

## Term Information

Effective Term Spring 2025

## General Information

Course Bulletin Listing/Subject Area Molecular Genetics  
Fiscal Unit/Academic Org Molecular Genetics - D0340  
College/Academic Group Arts and Sciences  
Level/Career Undergraduate  
Course Number/Catalog 1103  
Course Title Plants & Society: An Introduction to Plant Biology  
Transcript Abbreviation Plants & Society  
Course Description Plants and their relationships to humans and the biosphere, how plants adapt to changing environments and are critical to a collective response to the changing climate, plant anatomy, plant cell biology, plant genetics, and plant biotechnology.  
Semester Credit Hours/Units Fixed: 4

## Offering Information

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

## Prerequisites and Exclusions

Prerequisites/Corequisites None  
Exclusions Molgen 1101, Biology 1101, 1113, 1113H, 1114, 1114H  
Electronically Enforced Yes

## Cross-Listings

Cross-Listings

## Subject/CIP Code

Subject/CIP Code 26.0804  
Subsidy Level General Studies Course  
Intended Rank Freshman, Sophomore, Junior, Senior

## Requirement/Elective Designation

Natural Sciences

## Course Details

### Course goals or learning objectives/outcomes

- See attached syllabus

### Content Topic List

- Plants in the modern world
  - Plants and climate change
  - Introduction to life
  - The plant cell
  - Plant structure and growth
  - Plant metabolism: photosynthesis
  - Plant nutrition
  - Plant flowering and reproduction
  - Mendelian genetics
  - Plant biotechnology

### Sought Concurrence

No

## Attachments

- Molgen\_1103\_GE Foundations\_Syllabus.docx: Original Syllabus  
*(Other Supporting Documentation. Owner: Cole, Susan Elizabeth)*
- Cover Letter for 1103 revision 022224.docx: Response to revision  
*(Other Supporting Documentation. Owner: Cole, Susan Elizabeth)*
- Revision \_GE Foundations\_Syllabus\_MG1103.docx: Syllabus for first revision  
*(Other Supporting Documentation. Owner: Cole, Susan Elizabeth)*
- Cover Letter for 1103 request.docx: Original Cover letter  
*(Other Supporting Documentation. Owner: Cole, Susan Elizabeth)*
- Cover Letter for 1103 revision 071524.docx: Cover letter for second revision  
*(Cover Letter. Owner: Cole, Susan Elizabeth)*
- MOLGEN1103\_GE Foundations\_Syllabus\_v3\_080124.docx: Syllabus for second revision  
*(Syllabus. Owner: Cole, Susan Elizabeth)*
- MG1103\_ge-foundations-submission v3.pdf: GE foundations  
*(Other Supporting Documentation. Owner: Cole, Susan Elizabeth)*
- Concurrence request Molgen 1103 - Sent • cole.354@osu.edu.pdf: Email request CFAES concurrence  
*(List of Depts Concurrence Requested From. Owner: Cole, Susan Elizabeth)*

**Comments**

- Updates to reflect that the 1 credit experiential learning portion is a lab.  
While the class is an update of MolGen1101 for the GEN, the reduction in credit hours led us to request a new course number. At this time we are only seeking approval for the GEN Foundation in Natural Sciences, and no longer requested approval for the Legacy GE  
Concurrence sought with CFAES (by Cole, Susan Elizabeth on 08/05/2024 12:38 PM)
- Please see Subcommittee feedback email sent 4/15/24. (by Neff, Jennifer on 04/15/2024 09:46 AM)

**Workflow Information**

Status	User(s)	Date/Time	Step
Submitted	Cole, Susan Elizabeth	01/05/2024 11:41 AM	Submitted for Approval
Approved	Cole, Susan Elizabeth	01/05/2024 11:41 AM	Unit Approval
Approved	Vankeerbergen, Bernadette Chantal	01/24/2024 12:37 PM	College Approval
Revision Requested	Neff, Jennifer	02/13/2024 10:25 AM	ASCCAO Approval
Submitted	Cole, Susan Elizabeth	02/27/2024 11:25 AM	Submitted for Approval
Approved	Cole, Susan Elizabeth	02/27/2024 11:25 AM	Unit Approval
Approved	Vankeerbergen, Bernadette Chantal	03/07/2024 05:19 PM	College Approval
Revision Requested	Neff, Jennifer	04/15/2024 09:46 AM	ASCCAO Approval
Submitted	Cole, Susan Elizabeth	08/05/2024 12:38 PM	Submitted for Approval
Approved	Cole, Susan Elizabeth	08/05/2024 12:38 PM	Unit Approval
Approved	Vankeerbergen, Bernadette Chantal	08/08/2024 03:26 PM	College Approval
Pending Approval	Jenkins, Mary Ellen Bigler Hanlin, Deborah Kay Hilty, Michael Neff, Jennifer Vankeerbergen, Bernadette Chantal Steele, Rachel Lea	08/08/2024 03:26 PM	ASCCAO Approval



07/24/2024

Dear Members of the ASCC,

We thank the committee for their input on the The Department of Molecular Genetics course MOLGEN 1103. In this letter we outline the changes made in response to the second round of review and after consultation with Ian Howat. These changes are reflected in the new syllabus, and where practical are highlighted in yellow in that document. In addition, given the fact that very few students remain covered by the "Legacy" GenEd, the Legacy ELOs have been removed from the syllabus, and we are now solely requesting approval for the GEN Foundation: Natural Sciences

*The Subcommittee would like to express to the department that they believe this is an excellent course as a whole and offer the following feedback in terms of the GEN Foundation requirements.*

We thank the committee for their input

*The Subcommittee would like to point out the implications of referring to the non-lecture sessions of the course as "recitations". A recitation has a different academic meaning than a lab, with the former focusing on discussion and understanding of the lecture material and the latter focusing on hands-on, practical applications. If the department is intentionally avoiding referring to these sessions as labs, the Subcommittee requests that they use a different word in the syllabus instead of recitation (e.g., workshop) that does not have an existing meaning for students, faculty, and staff at Ohio State. However, though the department can do this in the syllabus, "lab" will need to be selected in the course components section of the submission form in curriculum.osu.edu. If the department objects to this and intends to use the session as a true recitation by definition, then this causes additional issues regarding the 1-credit hour equivalent of experiential learning required of GEN Foundation: Natural Sciences courses.*

To better reflect the hand on content of the non-lecture section, we have changed the syllabus and curriculum structure to call it a lab. Due to the reduction in credit hours required to complete the GEN Foundation: Natural Sciences, we feel that students will be best served by a 4-credit course, which prevented us from repositioning our existing 5-credit hour GEN course (MOLGEN 1101) into the space served by the class proposed here. As described in the syllabus and below, all mentions of "recitation" have been removed and replaced with "Lab/Workshop", and there is more explicit description of the experiential aspects of the course, including a detailed description of each week's lab (Syllabus p14-17).

*The Subcommittee notes that the explanation of the Foundation ELO 2.3 in the syllabus [p. 4] references discussions, which is not considered experiential learning and does not help to satisfy the 1-credit hour equivalent experiential learning component of the course. The Subcommittee requests a more detailed explanation of the activities that will be conducted in these recitation/lab/workshop sessions and how students will be regularly required to complete hands-on work in some way or another (e.g., lab work, collecting and working with data, using scientific tools to solve practical problems, etc.). Additionally, the Subcommittee notes that the GE rationale form and the in-syllabus explanation for the Foundation ELO 1.3 [p. 3] mention that students will be observing plants in the wild throughout the semester in order to satisfy the experiential learning expectations, but these activities do not seem to be a consistent part of the recitation/lab/workshop sessions. The Subcommittee asks that the department expound on the work that students will be conducting during these observations and that the department integrate this work into the course schedule more often, especially if it is the main activity intended to satisfy the experiential learning component of the course. The Subcommittee stresses the importance of more weeks of recitation/lab/workshop spending time on such work, as teaching the*



*scientific method and initiating discussion do not achieve the same goals as hands-on experiences. Though discussion can certainly remain a part of the course and even a part of the recitations/labs/workshops, the Subcommittee would like to see the majority of these sessions (more specifically, at least 10 of the 14 weeks) focused on hands-on work such as the plant observation activities or similar.*

After discussion with Ian Howatt, we assume that all these concerns relate mostly to ELO 1.3. However, throughout the ELO descriptions we have expanded the detail related to each ELO, and especially in ELO 1.3 have explicitly included which activities in which labs contribute to the hands on experiential learning expectations (Syllabus pages 2-5). In addition, for each class meeting described on pages 11-13 we explicitly indicate which ELOs are being satisfied, and ELOs are also highlighted in the descriptions of weekly lab activities (Syllabus pages 15-17). Weeks with hands on experiential activities are listed in bold in this section, and include 10/14 weeks (weeks 1-2, 5-6, 8-10,12-14) where students will engage in experiential learning in the lab. The other four weeks will include critical training and discussion of the scientific method (weeks 3 and 4), and socially relevant activities including analysis of biofuels and discussion of how science is portrayed in the public press compared to primary research publications.

The ongoing Plant Noticing journal provides a mechanism for students to connect their in class learning with their learned experience, and the check-in requirements for this journal are noted in the Lab schedule.

*Regarding how at least 25% of the course involves experiential learning, the Subcommittee notes that the points assigned to the readings and media of the course do not contribute to this calculation (as they are not considered experiential learning). Given this, the Subcommittee continues to struggle to see how the 25% of experiential learning is accounted for and requests that the department provide additional clarification on the breakdown of this percentage.*

The breakdown of graded work (Syllabus page 6) now explicitly highlights that 280/1000 (28%) of points arise from lab preparation and in class active learning activities. 30 points are used to encourage and reward students for completed required readings and preparatory work that is necessary for success in lab activities. 250 points are earned through lab activities.

*It has come to the attention of the Subcommittee that the Department of Evolution, Ecology and Organismal Biology offers an existing course with a title and transcript abbreviation (EEOB 4240 – “Focused Study of Ecology and Evolution – Plants and People”) similar to that of this course. The Subcommittee can easily imagine this being confusing to students as they search for courses and recommends that the department consider adjusting the course title and transcript abbreviation to be more distinguishable. The Subcommittee apologizes for not realizing this overlap sooner.*

The title of the class has been changed to Plants & Society: An Introduction to Plant Biology

*The Arts and Sciences Curriculum Committee recently (03-01-2024) updated the list of required syllabus statements for all syllabi to include a new statement on religious accommodations. The new version of this required statement is a result of a directive by the Executive Vice President and Provost and can be found here on the [ASC Curriculum and Assessment Services website](#). Please note that the link to religious holidays, holy days and observances at the end of the statement is also required to be included in the syllabus The Subcommittee thanks you for adding this revised statement to your course syllabus. [Syllabus p. 9]*

We have tried to catch all the syllabus statements that have changed since our original submission

Sincerely,



THE OHIO STATE UNIVERSITY

Susan Cole

Susan Cole, Ph.D.

Professor and Vice Chair of Molecular Genetics



Cover letter for revision 1

February 22, 2024

Dear Members of the ASCC,

We thank the committee for their input on the The Department of Molecular Genetics course to be titled "**MOLGEN 1103 Plants & People: An Introduction to Plant Biology**". This course will fulfill the requirements of the new General Education Foundation in Natural and Mathematical sciences, and will also serve as a 4-credit, non-lab course in the Legacy GE (NMS-Biological Sciences).

Our responses to your requests are outlined below. Parts of the syllabus that are responsive to these requests are additionally highlighted in yellow in the revised syllabus (highlights will be removed in the final version)

*The Subcommittee asks that the department provide further evidence in the syllabus that 25% of the course involves experiential learning for students (currently, the recitation work accounts for 15%). The Subcommittee requests an explanation of how the course will achieve this along with sample exercises highlighting the use of scientific tools to investigate problems throughout the course. Though this does not need to be accomplished in a way that fully mirrors Molecular Genetics 1101, the recitation work needs to play a similar role and account for 25% of the course.*

Thank you for this input. In addition to accounting for 25% of the class time, the work associated with the recitation activities accounts for 28% of the course grade. The "course content" description on pages 1-2 in the "course structure" section outlines that the points assigned to the readings and media assigned in the course, earned through completing "reflections", are a part of the work assigned for the recitation. Combined with the work completed in class for the recitations, the points earned for that portion of the course are 28% of the course total.

Experiential learning goals are highlighted in in the learning goals descriptions on pages 2-4. The recitation is designed to be a combination of demonstrations, hands on science experiments, and discussions of scientific advancements and their role in broader society. The overarching goal for the recitation is to convey an understanding of scientific approaches and tools, while connecting the scientific topics covered in class to real world challenges students see in their lives.

a. Some examples of science tools students will gain exposure to: Experimental design & hypothesis-driven inquiry (week 3-4); scientific analysis and experimental conclusions (week 3-4); isolation of biomolecules from live tissue (week 9); scientific communication (technical communication and public communication, week 11); genetic crosses and pedigrees (week 12), how scientists visualize and measure gene expression (week 13).

b. Some examples of discussions of scientific advancements: Rubber isolation & development of novel rubber crops (week 6); biofuel development, costs and benefits (week 7); identification of medicinal compounds from plants (week 9); the Green Revolution (week 12); genome editing technologies (week 13); plant genetic engineering (week 14).

*The Subcommittee notices some unnecessary language in the course policies that they ask be removed, including the discussion and communication guidelines (which are written in a way that applies only to*



written discussions) along with the reference to required and elective art courses in the paragraph regarding tolerance. However, if the course will involve online discussion thus calling for the inclusion of the discussion and communication guidelines in the syllabus, then the Subcommittee requests that those assignments be included in the syllabus. [Syllabus pp. 9-10]

Extraneous language has been removed as requested.

*The Subcommittee requests that, in the final syllabus, the department include details regarding the work distribution in a typical week to give students a general idea of the expectations. Providing students with information on when assignments will be assigned, available to work on, and due are great ways to help them gauge the workload.*

Language around weekly expectations and time commitment has been adjusted and expanded upon, including a description of "weekly expectations" on page 2, and expanded descriptions of "weekly reading reflections" and Weekly recitation activities on page 7. We also clarify that required recitation reading/viewing materials are linked on pages 13 and 14.

*The Subcommittee asks that the department include additional information on how the book can be obtained. The Subcommittee also offers the friendly advice that providing the ISBN helps students find the correct version. [Syllabus p. 8]*

Language around textbook availability has been added, as has the ISBN number (page 8).

*The Subcommittee asks that the department clearly label the religious accommodations statements (as the other statements are) so that it does not get lost in the surrounding text. [Syllabus p. 7]*

*The Subcommittee requests that the department use the most recent version of the Student Life Disability Services Statement, which was updated to reflect the university's new COVID-19 policies in August 2023. The updated statement can be found in an easy to copy/paste format on the Arts and Sciences Curriculum and Assessment Services website. [Syllabus p. 9]*

*The Subcommittee recommends that the department use the most recent version of the mental health statement if it wishes to keep the statement in the syllabus. The statement was updated to include the new Suicide and Crisis Lifeline number. The updated statement can be found in an easy to copy/paste format on the Arts and Sciences Curriculum and Assessment Services website. [Syllabus pp. 8-9]*

Updated statements are included as requested on pages

Sincerely,

Susan Cole, Ph.D.

Professor and Vice Chair of Molecular Genetics



## **MOLGEN 1103**

### **Plants & Society: An Introduction to Plant Biology**

#### **Course information**

##### **Instructor:**

- Iris Meier, Professor, Department of Molecular Genetics, College of Arts and Sciences
- Norman Groves, Postdoctoral Scholar, Department of Molecular Genetics, College of Arts and Sciences

**Email:** [meier.56@osu.edu](mailto:meier.56@osu.edu) & [groves.146@osu.edu](mailto:groves.146@osu.edu)

**Credits:** 4

**Day and Time:** Mon/Wed/Fri, 1 Hour Lecture. **TBD**, 2 hour **Lab**

**Section:** GE Foundations: Natural Sciences

**Location:** **TBD**

**Prereqs:** **None**

#### **Course Description**

This course is a 4-credit-hour lecture and **lab** course focusing on the basic principles of plant biology. It is a survey course, covering plant anatomy, plant cell biology, plant genetics, and plant biotechnology. Students will be introduced to the scientific method and will practice formulating a hypothesis and testing it in an experiment. They will be introduced to the fundamental chemical foundations of all living organisms, to understanding the body plans of organisms, to the nature of all life's genetic material, and to the process of photosynthesis, the core energy conversion step that transforms inorganic carbon dioxide, water and minerals into living matter. Each week, a "Plants and people" lecture will lead up to the science covered during that week by illustrating its relevance for human culture and nature, both through the centuries and in our contemporary world. **In addition to covering the foundations of plant biology, students will experience and contextualize the science within broader society in the lab sections.** Together, students will better appreciate the human impacts on plants, and how plants impact human life. Students will also learn how plants adapt to changing environments, and how plants are critical to a collective response to the changing climate.

#### **Course Content, Format, and Delivery:**

This course consists of lectures on plant biology, readings and videos on related topics, demonstrations, and group discussions.

The first lecture every week will be a "Plants and People" lecture, a lecture which contextualizes the science being covered that week within history and culture. These lectures will feature the stories behind the science, and tie into how plant biology impacts our everyday lives. The second and third lectures every week will be plant biology lectures, lectures which delve into the plant anatomy, plant cell biology, plant genetics, and plant biotechnology topics which undergird the course.

Students have assigned readings and videos to review weekly. These are designed to be companions to the **lab** sections and will cover a topic related to what is being covered in lecture that week. Students will read or watch the assigned materials and do weekly assignments prior to the **lab**. The **lab** sections will

feature experiences, demonstrations and discussions of scientific topics. These topics include: how experiments are designed and analyzed, how science is reported in popular media, how scientists can see how individual genes are expressed, and a discussion on genetically modified organisms and their role in society.

**Weekly Expectations:**

State of Ohio standards state that for every hour in class, 2 hours of coursework are expected outside of class. Students should expect that this course will require 8 hours of work outside of the classroom per week.

Every week, students will have readings from the textbook, as well as selected readings and videos to prepare for the lab. Prior to the lab, students will turn in a reflection on the week’s readings and videos (5 points/week), and will receive credit for attendance and participation in weekly lab (5 points /week). For a full breakdown of points for the course see page 6-7.

See the Course Calendar (page 11-12) for the weekly topics covered in Lecture and lab. See the Lab Calendar (Page 13-14) for the themes for the weekly labs, and assigned reading and media associated with each week’s theme.

**Course Goals / Rationale**

Goals and Expected Learning Outcomes (ELOs) for GE Foundations

1. Goal 1: Successful students will engage in theoretical and empirical study within the natural sciences while gaining an appreciation of the modern principles, theories, methods, and modes of inquiry used generally across the natural sciences.
  
2. 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.

ELOs related to Goals 1	Course activities and assignments to meet these ELOs
<p><b>ELO 1.1</b> Explain basic facts, principles, theories, and methods of modern natural sciences, and describe and analyze the process of scientific inquiry</p>	<p><b>In the course lectures, students will:</b></p> <ul style="list-style-type: none"> <li>• Learn the origins of botany, and how the scientific method and taxonomy have expanded our knowledge of plant life all around us</li> <li>• Learn core concepts in plant anatomy, plant physiology, and plant cell biology, including the scientific approaches that have led to this knowledge.</li> </ul> <p>In the course activities, such as class discussions following the course lectures, readings, watching and reviewing videos, students will:</p> <ul style="list-style-type: none"> <li>• critically investigate environmental impact on plants and humans.</li> <li>• logically recognize interdependence between them.</li> <li>• consider the effectiveness of various scientific strategies for communicating these topics.</li> </ul>

	<p>In the <b>lab</b> activity for weeks 3 and 4, students will:</p> <ul style="list-style-type: none"> <li>• learn to ask scientific questions and design an experiment.</li> <li>• Learn to interpret scientific data and judge their robustness and relevance</li> </ul>
<p><b>ELO 1.2</b> Identify how key events in the development of science contribute to the ongoing and changing nature of scientific knowledge and methods</p>	<p>Students will learn foundational knowledge in plant biology in lectures throughout the course of the semester. Some of the topics covered will include:</p> <ul style="list-style-type: none"> <li>• How botany and plant biology became scientific disciplines, covering from plant gathering and farming through modern plant biology and plant biotechnology.</li> <li>• Discussion of the historical roots of plant genetics, and how the knowledge learned there was key to broad scientific knowledge.</li> <li>• Discussion of biomolecules isolated from plants for use in medicine, materials, cosmetics, and biofuels.</li> <li>• How plant hormones control plant growth and responses, and how plant hormone effects have been discovered and observed.</li> <li>• Discussion of modern genetic engineering techniques, including how these techniques are used to advance scientific inquiry.</li> </ul> <p>Students will engage in experiences and discussions related to scientific advancements as a part of the <b>lab</b> portion of the course. Students will learn:</p> <ul style="list-style-type: none"> <li>• How to design and analyze experiments</li> <li>• How plants respond to their environment, and the role plant hormones play in these responses, through demonstration of these responses, and exposure to plants deficient in some of these responses.</li> <li>• How published science is communicated, and how scientific research gets interpreted by the popular press</li> <li>• Examination of plant inheritance, through examining kernel color in corn cobs. Discussion of plant breeding, compared to genetically modified organisms (GMOs) produced via modern plant biotechnology techniques.</li> <li>• Examination and discussion of cutting-edge science attempting to address the needs of modern society.</li> </ul>
<p><b>ELO 1.3</b> 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</p>	<p>As a part of the <b>lab</b> students will conduct hands-on experiments or activities several times throughout the semester. Activities will include:</p> <ul style="list-style-type: none"> <li>• Students will observe plant life around them through keeping a “plant noticing journal”, that will be checked and discussed throughout the semester (Week 1, Week 5, Week 8, Week 12, Week 14).</li> <li>• In Week 2, students will be exposed to historic observations of plant species, and will do their own observations as a part of a tour of the Biological Sciences Greenhouse.</li> <li>• In two labs, Biomolecules will be extracted from plants, in Week 5 (Coffee Extraction) and Week 9 (Marigold extraction).</li> </ul>

	<ul style="list-style-type: none"> <li>• Students will analyze and record inheritance of traits through observing corn kernel color (Week 12).</li> <li>• Students will analyze plant response to the environment, as shown in a variety of plant species and plant responses (Week 8).</li> <li>• Students will analyze differential gene expression, by working with plants that express a reporter gene, tied to a single gene promoter (Week 13).</li> <li>• Students will gain an appreciation for how plant materials and extracts are ubiquitous in their lives, by creating an object out of plant materials, and describing the origin of each material in their creation (Week 6)</li> <li>• Students will be exposed to the methodology of transgenic plants in Week 14, and gain an appreciation for how transgenic plants can be used to study problems, and solve them.</li> </ul>
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ELOs related to Goals 2	Course activities and assignments to meet these ELOs
<p><b>ELO 2.1</b> Analyze the inter-dependence and potential impacts of scientific and technological developments</p>	<p>The lectures in the course will cover several topics in scientific impacts, including:</p> <ul style="list-style-type: none"> <li>• How plants become a source of energy, and a storage for carbon</li> <li>• How plants can be processed to be used as fuel</li> <li>• How plant engineering has been used to produce better crop yields, and allow plants to adapt to different climates</li> <li>• How medicinal compounds have been extracted from plants, and how technological advances have changed how these products are produced</li> <li>• How plant breeding has been used to generate new and/or altered crops</li> <li>• How plants interface and impact the broader environment</li> </ul> <p>In lab/workshop, students will discuss and experience the impacts of scientific advancements, including:</p> <ul style="list-style-type: none"> <li>• Discussion of how biofuels compare to fossil fuels, and how end uses for plants compete for land and crop usage</li> <li>• Discussion on the impacts of Genetically Modified Organisms (GMOs)</li> <li>• Discussion of how plants are being engineered to address climate change-related impacts, and exposure to transgenic plants</li> </ul>
<p><b>ELO 2.2</b> Evaluate social and ethical implications of natural scientific discoveries</p>	<p>The lectures in the course will cover societal impacts of plants, including:</p> <ul style="list-style-type: none"> <li>• How plants have historically been used as medicine and materials</li> <li>• How crops have been involved in empires and colonization, and the impacts that has had on plant cultivation and broader society.</li> <li>• How plant breeding has changed plant life, and how those plants have in turn impacted our everyday lives.</li> <li>• How cutting-edge plant biotechnologies can further be used to engineer plants for broad use.</li> </ul>

	<p>In <b>lab</b>, students will discuss the ethical implications of scientific advancements, including:</p> <ul style="list-style-type: none"> <li>• How cultivation of crops for export worldwide impacts those societies that cultivate the crops</li> <li>• How climate change impacts plant cultivation, and how that interplays with demands on farming</li> <li>• How plants can be used as sources for fuel and specialized materials, and costs/benefits associated with using plants for purposes outside of the food system</li> <li>• Potential ethical issues with trademarking of genetic material, and trademarking of seed crops</li> </ul>
<p><b>ELO 2.3</b> Critically evaluate and responsibly use information from the natural sciences</p>	<p>In <b>lab</b> students will learn how to critically evaluate scientific reporting, including:</p> <ul style="list-style-type: none"> <li>• Discussion of how to design experiments and interpret their results (Weeks 3-4)</li> <li>• Discussion of how scientific advances get reported, then communicated through the popular press, and how to critically review scientific reporting (Week 11)</li> </ul>

### Communication

The best way to contact us outside of class time is through email or the Carmen Inbox. We expect that you should email us only from your OSU email or the Carmen Inbox. Email can also be used to schedule individual Zoom meetings to talk. You can generally expect a reply to emails within 24 hours on weekdays. We expect that you are checking your Buckeyemail email and your Carmen Inbox regularly. It is recommended that you use Buckeyemail for communication regarding grades or other private matters, as the Carmen Inbox is not as secure of a platform.

Carmen ([carmen.osu.edu](http://carmen.osu.edu)) is used for general communication through announcements. Carmen is where the most up-to-date schedule, assignment information, grades and feedback, readings, due dates for assignments, reference documents and general course content components are posted. Grades will also be posted to Carmen.

### Course Web Platforms and Technology

**Carmen:** [carmen.osu.edu](http://carmen.osu.edu) (<http://carmen.osu.edu/>)

Our course page on Carmen will contain all course documents. Students will upload assignments to specified Carmen drop boxes.

**Microsoft One Drive:** [office365.osu.edu](http://office365.osu.edu) (<http://office365.osu.edu/>)

One Drive can be used as a cloud-based backup for your work. Uploading important files in case of a hard drive failure is a way to prevent lost work. One Drive will be used in this class as a way of sharing large files that do not easily upload to Carmen.

**Other:** a mobile device (smartphone or tablet)

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

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

### Requirements and Evaluation

Your performance will be evaluated on the quality of your work, your understanding of the basic skills and concepts covered, your resourcefulness, initiative, active participation in all class activities and overall rigor as a student.

### Grading and Class work / Assignments

Weekly Lab preparation and in-class activities	280 points
Exam I	240 points
Exam II	240 Points
Final	240 points
<b>TOTAL</b>	<b>1000 points</b>

Assignments turned in late will be given half credit. If there are extenuating circumstances that will cause a project to be late, please communicate with us ahead of time and we will work on a case-by-case basis to make adjustments to this late policy.

#### Weekly reading reflections:

Weekly readings and required videos must be read/watched prior to each lab or workshop. All assigned readings and videos are linked in the lab schedule (page 14-15) of the syllabus and will be linked via Carmen as well. Prompts for your weekly reflections will be available on Carmen on the Monday of each week. Completion of the readings/videos and your responses will contextualize lecture material within the broader impacts of plant biology in the world, and prepare you for science experiences and demonstrations in the labs. These activities will be worth 30 points across the semester.

#### Weekly Lab Activities:

Lab activities will connect the foundations of plant biology presented in class to your own, hands on experiences, helping you contextualize concepts from the lectures within in the broader world. Labs activities will let you engage in the thought processes and techniques scientists use to make discoveries and advancements in our collective scientific knowledge. These activities will be worth 250 points across the semester.

### Grading Scale

A (93–100): 465-500 points

A- (90–92.9): 450-464 points

B+ (87–89.9): 435-449 points

B (83–86.9): 415-434 points

B- (80–82.9): 400-414 points

C+ (77–79.9): 385-399 points

C (73–76.9): 365-384 points

C- (70–72.9): 350-364 points

D+ (67–69.9): 335-349 points

D (60–66.9): 300-334 points

E (59.9–0): 0-299 points

### **Attendance Policy for Lab Sections:**

Attendance will be taken every Lab session. If you miss a class, for whatever reason, it is your responsibility to get ALL the information you missed from the instructor, or your classmates as soon as possible, and continue to complete all exercises, homework and projects on time.

### **Texts / Readings / Screenings:**

**Required Reading:** Botany: An Introduction to Plant Biology 7<sup>th</sup> edition (2019) James D. Mauseth. ISBN: 9781284157352. Textbook will be made available through the OSU Bookstore and Carmen Books.

Lecture material will be based primarily (but not entirely) on the required text. Additional short texts or diagrams for material not covered by the book will be distributed ahead of class on Carmen.

Articles, Videos, and Audio discussions as listed below will be associated with each week of the course. You will be expected to watch and read these materials prior to each week's Lab.

### **Academic integrity policy**

It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term "academic misconduct" includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct <http://studentlife.osu.edu/esc/>.

**If we suspect that a student has committed academic misconduct in this course, we are 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 us.

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

- Committee on Academic Misconduct web page ([go.osu.edu/coam](http://go.osu.edu/coam))
- *Ten Suggestions for Preserving Academic Integrity* ([go.osu.edu/ten-suggestions](http://go.osu.edu/ten-suggestions))

### **Student Services and Advising**

University Student Services can be accessed through BuckeyeLink. More information is available here: <https://contactbuckeyelink.osu.edu/>

FOR UNDERGRAD COURSES: <http://advising.osu.edu>

### **Copyright for instructional materials**

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

### **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's Counseling and Consultation Service (CCS) by visiting [ccs.osu.edu](http://ccs.osu.edu) or calling 614--292--5766. CCS is located on the 4th Floor of the Younkin Success Center and 10th Floor of Lincoln Tower. You can reach an on call counselor when CCS is closed at 614--292--5766 and 24 hour emergency help is also available 24/7 by dialing 988 to reach the Suicide and Crisis Lifeline.

### **Accessibility accommodations for students with disabilities**

The university strives to maintain a healthy and accessible environment to support student learning in and out of the classroom. 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.

If you are ill and need to miss class, including if you are staying home and away from others while experiencing symptoms of a viral infection or fever, please let me know immediately. In cases where illness interacts with an underlying medical condition, please consult with Student Life Disability Services to request reasonable accommodations. You can connect with them at [slds@osu.edu](mailto:slds@osu.edu); 614-292-3307; or [slds.osu.edu](http://slds.osu.edu).

### **Religious accommodations**

Ohio State has had a longstanding practice of making reasonable academic accommodations for students' religious beliefs and practices in accordance with applicable law. In 2023, Ohio State updated its practice to align with new state legislation. Under this new provision, students must be in early communication with their instructors regarding any known accommodation requests for religious beliefs and practices, providing notice of specific dates for which they request alternative accommodations within 14 days after the first instructional day of the course. Instructors in turn shall not question the sincerity of a student's religious or spiritual belief system in reviewing such requests and shall keep requests for accommodations confidential.

With sufficient notice, instructors will provide students with reasonable alternative accommodations with regard to examinations and other academic requirements with respect to students' sincerely held religious beliefs and practices by allowing up to three absences each semester for the student to attend or participate in religious activities. Examples of religious accommodations can include, but are not limited to, rescheduling an exam, altering the time of a student's presentation, allowing make-up assignments to substitute for missed class work, or flexibility in due dates or research responsibilities. If concerns arise about a requested accommodation, instructors are to consult their tenure initiating unit head for assistance.

A student's request for time off shall be provided if the student's sincerely held religious belief or practice severely affects the student's ability to take an exam or meet an academic requirement and the student has notified their instructor, in writing during the first 14 days after the course begins, of the date of each absence. Although students are required to provide notice within the first 14 days after a course begins, instructors are strongly encouraged to work with the student to provide a reasonable accommodation if a request is made outside the notice period. A student may not be penalized for an absence approved under this policy.

If students have questions or disputes related to academic accommodations, they should contact their course instructor, and then their department or college office. For questions or to report discrimination or harassment based on religion, individuals should contact the Office of Institutional Equity.

Policy: [Religious Holidays, Holy Days and Observances](#)

### **Accessibility of course technology**

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

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

### **Statement on Title IX**

Title IX makes it clear that violence and harassment based on sex and gender are Civil Rights offenses subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories (e.g., race). If you or someone you know has been sexually harassed or assaulted, you may find the appropriate resources at <http://titleix.osu.edu> or by contacting the Ohio State Title IX Coordinator at [titleix@osu.edu](mailto:titleix@osu.edu)

### **Commitment to a diverse and inclusive learning environment**

The Ohio State University affirms the importance and value of diversity in the student body. Our programs and curricula reflect our multicultural society and global economy and seek to provide opportunities for students to learn more about persons who are different from them. We are committed to maintaining a community that recognizes and values the inherent worth and dignity of every person; fosters sensitivity, understanding, and mutual respect among each member of our community; and encourages each individual to strive to reach his or her own potential. Discrimination against any individual based upon protected status, which is defined as age, color, disability, gender identity or expression, national origin, race, religion, sex, sexual orientation, or veteran status, is prohibited.

### **Land Acknowledgement**

We would like to acknowledge the land that The Ohio State University occupies is the ancestral and contemporary territory of the Shawnee, Potawatomi, Delaware, Miami, Peoria, Seneca, Wyandotte, Ojibwe and Cherokee peoples. Specifically, the university resides on land ceded in the 1795 Treaty of Greenville and the forced removal of tribes through the Indian Removal Act of 1830. I/We want to honor the resiliency of these tribal nations and recognize the historical contexts that have and continue to affect the Indigenous peoples of this land.

More information on OSU's land acknowledgement can be found here:

<https://mcc.osu.edu/about-us/land-acknowledgement>

**Course Calendar** (Subject to change to support course learning objectives)

Week	Plants and People Lecture	Plant Biology Lecture 1 (Chapter)	Plant Biology 2 (Chapter)	Lab/Workshop Topic (2h)
1	Aug 21 (W): Why Study Plants? (ELO 1.1, ELO 1.2)	Aug 23 (F): Intro to Botany; scientific method (1) (ELO 1.1, ELO 1.2)	N/A	Plant Blindness and the world around us & Begin a “plant noticing journal” (ELO 1.3)
2	Aug 26 (M): Plants & People through the millennia: From gathering to farming (ELO 1.1, ELO 1.2, ELO 2.1)	Aug 28 (W): Plant Life and Plant Anatomy (2) (ELO 1.1, ELO 1.2)	Aug 30 (F): Plants as Food, Materials, and Medicine (3) (ELO 1.1, ELO 1.2, ELO 2.2)	Biological diversity – Macro and Micro: Tour of the Biological Sciences Greenhouse. Plant descriptions and identification. (ELO 1.1, ELO 1.2, ELO 1.3)
3	Sep 2 (M): <u>No Class: Labor Day</u>	Sep 4 (W): Intro to life: the plant cell (4) (ELO 1.1, ELO 1.2)	Sep 6 (F): Intro to life: Growth and Division (5) (ELO 1.1, ELO 1.2)	Scientific method 1: How experiments are structured and analyzed. (ELO 1.1, ELO 1.2, ELO 2.3)
4	Sep 9 (M): From where comes our oxygen: Time travels with a Paleobotanist (ELO 1.1, ELO 1.2)	Sep 11 (W): Plant body plan, plant organs: Tissues & Stems (6) (ELO 1.1, ELO 1.2)	Sep 13 (F): Plant organs: Leaves (7) (ELO 1.1, ELO 1.2)	Scientific method 2: How to design your own experiment. (ELO 1.1, ELO 1.2, ELO 2.3)
5	Sep 16 (M): Roots and shoots and flowers and fruits: What exactly are we eating? (ELO 1.1, ELO 1.2)	Sep 18 (W): Plant organs: Roots (8) (ELO 1.1, ELO 1.2)	Sep 20 (F): Secondary Growth (9) (ELO 1.1, ELO 1.2)	Plant growth in diverse environments: A study in Coffee Environmental and processing impacts on chemical compounds (ELO 1.3, ELO 2.2)
6	Sep 23 (M): A roof over our head: Wood and other materials	Sep 25 (W): <u>Exam I</u>	Sep 27 (F): Photosynthesis I (ELO 1.1, ELO 1.2)	Plants as Materials: Creating with and through plants (ELO 1.3, ELO 2.2)

	(ELO 1.1, ELO 1.2, ELO 2.1)			
7	Sep 30 (M): Plants and energy: from bogs and seams to modern life. (ELO 1.1, ELO 1.2, ELO 2.1)	Oct 2 (W): Photosynthesis II (ELO 1.1, ELO 1.2)	Oct 4 (F): Mineral nutrition and transport I (13) (ELO 1.1, ELO 1.2)	Plants as energy: A cost vs benefit analysis of Biofuels (ELO 2.1, ELO 2.2)
8	N/A	Oct 7 (M): Mineral nutrition and transport II (14) (ELO 1.1, ELO 1.2)	Oct 9 (W): Plant signaling and growth response, hormones (15) (ELO 1.1, ELO 1.2)	Plant response to the environment vs “Plant Behavior” (ELO 1.2, ELO 1.3)
9	Oct 14 (M): Plants and medicine: How tree bark cures cancer (ELO 1.1, ELO 1.2, ELO 2.1)	Oct 16 (W): Plant signaling and growth response, hormones 2 (15) (ELO 1.1, ELO 1.2)	Oct 18 (F): Secondary metabolites (ELO 1.1, ELO 1.2)	Plants as Medicine: Isolation of biomolecules from plants (ELO 1.3, ELO 2.1)
10	Oct 21 (M) The Columbian Exchange: How humble plants have shaped great empires. (ELO 1.1, ELO 1.2, ELO 2.1)	Oct 23 (W): Plant organs: Flowers (10) (ELO 1.1, ELO 1.2)	Oct 25 (F): Plant organs: Fruits and seeds (10) (ELO 1.1, ELO 1.2)	Floral diversity & flower pollination. Investigation of floral mutants and vegetative to floral transition (ELO 1.2, ELO 1.3, ELO 2.3)
11	Oct 28 (M) A Monk in the Garden: The life and work of Gregory Mendel (ELO 1.1, ELO 1.2)	Oct 30 (W): <u>Exam II</u>	Nov 1 (F): Cell Division: Mitosis, Meiosis, life cycles (12) (ELO 1.1, ELO 1.2)	Science in the public press: From news article to press release to scientific paper (ELO 1.2, ELO 2.3)
12	Nov 4 (M): Form and Function: How genetic selection has changed plants (ELO 1.1, ELO 1.2, ELO 2.1)	Nov 6 (W): Patterns of inheritance (17) (ELO 1.1, ELO 1.2, ELO 2.1)	Nov 8 (F): The molecular basis of inheritance (16) (ELO 1.1, ELO 1.2, ELO 2.1)	Plant Breeding: How desirable traits are selected. Interpreting a genetic cross (ELO 1.2, ELO 1.3)
13	Nov 11 (M): <u>No Class: Veteran’s Day</u>	Nov 13 (W): Genetic Frontiers (16)	Nov 15 (F): Evolution (18)	Visualizing gene expression in plants (ELO 1.2, ELO 1.3)

		(ELO 1.2, ELO 2.1, ELO 2.2)	(ELO 1.1, ELO 1.2, ELO 2.1, ELO 2.2)	
14	Nov 18 (M): Plants & The Environment (EEOB Guest Lecture) (ELO 1.1, ELO 1.2)	Nov 20 (W): Plant Genetic Engineering (ELO 1.2, ELO 2.1, ELO 2.2)	Nov 22 (F): Plant Biotechnology: Theory (ELO 1.2, ELO 2.1, ELO 2.2)	Genetically Modified Organisms: Future potential, challenges and possible risks. Investigation and analysis of genetically modified <i>Arabidopsis thaliana</i> . (ELO 1.2, ELO 1.3, ELO 2.1, ELO 2.2, ELO 2.3)
15	Nov 25 (M): Plant Biotechnology: Applications (ELO 1.1, ELO 1.2, ELO 2.1, ELO 2.2)	Nov 27 (W): <u>No Class- Thanksgiving</u>	Nov 29 (F): <u>No Class- Thanksgiving</u>	
16	Dec 2 (M): Plants and People: Together into the Future (ELO 1.1, ELO 1.2, ELO 2.1, ELO 2.2)			

## Weekly Lab Topics and Assigned Readings and Media

Weekly Lab sections will include a discussion of the science theme covered in that week's lectures. Every week, there will be assigned readings and videos in preparation for Lab. A weekly reflection must be turned in prior to Lab, which will ask questions based on that week's theme and assigned media. You must watch or read ALL of the assigned material to be prepared for Lab, and submit the weekly reflection (5 points/week).

Week	Theme	Readings	Videos
1	Plants in Society	<a href="#">Plant Blindness</a>	<a href="#">What is Plant Blindness?</a>
2	Plant Diversity	<a href="#">Naming Plants to Save Them</a> ; <a href="#">What we know, what we don't, and how we find out</a>	<a href="#">Why is Biodiversity Important?</a>
3	Plant Domestication	<a href="#">Modern Tomatoes are very different from their wild ancestors</a>	<a href="#">The Origin of our Food Crops</a> ; <a href="#">Corn shouldn't be food, but is</a>
4	Experimental Design	<a href="#">A Tale of Two Scientists</a>	<a href="#">Oxygen</a>
5	Environmental impacts on plants	<a href="#">What climate change means for the future of Coffee</a>	<a href="#">TEDx Talk on Coffee</a> ; <a href="#">Why Single-Origin Coffee is So Expensive</a> ; <a href="#">The Global Coffee Crisis is Coming</a>
6	Plants as Materials	<a href="#">The wonder material we need but is running out</a>	<a href="#">The Dark Truth about Rubber</a> ; <a href="#">The War for the Amazon's most valuable trees</a> ; <a href="#">Natural Rubber from Dandelions</a>
7	Plants as Fuel	<a href="#">The Guardian on Biofuels</a> ; <a href="#">How corn ethanol for biofuel fed climate change</a>	<a href="#">Is Algae the Fuel of the Future?</a> ; <a href="#">The Problem with Biofuels</a>
8	Plant Signaling and Behavior	<a href="#">Marcuso Interview</a> ; <a href="#">The Mystery of the Mimic Plant</a>	<a href="#">TED talk Marcuso 2010</a> ; <a href="#">Plant memory</a> ; <a href="#">Can this plant actually see?</a>
9	Plant Metabolites and Medicine	<a href="#">Building a Better Drug</a> ; <a href="#">Just The Tonic</a>	<a href="#">The hidden history of Gin and Tonic</a>
10	Flowers & Reproduction	<a href="#">The Hidden Environmental Cost of Valentine's Day</a> ; <a href="#">The Real Story Behind "Tulip Mania"</a>	<a href="#">Orchids: These Flowers are Pretty Sus</a> ; <a href="#">The Rose Capital of the World</a> ; <a href="#">A time-lapse of flowers blooming</a>
11	Science Communication	Three documents: an original science paper; a university press release; and the newspaper	none

		article derived from it. To be selected from recent topics before class.	
12	Plant Breeding and Plant Genetics	<a href="#">The Green Revolution: Norman Borlaug and the Race to Fight Global Hunger</a> ; <a href="#">Norman Borlaug: Wheat Breeder who averted famine with a Green Revolution</a>	<a href="#">The Science of the world's most colorful corn</a> ; <a href="#">Apple Breeding at the University of Minnesota</a>
13	Plant Biotechnology	<a href="#">How Restriction Enzymes Changed Biology</a>	<a href="#">CRISPR: Gene Editing and Beyond</a> ; <a href="#">Promoters and Enhancers</a>
14	Genetically Modified Organisms	<a href="#">The Next Green Revolution</a> ; <a href="#">Second Revolution ahead for Green Revolution Grains</a>	<a href="#">Harnessing Plants Initiative</a> ; <a href="#">How supercharged plants could slow climate change</a>

Weeks in Bold are Experiential weeks, such as labs or other hands-on activities. Other weeks are a combination of demos, lectures, and discussions.

**Week 1: Topic – Plant Blindness and the world around us**

Students will bring foraged material from around campus to class, and start a “Plant Noticing Journal” **reporting on real world observations of plants around them (ELO 1.3)**

**Week 2: Topic – Biological diversity – Macro and Micro**

**Botany and how plant diversity has been identified, observed, and categorized.** Students will be given a guided tour of the Biological Sciences Greenhouse, focusing on biological diversity. Students will complete a detailed description of a chosen plant species in the greenhouse, including observations on the species’ anatomy & appearance. Students will then use modern phone apps to identify species and report their findings. **(ELO 1.1, ELO 1.2, ELO 1.3)**

**Week 3: Topic – The Scientific Method pt 1 – How experiments are structured and analyzed**

Lecture on the scientific method, how experiments are structured etc. Students are given examples of experiments, and discuss how they are structured. Classical Plant Biology experiments will be used as examples for the class. **(ELO 1.1, ELO 1.2, ELO 2.3)**

**Week 4: Topic – The Scientific Method pt 2 – How to design an experiment**

Students design experiments in lab, share them, and discuss expected outcomes etc. A focus will be on picking and testing hypotheses. (ELO 1.1, ELO 1.2, ELO 2.3)

### **Week 5: Topic – Plant Growth in Diverse Environments – A study in Coffee**

How coffee is cultivated, harvested, and prepared, with a focus on how varied environments change the chemical makeup of coffee. Coffee is brewed in class, and connection are made regarding how the roasting process chemically changes the coffee bean, and how varied brewing methods extract different classes of chemical compounds. (ELO 1.3, ELO 2.2)

**NOTE: Check-in #1 for Plant Noticing Journal (ELO 1.3)**

### **Week 6: Topic – Plants as Materials – Creating with and through plants**

How plants are used as materials (as raw materials, or processed/extracted materials). Students bring an object they have created through plant-based materials, then describe how the materials that went into their object were created or extracted. (ELO 1.3, ELO 2.2)

### **Week 7: Topic – Plants as Energy – A cost vs benefit analysis of Biofuels**

Lecture on how different types of biofuels are made, and how these fuels impact the food system. Informed by the reading and watching of the week, students will lead a discussion on plants as fuels, and the benefit and drawbacks of each fuel type. (ELO 2.1, ELO 2.2)

### **Week 8: Topic – Plant Response to the Environment**

Different types of plant responses to the environment: Response to light, gravity, and touch. Students are then walked through demonstrations of each phenomenon. Informed by the reading and watching of the week, students will lead a discussion on if these responses are active or passive, and if plants “think” and decide these responses. (ELO 1.2, ELO 1.3)

**NOTE: Check-in #2 for Plant Noticing Journal (ELO 1.3)**

### **Week 9: Topic - Plants as Medicine – Isolation of Biomolecules from plants**

History of medicines from plants or plant extracts. Students will isolate Lutein from Marigolds. (ELO 1.3, ELO 2.1)

### **Week 10: Topic – Floral Diversity and Flower Pollination**

General floral structure, and differences in floral structure. Students will examine *Arabidopsis thaliana* floral mutants and investigate how plants make transition from vegetative to floral growth. (ELO 1.2, ELO 1.3, ELO 2.3)



Week 11: Topic – Science in the Public Press

Students will read and discuss (3) articles: A primary research publication, a news and views paper on the same study, and a news story on the same study. Students will examine the similarities and differences between the articles, and discuss what details from the initial study are omitted or included from the news report. (ELO 1.2, ELO 2.3)

Week 12: Topic – Plant Breeding – How desirable traits are selected

Plant breeding and the Green Revolution. Students will examine corn cobs with different color kernels, and compare the inheritance of the color trait to mendelian segregation. (ELO 1.2, ELO 1.3)

**NOTE: Check-in #3 for Plant Noticing Journal (ELO 1.3)**

Week 13: Topic – Gene expression in plants

Gene regulation, and how gene expression is studied. Students will work with *Arabidopsis thaliana* plants that express promoter::GUS fusions, to visualize expression of a single gene in plants. Students will prepare tissue for the staining, then image pre-prepared samples to see in what tissues a particular gene is expressed. (ELO 1.2, ELO 1.3)

Week 14: Topic – Genetically Modified Organisms

Gene editing technologies, and examples of experimental questions & world challenges GMOs are being used to answer or address. Students will be presented with genetically modified *Arabidopsis thaliana* plants and examine how scientists use biotechnology to both study problems and help address them. (ELO 1.2, ELO 2.1, ELO 2.2, ELO 2.3)

**NOTE: Final Check-in (#4) for Plant Noticing Journal. (ELO 1.3)**

# GE Foundation Courses

## Overview

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

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

## Accessibility

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

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

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

### A. Foundations

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

Course Subject & Number: \_\_\_\_\_

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

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

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

**Expected Learning Outcome 1.2: Successful students are able to explain how categories including race, gender, and ethnicity continue to function within complex systems of power to impact individual lived experiences and broader societal issues.** Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. (50-700 words)

Course Subject & Number: \_\_\_\_\_

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

**Expected Learning Outcome 1.4: Successful students are able to evaluate social and ethical implications of studying race, gender, and ethnicity.** Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. (50-700 words)

Course Subject & Number: \_\_\_\_\_

GOAL 2: Successful students will recognize and compare a range of lived experiences of race, gender, and ethnicity.

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

**Expected Learning Outcome 2.2: Successful students are able to recognize how perceptions of difference shape one’s own attitudes, beliefs, or behaviors.** Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. (50-700 words)

Course Subject & Number: \_\_\_\_\_

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

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

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

**A. Foundations**

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

Course Subject & Number: \_\_\_\_\_

**B. Specific Goals of Social and Behavioral Sciences**

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

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

**Expected Learning Outcome 1.2: Successful students are able to explain and evaluate differences, similarities, and disparities among institutions, organizations, cultures, societies, and/or individuals using social and behavioral science.** Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. (50-700 words)

Course Subject & Number: \_\_\_\_\_

GOAL 2: Successful students will recognize the implications of social and behavioral scientific findings and their potential impacts.

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

**Expected Learning Outcome 2.2: Successful students are able to evaluate social and ethical implications of social scientific and behavioral research.** Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. (50-700 words)



Course Subject & Number: \_\_\_\_\_

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

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

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

**A. Foundations**

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

Course Subject & Number: \_\_\_\_\_

**B. Specific Goals of Historical *or* Cultural Studies**

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

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

**Expected Learning Outcome 1.2A:** Successful students are able to use methods and theories of historical inquiry to describe and analyze the origin of at least one selected contemporary issue. Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. (50-700 words)

Course Subject & Number: \_\_\_\_\_

**Expected Learning Outcome 1.3A: Successful students are able to use historical sources and methods to construct an integrated perspective on at least one historical period, event or idea that influences human perceptions, beliefs, and behaviors.** Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. (50-700 words)

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

Course Subject & Number: \_\_\_\_\_

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

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

**Expected Learning Outcome 1.2B: Successful students are able to describe and analyze selected cultural phenomena and ideas across time using a diverse range of primary and secondary sources and an explicit focus on different theories and methodologies.** Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. (50-700 words)

Course Subject & Number: \_\_\_\_\_

**Expected Learning Outcome 1.3B: Successful students are able to use appropriate sources and methods to construct an integrated and comparative perspective of cultural periods, events or ideas that influence human perceptions, beliefs, and behaviors.** Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. (50-700 words)

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

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

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

Course Subject & Number: \_\_\_\_\_

### A. Foundations

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

### B. Specific Goals of Writing and Information Literacy

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

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

Course Subject & Number: \_\_\_\_\_

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

**Expected Learning Outcome 1.3: Successful students are able to generate ideas and informed responses incorporating diverse perspectives and information from a range of sources, as appropriate to the communication situation.** Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. (50-700 words)

Course Subject & Number: \_\_\_\_\_

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

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

**Expected Learning Outcome 2.1: Successful students are able to demonstrate responsible, civil, and ethical practices when accessing, using, sharing, or creating information.** Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. (50-700 words)



Course Subject & Number: \_\_\_\_\_

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

**Expected Learning Outcome 2.3: Successful students are able to employ reflective and critical strategies to evaluate and select credible and relevant information sources.** Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. (50-700 words)

Course Subject & Number: \_\_\_\_\_

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

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

**A. Foundations**

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

**B. Specific Goals**

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

**Expected Learning Outcome 1.1: Successful students are able to analyze and interpret significant works of design or visual, spatial, literary or performing arts.** Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. (50-700 words)

Course Subject & Number: \_\_\_\_\_

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

**Expected Learning Outcome 1.3: Successful students are able to evaluate how artistic ideas influence and shape human beliefs and the interactions between the arts and human perceptions and behavior.** Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. (50-700 words)

Course Subject & Number: \_\_\_\_\_

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

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

**Expected Learning Outcome 2.1: Successful students are able to engage in informed observation and/or active participation within the visual, spatial, literary, or performing arts and design.** Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. (50-700 words)

Course Subject & Number: \_\_\_\_\_

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

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

### **GE Rationale: Foundations: Natural Science (4 credits)**

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

#### **A. Foundations**

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

Course Subject & Number: \_\_\_\_\_

## **B. Specific Goals for Natural Sciences**

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

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

**Expected Learning Outcome 1.2: Successful students are able to identify how key events in the development of science contribute to the ongoing and changing nature of scientific knowledge and methods.** Please link this ELO to the course goals and topics and indicate specific activities/assignments through which it will be met. (50-700 words)

Course Subject & Number: \_\_\_\_\_

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

Course Subject & Number: \_\_\_\_\_

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

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

**Expected Learning Outcome 2.2: Successful students are able to evaluate social and ethical implications of natural scientific discoveries.** Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. (50-700 words)



Course Subject & Number: \_\_\_\_\_

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

Course Subject & Number: \_\_\_\_\_

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

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

**A. Foundations**

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

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

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

**Expected Learning Outcome 1.1: Successful students are able to use logical, mathematical and/or statistical concepts and methods to represent real-world situations.** Please link this ELO to the course goals and topics and indicate *specific* activities/ assignments through which it will be met. (50-700 words)

Course Subject & Number: \_\_\_\_\_

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

**Expected Learning Outcome 1.3: Successful students are able to draw appropriate inferences from data based on quantitative analysis and/or logical reasoning.** Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. (50-700 words)

Course Subject & Number: \_\_\_\_\_

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

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

Monday, August 5, 2024 at 12:36:59 Eastern Daylight Time

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**Subject:** Contingency request Molgen 1103  
**Date:** Monday, August 5, 2024 at 12:28:23 PM Eastern Daylight Time  
**From:** Cole, Susan  
**To:** Osborne, Jeanne  
**Attachments:** MOLGEN1103\_GE Foundations\_Syllabus\_to CFAES.docx

Dear Dr. Osborne,

The department of Molecular Genetics is converting an existing course (MolGen 1101, “Introduction to Plant Biology: Plants, People, and the Environment” originally 5 credits, Legacy GE) into a 4-credit hour, experiential course to meet the GEN Foundation: Natural Sciences requirement. Because of the reduction in credit hours, we were requested to use a new course number to prevent confusion. The revised course will be called MolGen 1103: “Plants and Society, An Introduction to Plant Biology”. As this makes this technically a “new” course request, we are reaching out to the College of Food, Agricultural, and Environmental Science to seek concurrence with the appropriate departments within the college, as this course intersects with material that the college teaches.

I have attached the syllabus for the class, and would appreciate it if you could circulate to any appropriate departments.

All the best,

Susan Cole

Professor and Chair

Department of Molecular Genetics