles. However, you must complete the midterm and final exams yourself, without any external help or communication. You cannot use a group message App during the exam. You cannot share questions and answers.
- **Poster assignments**: All poster assignments are open book. You can use notes, lecture slides, videos, documentaries, the Internet, Google, calculators, books, articles. Your written assignments should be your own original work. You can ask a trusted person to proofread your assignments before you turn them in, but this person should not revise or rewrite your work. Dr. Lower uses Turn-It-In software to check for plagiarism in all written assignments. Plagiarized work will result in a grade of 0%.
- **Reusing past work**: In general, you are prohibited in university courses from turning in work from a past class to your current class, even if you modify it. If you want to build on past research or revisit a topic you've explored in previous courses, please discuss the situation with your instructor (ENR2100@osu.edu).

### 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*, 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:

- The Committee on Academic Misconduct web pages (COAM Home)
- *Ten Suggestions for Preserving Academic Integrity (Ten Suggestions)*
- *Eight Cardinal Rules of Academic Integrity* (www.northwestern.edu/uacc/8cards.htm)

## Copyright disclaimer

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

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

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

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

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

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

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

**Diversity Statement**

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

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

- https://odi.osu.edu/
- https://odi.osu.edu/racial-justice-resources
- https://odi.osu.edu/focus-on-racial-justice

- http://mcc.osu.edu/

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

## Your mental health

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

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

# ACCESSIBILITY ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES

## Requesting accommodations

The university strives to make all learning experiences as accessible as possible. In light of the current pandemic, students seeking to request COVID-related accommodations may do so through the university's request process, managed by Student Life Disability Services.  If you anticipate or experience academic barriers based on

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

**Several accessibility accommodations are already built into our course for all students (see list below).** We work to provide these accommodations to all students and want to make sure all students have a positive learning experience in our course. Please send documentation from SLDS to ENR2100@osu.edu in order to establish any further accommodations needed during the semester.

1. **Extended Time (1.5x or 2x) Assignments: SLDS-REGISTERED STUDENTS SHOULD EMAIL THEIR PLAN**. A student must send their completed SLDS paperwork to the instructor at ENR2100@osu.edu. Once accommodations are verified, we will setup all assessments accordingly.
2. **Note Taking Assistance/Recording: PROVIDED TO ALL STUDENTS.** We provide all lab presentation slides via Carmen. Fully typed transcripts for lab presentations are provided via YouTube. Students can copy/paste the entire typed transcript anytime using any word processing software (e.g., Microsoft Word) directly from YouTube for all videos. These transcripts serve as written notes for all lectures.
3. **Distraction Reduced Testing Space, Small Group Setting: PROVIDED TO ALL STUDENTS.** Students can take all assessments on Carmen from anywhere. Students who are registered with Office of Student Life Disability Services (SLDS) and require distraction reduced testing space should make their own accommodations.
4. **Closed-captioning and transcripts: PROVIDED TO ALL STUDENTS.** All required multimedia (e.g., videos, podcasts) are accompanied with closed captioning or transcripts that meet ADA requirements. Most times these features are provided by the content producer (e.g., The New York Times, PBS, NPR, Nature, National Geographic). However, you may find select transcripts produced by the course team and linked in Carmen.
5. **Flexible due dates for assignments: PROVIDED TO ALL STUDENTS.** All quizzes and exams are open on Carmen for a period of 7 days and all poster assignments are open on Carmen for a period of 14 days to accommodate students' busy schedules. Students can complete these assignments anytime while the window is open. Extenuating circumstances sometimes occur. Students who miss a due date for a legitimate reason (e.g., emergency,

hospital visit, extended illness, unforeseen health issue, homelessness) should contact the instructor before the due date by email (ENR2100@osu.edu) to request additional time. The instructor will determine if an excuse is acceptable.

# LECTURE SCHEDULE

| Week | Topic | Assessment | Due Date |
|---|---|---|---|
| 1 | Introduction | Quiz 1 | Sunday at 11:59PM |
| 2 | Scientific Process | Poster Assignment 1 | Sunday at 11:59PM |
| 3 | Persistent Pollutants | Quiz 2 | Sunday at 11:59PM |
| 4 | Human Populations | Poster Assignment 2 | Sunday at 11:59PM |
| 5 | Energy, Ecosystems and Population Ecology | Poster Assignment 3 | Sunday at 11:59PM |
| 6 | Community Ecology | --- | |
| 7 | Wrap Up and Prepare for Exam | Midterm Exam | Sunday at 11:59PM |
| 8 | Biomes and Biodiversity | Quiz 3 | Sunday at 11:59PM |

| Week | Topic | Assessment | Due Date |
|---|---|---|---|
| 9 | Water Resources and Food Production | Poster Assignment 4 | Sunday at 11:59PM |
| 10 | Protecting Earth's Water | Quiz 4 | Sunday at 11:59PM |
| 11 | Protecting Earth's Atmosphere | Quiz 5 | Sunday at 11:59PM |
| 12 | Nonrenewable Energy, Fossil Fuels and Climate Change | Poster Assignment 5 | Sunday at 11:59PM |
| 13 | Alternative and Renewable Energy | Poster Assignment 6 | Sunday at 11:59PM |
| 14 | Sustainable Living | Quiz 6 | Sunday at 11:59PM |
| 15 | Wrap Up and Prepare for Exam | Final Exam | Set by University |

# Application for GE Foundations, Natural Science: 4 credits

1. ENR 2100 - Introduction to Environmental Science Lecture (3 credits)
2. ENR 2101 - Introduction to Environmental Science Laboratory (1 credit)

## A. Foundations

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

ENR 2100 and ENR 2101 are taught by the School of Environment and Natural Resources (SENR). When taken together (ENR 2100 + ENR 2101) will fulfill 4 credits of the GE Foundations, Natural Science category. Introduction to Environmental Science Lecture (ENR 2100) is a 3-credit course that is currently taught at Ohio State as a Natural Science, Biological Science GE course. Introduction to Environmental Science Lab (ENR 2101) is a brand new 1-credit online laboratory. Both ENR2100 and ENR2101 follow a similar sequence in topics that introduce a wide breadth of study within this highly interdisciplinary field.

ENR 2100 will fulfill Natural Science Goals 1 and 2, and Expected Learning Outcomes (ELOs) 1.1, 1.2, 2.1, 2.2, and 2.3. ENR 2101 will fulfill Natural Science Goal 1 and ELO 1.3. When the 1-credit ENR 2101 laboratory is taken in combination with the 3-credit ENR 2100 lecture, together these 4-credits (i.e., 1-credit lab + 3-credit lecture) fulfills all Goals (i.e., Goals 1 and 2) and all ELOs (i.e., ELOs 1.1, 1.2, 1.3, 2.1, 2.2, 2.3) for the Foundations, Natural Science GE category.

SENR will offer ENR 2100 and ENR 2101 separately as a 3-credit lecture and 1-credit laboratory, rather than combining them together as a 4-credit course. We want to do this because (1) it will allow for greater flexibility for students when scheduling courses, (2) ENR 2101 will be offered exclusively online, while ENR 2100 will be offered as both an in-person synchronous course and an online asynchronous course each semester so that students can choose to take ENR 2100 in-person or online and (3) to accommodate SENR majors who will be required to take ENR 2100 but will not be required to take ENR 2101. Requiring SENR majors to take 4-credits (instead of 3-credits) would put them over the credit limit for earning a B.S. degree and make it difficult for them to finish their B.S. degree in 4 years. In addition, students earning a B.S. degree in SENR are already required and will continue to be required to take natural science labs in biology, chemistry, physics and soil science.

ENR 2100 and ENR 2101 will foster an understanding of the principles, theories, and methods of modern science, the relationship between science and technology, the implications of scientific discoveries and the potential of science and technology to address problems of the contemporary world. Students will develop a foundational knowledge and understanding of natural sciences to evaluate the economic, social and ethical implications of scientific discoveries and new found technologies. Students will learn that environmental science is an interdisciplinary field of study,

which combines practices, theories and methods from the biological sciences, physical sciences and social sciences. Students will develop an understanding for the complex nature of Earth systems, how humans are part of and rely on these natural systems, how human activities contribute to environmental problems, and how changes in human activities, behaviors, beliefs and values can solve environmental problems. Developing scientific literacy skills to encourage life-long learning, will be emphasized throughout the course with high-impact readings, documentaries and the opportunity for students to practice and apply these skills through writing assignments and the creation and presentation of a scientific poster on contemporary topics in environmental science.

ENR 2100 and ENR 2101 will focus on similar topics and follow similar course designs. Course topics will be divided into 13 learning modules (see list below). One module will be taught approximately each week of the semester. Course materials for ENR 2100 and ENR 2101 will be completely free to all students and consist of lecture slides, lecture presentations, lecture transcripts, closed-caption lecture videos, study guides, self-check quizzes, vocabulary lists, journal articles, book chapters, documentaries, software, technical reports, grading rubrics, and data sets. Course materials will be provided to students through Carmen, the Ohio State Libraries, academic, professional or government websites and online open-source textbooks. Course materials have gone through extensive testing and usage to ensure that they meet accessibility guidelines required by the Ohio State Digital Accessibility Policy. Students who receive accommodations through Student Life Disability Services will receive all required accommodations.

Course Modules for ENR 2100 and ENR 2101:

1. Scientific Process and Experimental Design
2. Natural Science Literacy
3. Persistent Pollutants
4. Human Populations
5. Energy, Ecosystems and Population Ecology
6. Community Ecology
7. Biomes and Biodiversity
8. Water Resources and Food Production
9. Protecting Earth’s Water
10. Protecting Earth’s Atmosphere
11. Nonrenewable Energy, Fossil Fuels and Climate Change
12. Alternative and Renewable Energy
13. Sustainable Living

## 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.**

**GOAL 1 will be fulfilled in ENR 2100 (Lecture) and ENR 2101 (Laboratory)**

Course Modules for ENR 2100 and ENR 2101:

1. Scientific Process and Experimental Design
2. Natural Science Literacy
3. Persistent Pollutants
4. Human Populations
5. Energy, Ecosystems and Population Ecology
6. Community Ecology
7. Biomes and Biodiversity
8. Water Resources and Food Production
9. Protecting Earth's Water
10. Protecting Earth's Atmosphere
11. Nonrenewable Energy, Fossil Fuels and Climate Change
12. Alternative and Renewable Energy
13. Sustainable Living

**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)*

**ELO 1.1 will be fulfilled in ENR 2100 (Lecture)**

**ENR 2100 - Exams (2 exams per semester, 25% each, 50% total)**: Students will complete a total of 2 exams each semester. Each exam will consist of 50 questions that focus on 7 weekly course modules. Exams will be completed using Carmen and open for 7 days to accommodate all students. Each exam will be unique and worth 25% of a student's Final Grade for ENR 2100. Students will have two attempts and we will keep the highest score between both attempts. Each attempt will contain new questions and answers. Exams will focus on readings, lecture slides and lecture presentations. Exams are open-book, however, students must complete the work on their own without help from peers.

ENR 2100 - Objectives of exams:

1. Evaluate student learning at the end of weekly course modules.
2. Assess reading comprehension, problem solving skills, critical thinking and vocabulary usage.
3. Assess understanding of key concepts principles, theories, and methods.

ENR 2100 - For each exam, students will be required to:

1. Answer multiple-choice, true/false, matching and fill-in-the-blank questions. These questions will be based on lecture slides and presentations given by the instructor.
2. Analyze and interpret data presented in figures, graphs and tables.
3. Use reasoning skills to solve problems using mathematics and statistics.
4. Make quantitative comparisons of data presented in graphs and tables.

**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)*

**ELO 1.2 will be fulfilled in ENR 2100 (Lecture)**

**ENR 2100 - Quizzes (6 quizzes per semester, 4.17% each, 25% total)**: Students will complete a total of 6 quizzes each semester, all of which will be completed using Carmen. Quizzes will be open for 7 days to accommodate all students. Each quiz will contain 10-20 questions that focuses on 1-2 weekly course modules. Students will have two attempts and we will keep the highest score between both attempts. Each attempt will contain new questions and answers. Each quiz will be unique and worth 4.17% of a student's Final Grade for ENR 2100. These quizzes are open-book, however, students must complete the work on their own without help from peers. Quizzes will focus on readings and course materials.

ENR 2100 - Objectives of quizzes:

1. Understand how data is collected by scientists, why replication is important in experiments. Analyze the process of scientific inquiry, principles, theories and methods of natural science.
2. Critically evaluate and responsibility use information from the natural sciences. Analyze data using statistics.
3. Learn how our knowledge and understanding about a scientific discipline has changed over time through the generation of testable explanations and predictions, newfound knowledge, new techniques and new instrumentation.
4. Recognize social and ethical implications of scientific discoveries and understand the potential of science and technology to address problems of the contemporary world.

ENR 2100 - For each quiz, students will be required to:

1. Read articles, book chapters and/or technical reports provided by instructor on Carmen or Ohio State Libraries. Watch short documentaries or instructional videos. There will be no cost to the student, all readings and videos will be free.
2. Answer multiple-choice, true/false, matching and fill-in-the-blank questions. These questions will be based on the articles and book chapters students read, documentaries and instructional videos students watch and data that students collect and analyze.

**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)*

**ELO 1.3 will be fulfilled in ENR 2101 (Laboratory)**

**ENR 2101 - Weekly Participation Activities (15 activities per semester, 2% each, 30% total):** Each student will complete a total of 15 weekly participation assignments this semester (1 activity per week), all of which will be submitted on Carmen. Each activity will be open for 7 days to accommodate all students. Each activity will be unique and worth 2% of the student's Final Grade for ENR 2101. These assignments are open-book, however, a student must complete the work on their own without help from peers. A student who demonstrates good faith effort on all aspects of the weekly participation activity and demonstrated engagement in the activity will receive full credit.

ENR 2101 - Objectives of weekly participation activities:

1. Communicate your experiment results to your team members.
2. Reflect on the experimental process.
3. Wrap up each lab through a reflective, metacognitive, or so what activity.
4. To serve as a formal weekly check-in that promotes and encourages peer-to-peer interaction.

ENR 2101 - For each weekly participation activity, students will be required to:

1. Participate in a weekly group discussion on Carmen through written, audio, or video posts. Respond to a structured prompt: For part 1 of each lab the activity will require you to share your data with your group members and reflect on a key component of the experimental process. For part 2 of each lab, the activity will serve to wrap up the lab. The wrap up activity will vary each week depending on the nature of the lab. Wrap up activities may include a reflection on the data analysis, conducting cursory research on a topic related to the lab, or sharing a component of your data analysis such as a graph.

**Written Laboratory Assignments (14 assignments per semester, 5% each, 70% total**): You will complete a total of 14 laboratory assignments over 7 labs this semester, all of which will be submitted on Carmen and due on Sundays at 11:59PM. Each lab will be conducted over two weeks and comprise of two related laboratory assignments. For example, Lab Assignment 1 and Lab Assignment 2 will both pertain to the first lab on Experimental Design (see course schedule within syllabus). Within the first lab assignment, you will collect and report data. Within the second lab assignment you will summarize and analyze class data collected in the first lab

assignment. Each assignment will be unique and worth 5% of your Final Grade for the course. Therefore, each lab will be worth 10% of your Final Grade (5% x 2 assignments = 10%) These assignments are open-book. Assignments will be available on Carmen for 7 days to accommodate all students. Readings, data sets, and instructional videos that are required for laboratory assignments will all be free and provided through Carmen.

Objectives of written laboratory assignments:

1. Describe common instruments, equipment, techniques and methods used by scientists to collect data. Learn about protocols, operation, benefits and limitations of each.
2. Use described methods to collect data and report data to peer group.
3. Analyze consolidated peer group data through calculations (i.e., mean, p-value, standard deviation).
4. Summarize consolidated peer group data through visualizations (i.e., graphs, charts, tables).

Each laboratory will consist of two parts (Part 1 and Part 2) that will be completed over two weeks. Part 1 should be completed by you, the student, on your own. Part 2 should be completed as part of your lab group.

1. Part 1 (1st week) - Learn about the lab procedure and how scientists have used the technique or methods by reading peer-reviewed literature and watching instructional videos provided by your instructor. Execute laboratory experiments at home, collect and report standardized data to your instructor via a Carmen assignment or quiz. Data and results will also be reported to your peer group via the week's participation activity.
2. Part 2 (2nd week) – Gather your lab group's data from the participation activity submitted for Part 1 of the lab. Consolidate this data in a Microsoft Excel lab template. Analyze grouped data by performing calculations with Microsoft Excel. Interpret and summarize results by creating tables, graphs, and answering short-answer questions. These questions will be based on data that your group collected. You will be asked to analyze data, and answer questions about the experiments that you conducted at home.

**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.**

**GOAL 2 will be fulfilled in ENR 2100 (Lecture)**

Course Modules for ENR 2100 and ENR 2101:

1. Scientific Process and Experimental Design
2. Natural Science Literacy
3. Persistent Pollutants
4. Human Populations
5. Energy, Ecosystems and Population Ecology
6. Community Ecology
7. Biomes and Biodiversity
8. Water Resources and Food Production
9. Protecting Earth's Water
10. Protecting Earth's Atmosphere
11. Nonrenewable Energy, Fossil Fuels and Climate Change
12. Alternative and Renewable Energy
13. Sustainable Living

**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)*

**ELO 2.1 will be fulfilled in ENR 2100 (Lecture)**

**ENR 2100 - Exams (2 exams per semester, 25% each, 50% total)**: Students will complete a total of 2 exams each semester. Each exam will consist of 50 questions that focus on 7 weekly course modules. Exams will be completed using Carmen and open for 7 days to accommodate all students. Each exam will be unique and worth 25% of a student's Final Grade for ENR 2100. Students will have two attempts and we will keep the highest score between both attempts. Each attempt will contain new questions and answers. Exams will focus on readings, lecture slides and lecture presentations. Exams are open-book, however, students must complete the work on their own without help from peers.

ENR 2100 - Objectives of exams:

1. Evaluate student learning at the end of weekly course modules.
2. Assess reading comprehension, problem solving skills, critical thinking and vocabulary usage.
3. Assess understanding of key concepts principles, theories, and methods.

ENR 2100 - For each exam, students will be required to:

1. Answer multiple-choice, true/false, matching and fill-in-the-blank questions. These questions will be based on lecture slides and lecture presentations given by the instructor.
2. Analyze and interpret data presented in figures, graphs and tables.
3. Use reasoning skills to solve problems using mathematics and statistics.
4. Make quantitative comparisons of data presented in graphs and tables.

**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)*

**ELO 2.2 will be fulfilled in ENR 2100 (Lecture)**

**ENR 2101 - Scientific Poster Assignments (6 assignments per semester, 4.17% each, 25% total)**: Students will complete a total of 6 scientific poster assignments this semester, all of which will be submitted on Carmen. Each assignment will be unique and worth 4.17% of a student's Final Grade for ENR 2101. These assignments are open-book, however, students must complete the work on their own without help from peers. An open textbook titled "Scientific Posters, A Learners Guide" will serve as a reference as students complete poster assignments: https://ohiostate.pressbooks.pub/scientificposterguide/. This textbook is free to all students.

ENR 2100 - Objectives of scientific poster assignments:

1. Locate primary source journal article using Ohio State Libraries, Web of Science, PubMed or another search engine.
2. Understand how journal articles are organized (e.g., abstract, introduction, results) and how to read an article, find information, interpret data and become proficient at reading and understanding figures, graphs and tables.
3. To make informed decisions and develop potential solutions to environmental issues based on published scientific articles, results and data.
4. Develop skills and gain experience in scientific writing and how to effectively present data using figures and tables and verbal communication.
5. Gain an appreciation for how discoveries in natural science often require collaboration between many scientists from many different specializations.

ENR 2100 - For each poster assignment, students will be required to:

1. Answer short-answer and essay-style questions. These questions will be based on readings, documentaries or data provided by academic or governmental institutions. Some questions will require students to use formulas and equations, complete calculations, calculate statistical values, plot data, produce tables, and describe procedures and experimental approaches.
2. Use reasoning skills to propose method, protocol or technique that could be utilized to solve an environmental problem.
3. Evaluate the economic, social and ethical implications of scientific discoveries and new technologies.

**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)*

**ELO 2.3 will be fulfilled in ENR 2100 (Lecture)**

**ENR 2100 - Quizzes (6 quizzes per semester, 4.17% each, 25% total)**: Students will complete a total of 6 quizzes each semester, all of which will be completed using Carmen. Quizzes will be open for 7 days to accommodate all students. Each quiz will contain 10-20 questions that focuses on 1-2 weekly course modules. Students will have two attempts and we will keep the highest score between both attempts. Each attempt will contain new questions and answers. Each quiz will be unique and worth 4.17% of the Final Grade for ENR 2100. These quizzes are open-book, however, students must complete the work on their own without help from peers. Quizzes will focus on readings and course materials.

ENR 2100 - Objectives of quizzes:

1. Understand how data is collected by scientists, why replication is important in experiments. Analyze the process of scientific inquiry, principles, theories and methods of natural science.
2. Critically evaluate and responsibility use information from the natural sciences. Analyze data using statistics.
3. Learn how our knowledge and understanding about a scientific discipline has changed over time through the generation of testable explanations and predictions, newfound knowledge, new techniques and new instrumentation.
4. Recognize social and ethical implications of scientific discoveries and understand the potential of science and technology to address problems of the contemporary world.

ENR 2100 - For each quiz, students will be required to:

1. Read articles, book chapters and/or technical reports provided by instructor on Carmen or Ohio State Libraries. Watch short documentaries or instructional videos. There will be no cost to the student, all readings and videos will be free.
2. Answer multiple-choice, true/false, matching and fill-in-the-blank questions. These questions will be based on the articles and book chapters that students read, documentaries and instructional videos that students watch and data that students collect and analyze.

October 5, 2021

Dear ASC Curriculum Committee,

We thank the Natural and Mathematical Sciences Panel of the ASC Curriculum Committee for reviewing ENR2100 (3-credit lecture) and ENR2101 (1-credit lab). The panel provided excellent advice and insight about our course/lab combination for the new GE.

The panel listed 8 items that they would like us to address (shown in black-colored font below). Below we list these eight items and the actions (shown in blue-colored font) that we took to address these concerns.

Based on the panel's recommendations, we revised the syllabi for both ENR2100 (3-credit lecture) and ENR2101 (1-credit lab). We believe that we have adequately addressed all the committee's concerns listed below and in the syllabi. If the committee has additional concerns or questions, please let us know so we can keep working on these items until the committee is fully satisfied.

Sincerely,

School of Environment & Natural Resources (SENR)

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On Wednesday, September 15th, the Natural and Mathematical Sciences Panel of the ASC Curriculum Committee reviewed a course change proposal for ENR 2100 and 2101. The Panel did not vote on the proposal and would like the following 8 items addressed:

1. The Panel would like to ask the Department to consider all the permutations of the various student populations taking this course, such as students who may have transfer credit and/or AP/IB for the lecture and/or the laboratory, students that may not be taking the course for GE credit, students that may only enroll in 2101 to fulfill a lab credit, students who may be taking it in the next several years to fulfill the current GE, etc.

   We recognize students will be enrolling in ENR2100 and/or ENR2101 in various patterns and for various requirements over the next several years. Students coming into the university with transfer or examination credit for ENR2100 will be able to enroll in ENR2101 should they need the lab course. Transfer credit for environmental science labs will be evaluated within the School of Environment and Natural Resources (SENR) to determine if it is eligible to receive credit for ENR2101. Students majoring in the School of Environment and Natural Resources (SENR) will only need ENR2100 as they will be taking it as part of their SENR core and not part of the GE beginning next fall. This is no change to how the majors are currently structured. Students completing the current GE will only be required to complete

ENR2100 to fulfill their Natural Science requirement. A student that chooses to take ENR 2100 and/or ENR2101 not as part of the GE is eligible to do so. The only prerequisite is for ENR2101, they must have credit or be enrolled in ENR2100. We will continue to ensure we have enough seats available for the various enrollment patterns.

2. The Panel would like to remind the Department that laboratory exercises each week should be the equivalent of two contact hours, or two hours a week. Please see page 18 of the ASC Curriculum and Assessment Services Operations Manual (under Definition of a Semester Credit Hour) for further information here: https://asccas.osu.edu/sites/default/files/2021-09/2021-22_asc_curriculum_and_assessment_operations_manual.pdf

   ENR2100 is currently taught at Ohio State as a 3-credit class, and we will continue teaching it in this manner in the new GE system. ENR2101 will be taught as a new 1-credit laboratory in the new GE system and students will spend 2-hours per week working as part of this laboratory. We have already piloted all components of our laboratory modules at Ohio State during autumn, spring and summer semesters with undergraduate students. Our pilot projects helped to determine how long it takes an undergraduate student to complete a laboratory module, test design elements and identify and fix technological bugs. During the development of our online laboratory, we consulted with faculty at Ohio State, staff at Ohio State Office's Distance Education and eLearning (ODEE) and companies that create virtual laboratory simulations (e.g., SimBio). Based on our pilot projects and consultation with experts in online education, we have developed and will teach weekly laboratory exercises that will be equivalent to two contact hours per week.

   On pages 2-3 of our Laboratory Syllabus (ENR2101), we inform students that they should expect to spend 2 hours per week on each weekly laboratory module. On pages 2-3 in the section called "How This Course Works", we describe mode of delivery, pace of online activities, credit hours and work expectations, attendance and participation requirements. On **page 3 of the ENR2101 (lab) syllabus**, we write:

   > **Credit hours and work expectations:** This is a 1-credit-hour laboratory. According to Ohio State policy, students should expect to spend 2 hours per week in this laboratory. A student's 2-hour-workweek includes direct instruction, taking notes, studying, readings, assignments, group work and completing labs.

3. The Panel requests further clarification surrounding the data collection and analysis aspects of the laboratory portion of the course, as they currently are unsure what the requirements are and what the data collected is and what it will be used for within the laboratory experiments.

All labs are designed to accommodate all students and leverage software that is free to Ohio State students (e.g., Microsoft) and common materials found in a student's home or use of free online tools to produce data for analysis. Data analysis primarily utilizes Microsoft Excel to calculate common statistical measures (e.g., mean, median, standard deviation, quartiles), generate graphs and determine discipline-specific indices based on the focus of the lab. Analysis also asks students to identify and describe trends found in the data.

Below are examples of data collection and analysis for three different labs (scientific method, ecology, sustainability):

Scientific Method Lab. Students will practice using and identifying components of the scientific method through a simulated ecology experiment. Data collection: students fold three origami jumping frogs with 3-, 4-, and 5-inch paper. Students create a hypothesis relating frog size and jumping distance then jump each frog "species" 5 times, measuring the distance of each jump. Jump data is shared with the lab group via Carmen Discussions. Analysis: students gather the jump data from their peers and input it into a table in the lab's Microsoft Excel template. Students then calculate the mode, median, mean, and standard deviation for each frog "species" using the combined data from the group. Students summarize the data visually by creating a bar graph showing the average and standard deviation for the three frog "species". Students justify if the data supports or does not support the initial hypothesis. Students are introduced to the concept of confounding variables, then reflect and discuss results with their lab group and how to better control for variables in their experiment.

Ecology Lab. Students use a citizen scientist technique from the Audubon Society to measure the biodiversity of bird populations in their local environment. Data collection: students identify a stationary site or choose a transect to count birds for 30 minutes. Students identify bird species and count the number of each species during their counting time. Students record site details such as habitat type, weather, and time. Completed counts are shared with the lab group via Carmen Discussions. Analysis: students gather the bird counts from their lab group members and input the data into tables in the lab's Microsoft Excel template. Biodiversity indices are used to calculate the Species Richness, Species Diversity, and Species Evenness of each of the 5 sites sampled by the lab group. Students summarize the index values visually using tables and charts and textually using concise scientific language. Students are asked to identify the most diverse of the 5 sites and speculate why it is most diverse based on the site description.

Sustainability Lab. Students are introduced to the ecological footprint, how it is measured, and what each component of the measure means. Data collection: students use the Global Footprint Network's online calculator to calculator their

Ecological and Carbon Footprints. The key values of the footprint are shared with the lab group via Carmen Discussions. Analysis: students gather the data from their lab group members and input the data into a table in the lab's Microsoft Excel template. Students calculate the group's average ecological footprint in number of Earth's and global hectares (gha). Students then use the Global Footprint Network's online database to download the moist recent data for the ecological footprint of each country and identify the country or region that the group's average most closely matches. Students analyze and summarize the biocapacity and ecological footprints trends of these locations by referring to the online Reserve/Deficit database. Students analyze and summarize global trends using the online Sustainable Development database. Lastly, students determine lifestyle changes the group would need to make to reduce their ecological footprint by one Earth.

4. The Panel questions whether the Poster Assignment, found in the 2101 laboratory course, is reflective of a lab activity and would be better suited in the lecture component of the course and asks the Department to consider this or provide a rationale as to how the Poster Assignment addresses the laboratory component, specifically GE Foundation goal 1.3.

   Thank you for the feedback. Following the committee's advice, we have removed the poster assignment from the laboratory, ENR2101. The poster assignment will be placed in ENR2100 (lecture) where it currently exists for ENR2100. We have been using the poster assignment as part of ENR2100 for the past 10 years, it works well in the lecture and so we will keep the poster assignment in the lecture.

   The poster was completely removed from the ENR2101 syllabus. The poster assignment was added to the ENR2100 (lecture) syllabus and students read information about the poster assignment on **pages 5,6,14 of ENR2100 (lecture) syllabus**.

5. The Panel has questions surrounding the peer interaction within the laboratory component of the course. For example, on page 6 of the syllabus under the Written Laboratory Assignments section, the syllabus mentions that the objectives are to "report standardized data to me and to your peer group", "analyze consolidated peer group data", and "summarize consolidated peer group data" yet the academic integrity statements mention that "you must complete the work on your own without help from peers". They would like further clarification around the peer groups and how they function within the course.

   Thank you for helping us to clarify individual versus group activities in our laboratory syllabus. Each lab consists of two parts. Part 1 will be completed by the individual student and Part 2 will be completed as a group. We added text to clarify what elements students will complete on their own and what elements students will

complete as part of their group. On **page 6 of the ENR2101 (lab) syllabus**, we added the following text:

> Each laboratory will consist of two parts (Part 1 and Part 2) that will be completed over two weeks. Part 1 should be completed by you the student on your own. Part 2 should be completed as part of your lab group.
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> Part 1 (1st week) - Learn about the lab procedure and how scientists have used the technique or methods by reading peer-reviewed literature and watch instructional videos provided by your instructor. Execute laboratory experiment at home, collect and report standardized data to your instructor via a Carmen assignment or quiz. Data and results will also be reported to your peer group via the week's participation activity.
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> Part 2 (2nd week) – Gather your lab group's data from the participation activity submitted for Part 1 of the lab. Consolidate this data in a Microsoft Excel lab template. Analyze grouped data by performing calculations with Microsoft Excel. Interpret and summarize results by creating tables, graphs, and answering short-answer questions. These questions will be based on data that your group collected. You will be asked to analyze data, and answer questions about the experiments that you conducted at home.

Peer groups will be created by using the Carmen Learning Management System to randomly divide enrolled students into groups of 5. Students maintain group membership throughout the semester, which helps to form community within the course. To allow for flexibility in an asynchronous format, each lab spans across a two-week period, so that in week 1, students are collecting data and in week 2, students are analyzing data. Due dates for these activities are at the end of each week so that students can complete the work on their own time without having to rely on the schedule of their peers in their assigned lab group. Lab groups are also used for small reflection activities related to the topic of that week's lab. For example, lab 1 covers the Scientific Method. Students are introduced to the concept of confounding variables and are asked to discuss how to better control for variables in the class experiment. This discussion is conducted through Carmen discussions in a classic post-and-reply asynchronous format. Outside of gathering the datasets from their group members in the second week of each lab, students do not need to rely on each other to complete data collection or analysis. For this reason, as well as to align with the practicality of the asynchronous format, we clearly state in our academic integrity expectations that students should complete the work themselves. The academic integrity policy appears on pages 8-9 of the lab syllabus.

6. Additionally, the Panel would like to ask how these peer groups are formed, given the asynchronous nature of the course and students will never physically (and possibly virtually) meet one another.

The Carmen platform allows instructors to assign, organize, and interact with students in online peer groups. The software works well, even for very large asynchronous classes (e.g., 1,000 students). We have been using Carmen to manage peer groups in our asynchronous, online ENR2100 class over the past 7 years and have a great deal of experience on how to effectively manage and interact with peer groups through Carmen (e.g., we have taught 25 different online ENR2100 classes during Summer, Autumn and Spring semesters with enrollments ranging from 40 students to 1,000 students). We will use our past experiences to guide us in our asynchronous online lab.

For the lab, we will divide the class into manageable peer groups on Carmen. Carmen allows groups to be organized a variety of ways. For the purposes of the lab procedures, we will randomly divide students into groups of five students. We assign 1 teaching assistant (TA) to each peer group and that TA manages their group throughout the semester. TA responsibilities including scoring assignments based on grading rubrics, setting clear guidelines and expectations for each week's activities, setting clear boundaries to ensure professional communication among students, create communication plans for students, communicating with students in discussion boards and by email, and troubleshoot problems that arise. Instructors will be in constant (weekly) contact with TAs to ensure that each group is running smoothly and meeting weekly objectives. If students have questions or concerns throughout the semester, they can contact the instructor directly via a dedicated class Email (e.g., ENR2100@osu.edu) or using Carmen discussion boards (e.g., Course Q&A Discussion Board).

Based on our previous experience working with online peer groups in our current online asynchronous ENR2100 class, we have found that opening assignments for a period of 7 days allows for robust asynchronous interactions between online students. The 7-day submission window also allows us to accommodate 100% of our students who receive accommodations through SLDS. For example, in our current online ENR2100 class, students interact with one another in a virtual poster symposium run through Carmen. Students upload their poster presentation to Carmen on Week 12. Then during the next week, Week 13, each student is required to conduct a review of 3 poster presentations. For a very large class, this works out to ~1,000 poster submissions in Week 12 and ~3,000 peer reviews in Week 13. We have always achieved student completion rates of 90% or higher for these projects. End-of-semester student surveys indicate that 85% of the students found the online virtual poster symposium to be interactive, engaging and easy to navigate. We have found that students adapt well to asynchronous online classes if an instructor (1) provides clear instructions each week about what is expected, (2) uses the same due date each week (e.g., Sunday at 11:59PM), and (3) opens assignments on Carmen for at least 1-week so students can complete an assignment anytime over a 7-day period.

We have found that students are able to effectively communicate and interact with one another in an asynchronous environment through Carmen when given measurable and specific instructions and when using standardized prompts from week to week. We will continue to do this in our online lab so that students understand what is expected and to help ensure that the activity runs as planned. For example, rather than instruct our students “post 3 comments”, we will instruct them “using the assignment rubric as a guide to do a, b, and c”.

We have also found in our current asynchronous, online ENR2100 class, that having groups of at least 5 students ensures that there are robust interactions among students, interactions that may not happen with smaller groups (e.g., 3 students), especially if multiple students are sick (e.g., 2 students in a group of 3 are sick with Covid) and miss an entire week of class. We have an effective late policy and currently use it for our asynchronous, online ENR2100 class in situations where students miss an extended period. Our late policy allows students who have an excused absence (e.g., sick with Covid) to still participate in group activities on Carmen when they are well and able to return to class.

Using Carmen, we have developed and use a late assignment policy that allows us to accept late work from our students. We have found this to be a requirement for a large enrollment, asynchronous course. This is also a requirement for students who have a Flex-Plan set up with SLDS and receive accommodations. The Carmen learning management platform allows us to accept late assignments with or without a late penalty (e.g., -10% per day late) and for so many days past the due date (e.g., 10 days past). The Carmen software works in the background to automatically calculate and assess a late penalty without the instructor having to do it by hand. This ensures that all students receive their accommodations and are able to complete their work.

Finally, Carmen works well most of the time, however, it can go down. A few years ago, Ohio State experienced a two-week period when Carmen went down for about 2 weeks and faculty and students were not able to access Carmen. We were able to overcome this challenge because we had a go.osu.edu site for our class that contained all educational materials our students needed for class (e.g., lecture slides, closed-captioned lecture videos, assignments, rubrics, templates) and students were able to complete their coursework outside of Carmen. It wasn’t an ideal situation, but we were still able to communicate with students by Email and students were still able to complete their coursework outside of Carmen. We will develop a similar go.osu.edu site for our online lab to (1) increase accessibility for our students and (2) serve as a back-up for the Carmen system.

7. The Panel would like to see details in the syllabus as to how the group work is managed in the weekly schedule; how a group member working early in the week is guided to collaborate with one working much later in the week.

This is a very good point, thank you for raising it. Real-time student-to-student interactions aren't realistic for asynchronous online courses, especially large enrollment courses where students are often in different time zones. These types of activities are better reserved for in-person, synchronous courses.

What does work well for asynchronous online courses is delayed responses (e.g., delayed student-to-student interactions) where students complete work as individuals in week 1 and then in week 2, students complete group activities based on the work that was completed in the previous week. We will use "delayed responses" for group work that is completed in our asynchronous, online lab. The opportunity of delayed response allows the flexibility required in asynchronous courses and encourages higher order learning skills as students are able to think about a problem or issue over an extended period of time (e.g., 1-week). The delayed response also allows the instructor to scaffold assignments to encourage students to use previous knowledge to explain new concepts. We have used "delayed responses" for group activities in our current asynchronous, online ENR2100 class for the past 7 years and found it to work very well to manage group work both for the students and instructor.

We have added more detailed information in our **ENR2101 (lab) syllabus on page 6**, which describes that each laboratory consists of two parts: Part 1 will be completed in week 1 by an individual student; and Part 2 will be completed in week 2 as a group activity that is based on work completed in Part 1. Running an asynchronous online lab in this manner means that a group members can work anytime over a 7-day period.

We have a great deal of experience managing group work in our current large-enrollment, asynchronous, online class (ENR2100). We will use these experiences to guide us and serve as a model for how to effectively manage group work in the new asynchronous lab. What we have found works best in an asynchronous, online course is to use flexible schedules that allows students to participate across different time zones, scaffolded assignments, rubrics, and collaborative documents. For example, in the week 1 of lab, students are required to collect observational data (e.g., number of different trees found in a 10-meter x 10-meter area at local park) on their own and submit their data to their group members via the Carmen Discussion Board. In the second week of the lab, students are asked to gather all observational data from all group members provided on Carmen Discussion Board and analyze the combined data by calculating indices and producing a graph in Excel using these data provided and provide plausible explanations about each other's observations. This way students are still collaborating with one another, but their interactions are based on the previous weeks' work. Running the asynchronous labs in this manner

ensures that students are making constant forward progress from week to week, rather than waiting for their classmates. We have found in our current asynchronous ENR2100 class, that this method works very well to foster student-to-student interactions in asynchronous online settings.

Several approaches have worked well for us in the past when teaching our large, asynchronous class. We will use these same management methods with our online lab to promote and encourage student interactions in group activities. First, creating peer groups with 5 or more students ensures that plenty of students are participating from week to week so that student absences (e.g., illness) will not completely stop group work. Second, we have found that assigning roles to different students from week to week, helps to encourage peer interactions. For example, discussion leader, moderator, source finder and example finder, summarizer. Third, using Carmen we can require each student to post their material (e.g., video, Excel file, PowerPoint slide) before they can see posts from other students. Fourth, using grading rubrics in Carmen students understand exactly when we expect their work to be done and how their work will be judged on purpose, organization, details, completeness, and mechanics.

We will assign Teaching Assistants to each group and our TAs will monitor group activities throughout the week, adjust as needed and maintain constant contact with students, including those who miss assignments, to ensure that students are making satisfactory progress from week to week. We will also utilize a standard late policy (e.g., -10% deduction for each day late) and standard Flex-Plan (e.g., 72-hours extension when needed) in place for students who receive accommodations through SLDS.

Another technique that we have used before in our asynchronous, online course, and we have found works well to encourage peer interactions, is to have students submit video files, audio files, and/or image files about their work through Carmen. Using different multimedia platforms allows students to interact with each other in different ways. For example, in week 5 students are asked to upload a video presentation of a graph describing data they collected and explaining their methods and results to their audience. The next week, week 6, students are required to complete a rubric-guided, peer reviews of two video presentations.

It is challenging to have real-time, student-to-student interactions in a large, asynchronous course. Especially when students are in different time zones and have different schedules. However, we have found that if we are flexible, if real-time interactions are infrequent, we can have real-time interactions among students using Carmen Zoom or Carmen Discussion Boards. For example, discussion boards can be opened at different times on different days throughout the semester and students are required to participate in so many real-time sessions throughout the semester. Students who cannot participate will be required to upload a video file (or audio file)

of them responding to a prompt or explaining a problem set. Teaching assistants will be used to moderate Zoom sessions and discussion boards. Students who receive accommodations through SLDS will receive all their accommodations as they may pertain to real-time, student-to-student interactions.

8. The Panel recommends that the syllabus clearly state how each component of the course functions within the current and new GE program.

We thank the committee for this recommendation, this is a very good point to be sure that students enrolled in the prior GE program and new GE program understand how ENR2100 (lecture) and ENR2101 (laboratory) functions in the prior and new GE curriculum.

The new 1-credit ENR2101 laboratory does not fulfill any requirement outlined under the prior GE curriculum. We provide this information on page 2 of the ENR2101 syllabus.

The new 1-credit ENR2101 laboratory does fulfill goal 1 and learning outcome 1.3 for the new GE program. We provide this information on page 2 of the ENR2101 syllabus. When this 1-credit ENR 2101 laboratory is taken in combinations with the 3-credit ENR 2100 lecture, together these 4-credits (i.e., 1-credit laboratory + 3-credit lecture) fulfills all Goals (i.e., Goals 1 and 2) and ALL Expected Learning Outcomes (i.e., ELOs 1.1, 1.2, 1.3, 2.1, 2.2, 2.3) for the Foundations, Natural Science GE category.

On **page 2 of the ENR2101 (lab) syllabus**, we provided detailed information for how ENR2101 functions within the new GE program and prior GE program. See page 2 “NEW GENERAL EDUCATION CURRICULUM” and page 2 “PRIOR GENERAL EDUCATION CURRICULUM”

On **pages 2-3 of the ENR2100 (lecture) syllabus**, we provide detailed information for how ENR2100 (lecture) functions within the new GE program and prior GE program. See page 2 “NEW GENERAL EDUCATION CURRICULUM” and page 3 “PRIOR GENERAL EDUCATION CURRICULUM”