# BZ 120 SYLLABUS - ONLINE

#### **INSTRUCTOR INFORMATION**

Instructor: Dr. Heather Blackburn

Preferred email: Canvas Inbox (Responses to email will be provided within 36 hours during weekdays.) Secondary Email: <u>heather.blackburn@colostate.edu</u> (Responses may take longer than 36 hours.)

Dr. Heather Blackburn teaches in the Department of Biology at Colorado State University. Her academic background is in Biology and Ecology, with a particular interest in plant ecology. Her interest in ecology was shaped by her childhood on a farm and her enjoyment of outdoor sports, including rock climbing, backpacking, and telemark skiing.

## **TECHNICAL SUPPORT**

Need technical assistance with your online course? Try the following:

- Visit the <u>Canvas Student Resources</u> for guides and videos.
- Visit <u>Central I.T. Technical Support Helpdesk</u> for technical support.
- Call 970-491-7276.
- Email <u>Help Desk Support</u>.

## **COURSE DESCRIPTION**

Principles of Plant Biology (BZ 120) is an in-depth introductory survey of botany, intended primarily for science majors in related fields such as Natural Resources, Botany, Zoology, Horticulture, and so on. It is a prerequisite for later botany courses in many of these programs. Another course, BZ 104 (Basic Concepts of Plant Life), is a less detailed overview of botany concepts intended for non-science majors. BZ 104 also counts as an AUCC 3A course, so is often a better choice for students that need to fill that requirement but do not need BZ 120 as a required course in their major or as a prerequisite for more advanced courses. The course includes outside readings, lectures, videos, and discussions.

## **REQUIRED TEXTS AND RESOURCES**

**Canvas:** Students have automatic access to the Canvas site for the course. Canvas is necessary for access to grades, assignments and discussions, quizzes, and additional resources. Resources can be accessed through the modules (a module is posted for each week), and quizzes can be accessed through the module, the calendar, or the assignments tab. In each module, be sure to read the module outline for the current week. Some resources will be linked in the outline.

**Laboratory kit (required):** A lab kit for the course must be ordered through the Colorado State University Bookstore (https://www.bookstore.colostate.edu/home). The lab kit will be shipped to your mailing address, and contains materials and equipment necessary for the lab portion of the course. Guidance for the lab exercises will be provided online through Canvas.

<u>MS Teams (required)</u>: Microsoft Teams will be used for virtual office hours and meetings within lab groups. The link to the course Team is available on the course Canvas page.

**Textbook (optional):** Raven - Biology of Plants (8<sup>th</sup> edition) by Evert and Eichhorn. The book provides excellent and well-illustrated coverage of the topics we will cover, but sometimes in more depth than is necessary for our purposes. As a result, you will be using the book primarily as a reference to review and reinforce material covered in lecture. If you are near Colorado State University, several copies of the textbook are on reserve in the Morgan Library.

## **G**RADING\*

Assignment**	GRADE POINTS
Exams - 3 exams, 50 points each	150
Final exam – 100 points (Half will be dropped if this is your lowest grade)	100
Drop lowest exam grade (or half of final exam grade)	-50
Weekly knowledge checks based on both lecture and lab (15 x 15 points)	225
Drop lowest knowledge check grade	-15
Laboratory	
Independent experiment and presentation	100
Lab exercise (15 x 15 pts)	225
Weekly lab feedback (15 x 5 pts)	60
Collaboration (online participation in weekly lecture and/or office hour)	15
Approximate Total:	810

\*Your final average will be calculated as a percentage of the total points possible for the course. All points are weighted equally. Assignments and points may be changed, added, or removed, with notice posted in a Canvas announcement.

\*\*Keep a copy of all work created for the course, including work submitted through Canvas.

## **GRADE DESCRIPTION**

90-100% = A
80-89.9% = B
70-79.9% = C
60-69.9% = D
0-59.9% = F

# **EXAM PROCTORING**

This course requires proctored exams. **Within the first module of your class**, please be sure to explore the proctoring information included in your Canvas "Course Information" module. You may contact the University Testing Center at 970-491-6498 or proctor@colostate.edu should you have questions. If you need accommodations, please get documentation for those accommodations from the SDC and provide early documentation to your instructor.

# MAKE UP POLICY

**No make-up quizzes or exams will be given.** You have advance notice for all activities, and multiple days to complete exams and quizzes. We will also drop the lowest exam grade, and the lowest weekly knowledge check. *I strongly recommend that you do not wait until the last minute to submit quizzes and exams.* If you wait until the last minute and a technical problem prevents the submission of your exam, you will lose the points for that exam.

## **ACADEMIC INTEGRITY POLICY**

Academic integrity lies at the core of our common goal: to create an intellectually honest and rigorous community. Because academic integrity, and the personal and social integrity of which academic integrity is an integral part, is so central to our mission as students, teachers, scholars, and citizens, I will ask that you affirm the CSU Honor Pledge as part of completing your work in this course. *While you will not be required to affirm the honor pledge*, you will be asked to affirm the following statement at the start of your exams:

"I have not given, received, or used any unauthorized assistance."

Further information about Academic Integrity is available at CSU's Practicing Academic Integrity.

## **LEARNING ACCOMMODATIONS**

If you are a student who will need accommodations in this class, please contact me to discuss your individual needs. Any accommodation must be discussed in a timely manner prior to implementation. A verifying memo from <u>Resources for Disabled Students</u> may be required before any accommodation is provided.

#### SYSTEM, MULTIMEDIA, AND SOFTWARE REQUIREMENTS

If you are having trouble with the multimedia in this course or with accessing Microsoft Office products, find solutions to a number of common problems at <u>System, Multimedia, and Software</u> <u>Requirements</u>. Also, it is highly recommended that you access your course via a **high-speed Internet connection**.

You must have speakers, a microphone, and a camera installed and working properly on your computer before beginning the course. Your lab kit also includes a USB-compatible microscope. Instructions for operation of the microscope are provided in Canvas (described in Lab Exercise 1), and available on the microscope manufacturer's website.

Still having issues? Call the CSU Help Desk at 970-491-7276 or Email Help Desk Support.

## **COMMUNICATION WITH LABORATORY GROUPS AND INSTRUCTORS**

You will be assigned to a group of four students as a laboratory group. You will be collaborating in weekly laboratory exercises and interacting frequently with your lab group. You can interact with your lab group by messaging each other on Canvas, by setting up virtual meetings in MS Teams, or by interacting on the message board set up for your group accessed through the "Discussions" link in Canvas. You are also strongly encouraged to arrange weekly real-time group chat sessions to discuss your progress in the laboratory and discuss questions and concepts.

You are able to message instructors at any time. The instructor for the course and the laboratory teaching assistant will also be available for live online chat weekly, at times posted on the course Canvas home page. During this time, you can chat directly with the instructor or the teaching assistant, upload videos or photos, ask questions, and get help. In addition, the most common questions about course content (in lecture or laboratory) will be compiled and discussed in announcements or in a Q&A posted on the course Canvas page.

Make sure that your Canvas settings are set to notify you of announcements and messages posted in the course, and check Canvas daily.

## LABORATORY PREPARATION AND GRADING

In the laboratory portion of this course, you will be expected to perform experiments or observations and report your findings. This will require uploading photos or videos of your work, answering questions posted in Canvas for each exercise, and discussing the lab exercise with your lab group. Earning all points for the week's exercise requires that you meet all of these requirements, which are described in detail in each week's module under the "Laboratory" heading. Every week, approximately 5 points in the weekly Knowledge Check will be based on your lab exercise for that week. During the semester, you will also design and perform an independent experiment and present your experiment to the class. Further instructions on this experiment and presentation are provided in the Canvas module "Independent experiment information."

You must order the laboratory kit promptly from the Colorado State University Bookstore (970-491-6692; <u>https://www.bookstore.colostate.edu/home</u>). This kit contains equipment required for the laboratory beginning in Week 2 (Module 2). You will also be required to obtain a few inexpensive materials locally throughout the semester, such as plant materials from a grocery store. Some labs require advance preparation, such as starting seeds several weeks before the lab; you will be notified in the Canvas module each week if you need to perform any tasks that week in preparation for a future lab.

# **ONGOING COURSE FEEDBACK**

Regular feedback surveys are provided throughout the course. These surveys and other assessments will be used to further refine the course. In addition, you are encouraged to contact your instructor with any questions or constructive feedback regarding the course.

## **COURSE SCHEDULE**

MODULE/	DATES	Торіс	LABORATORY	SCHEDULED
WEEK			Exercise(s)	Ехам
1	1/16-1/19	Organic molecules in plant cells	Introduction	
2	1/22-1/26	Cell structure	1	
3	1/29-2/2	Diffusion, osmosis, and transport	2	
		across cell membranes		
4	2/5-2/9	Mitosis and cytokinesis in plants; protein synthesis	3	Exam 1
5	2/12-2/16	Reproduction and meiosis	4	
6	2/19-2/23	Mendelian genetics and evolution	5,6	
7	2/26-3/2	Respiration	7	
8	3/4-3/8	Photosynthesis	8	Exam 2
	3/11-3/15	***Spring recess***		
9	3/18-3/22	Tissue systems and cell types; Stems	9	
10	3/25-3/29	Roots and leaves	10, 11	
11	4/1-4/5	Mineral nutrition, transpiration, and	12	
		translocation		
12	4/8-4/12	Plant hormones and responses to the	13	Exam 3
12				
13	4/15-4/19	Evolution, algae, and lichens	14, 15, 16	
14	4/22-4/26	Bryophytes and seedless vascular	17, 18	
			10.00	
15	4/29-5/3	Seed plants: gymnosperms and	19, 20	
		angiosperms		
16	5/6-5/10	None, see Canvas for final exam date	No	Final Exam

#### GT Pathways program course approval:

The Colorado Commission on Higher Education has approved BZ120 for inclusion in the Guaranteed Transfer (GT) Pathways program in the GT-SC1 category. For transferring students, successful completion with a minimum C– grade guarantees transfer and application of credit in this GT Pathways category. For more information on the GT Pathways program, go to http://highered.colorado.gov/academics/transfers/gtpathways/curriculum.html.

The content criteria and student learning outcomes (SLOs) listed below are required for GT-Pathways courses in the Natural and Physical Sciences content area, in the GTSC-1 (Lecture course with required laboratory) category. The peculiar numbering of the SLOs is due to the fact that they are excerpted from a comprehensive list of SLOs across all GT-Pathways courses. The SLOs are listed within categories that the GT-Pathways program calls "competencies" and are displayed in italics below.

#### GT Pathways Natural & Physical Sciences - Course with Required Laboratory (GT-SC1) Content Criteria:

1. The lecture content of a GT Pathways science course (GT-SC1):

- a. Develop foundational knowledge in specific field(s) of science.
- b. Develop an understanding of the nature and process of science.
- c. Demonstrate the ability to use scientific methodologies.
- d. Examine quantitative approaches to study natural phenomena.

2. The laboratory (either a combined lecture and laboratory, or a separate laboratory tied to a science lecture course) content of a GT Pathways science course (GT-SC1):

- a. Perform hands-on activities with demonstration and simulation components playing a secondary role.
  - b. Engage in inquiry-based activities.
  - c. Demonstrate the ability to use the scientific method.
  - d. Obtain and interpret data, and communicate the results of inquiry.
  - e. Demonstrate proper technique and safe practices.

#### <u>GT Pathways Natural & Physical Sciences - Course with Required Laboratory (GT-SC1) Competencies:</u> Inquiry & Analysis

1. Select or Develop a Design Process

a. Select or develop elements of the methodology or theoretical framework to solve problems in a given discipline.

2. Analyze and Interpret Evidence

a. Examine evidence to identify patterns, differences, similarities, limitations, and/or implications related to the focus.

b. Utilize multiple representations to interpret the data.

3. Draw Conclusions

a. State a conclusion based on findings.

#### **Quantitative Literacy**

1. Interpret Information

a. Explain information presented in mathematical forms (e.g., equations, graphs, diagrams, tables, words).

2. Represent Information

a. Convert information into and between various mathematical forms (e.g., equations, graphs, Bdiagrams, tables, words)

## **COURSE-SPECIFIC LEARNING OBJECTIVES**

This course will provide students with the opportunity for competence in the following areas:

- Evolution: a. Explain the fundamental processes of evolution, including natural selection, genetic drift, gene flow, and mutation. b. Explain how the four fundamental processes of evolution relate to adaptation and genetic variation in plants. c. Describe the evolutionary history and resulting diversity of plants and plant-like organisms.
- Structure & Function: a. Describe fundamental aspects of plant structure (anatomy) and function (physiology) at a variety of biological levels of organization. For example, students will be able to explain how the structures of leaves, roots, and stems facilitate critical functions such as photosynthesis, transport, and reproduction. b. Explain patterns and mechanisms of plant growth and development.
- 3. **Information Flow, Exchange, and Storage: a.** Describe multiple forms of information storage and flow in plants. These forms include the recognition of and response to environmental stimuli at the cellular and systemic levels, and the storage, transmission, and expression of genetic information.
- 4. Pathways and Transformations of Energy and Matter: a. Describe fundamental mechanisms of the movement and transformation of matter and energy in plants, and between plants and their environments. These mechanisms include water and nutrient uptake and transport, cellular respiration, and photosynthesis. b. Explain the trophic importance of plants in ecological systems and the global carbon cycle.
- 5. **Apply the Process of Science: a.** Recount the scientific reasoning and experiments that shaped our knowledge of several biological processes. **b.** Use knowledge of physical and biological processes to generate testable, falsifiable predictions. **c.** Use experimentation and observation to investigate biological questions.
- Use Quantitative Reasoning: a. Summarize and communicate scientific data effectively. b. Perform mathematical calculations on data and use the results to draw appropriate conclusions regarding biological processes.
- 7. **Use Modeling and Simulation: a.** Use the Hardy-Weinberg model to demonstrate when evolutionary change can occur.
- Tap into the Interdisciplinary Nature of Science: a. Describe examples of how the structure and function of plants informs crop, silvicultural and horticultural practices. b. Identify ways in which plants interact with other organisms and with the abiotic environment. c. Use the principles of physics and chemistry to describe aspects of structure and function in plants.
- Understand the Relationship between Science and Society: a. Apply knowledge of plant structure, function, and diversity to real-world questions with relevance to human health, nutrition, agriculture, ecology and climate change. b. Describe examples of the historical

importance of plants in human societies and culture.

- 10. Use Situational Skills: a. Demonstrate lab skills including using a lab notebook, using a microscope, an understanding of lab safety, performing measurements, **b.** Demonstrate familiarity with specialized lab equipment.
- 11. Write: a. Clearly communicate the process and results of a scientific experiment in writing.
- 12. Use a Computer: a. Use computer programs to analyze and visually represent biological data.