

The Indiana Academy for Science, Mathematics, and Humanities
AP Biology SCI04301.1
Fall 2023

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Office hours: M 3-5 PM, T 2-5 PM, W 3-5 PM, R 4-5 PM, F 3-5 PM

Class meetings: in Burris 211, MWF 9-10 AM, Lab Thursday 8-10 AM

Course description (from the Catalog):

Prerequisite: Fall – Successful completion of two semesters (or equivalent) of General Biology and General Chemistry or permission of instructor

Spring – Successful completion of first semester AP Biology or permission of the Science Division Chair.

Co-requisite: AP Biology Lab (SCI4301L/4302L)

Credit: 1.5 credits per semester

Offered: Fall/Spring Sequence

This Advanced Placement course provides an accelerated, comprehensive, and thorough overview of the field of biology in preparation for the AP Biology exam. The course covers biological chemistry, cell biology, Mendelian genetics, evolutionary theory and principles, and an overview of the diversity, structure and ecology of organisms. Laboratory activities follow the required AP Biology lab exercises and other lab activities. Students will prepare for and are encouraged to take the AP Biology exam in May.

Course student learning outcomes:

At the end of the course, students will:

1. have an awareness of the integration of other sciences into the study of Biology,
2. understand scientific processes,
3. know how to apply science methodology,
4. recognize how our own species is similar, yet different, from other species
5. become knowledgeable and responsible citizens in understanding biological issues that could potentially impact their lives.

Course materials:

Urry, Cain, Wasserman, Minorsky, and Orr. 2020. *Campbell Biology in Focus*, 3rd ed., Pearson Education Inc.

Field and lab notebook

Please note that some aspects of this course may need to be changed during the semester, so this syllabus is subject to revision. If the syllabus is revised during the semester, the updated syllabus will be posted on Canvas. Please refer to Canvas for updated information.

Assignments:

The assignments for the course are shown in the table below.

Category	Number	Points each	Total points	Percentage
Multiple choice exams	5	70	350	35%
Constructed response (essay) exams	5	70	350	35%
Homework			150	15%
Laboratory exercises			150	15%
Total			1000	

Grading scale: A: 90-100%, B+: 85-90%, B: 80-85%, B-: 75-80%, C: 70-75%, C-:65-70%, D*: <65%

Grades will be posted on Canvas and Powerschool. If I am late posting grades, you can estimate your current grade in the course by adding all the points you have earned or anticipate earning from all assignments. There are 1000 points available in the course, so each point is worth 0.1%. **Please make an appointment to talk with me if you are concerned about your grade or uncertain about your standing in the course.**

Attendance

Please arrive on time for class. The instructor is required to take attendance so that all students are accounted for. If you are late, you may need to remind the instructor to change the absence to tardy. This will disrupt our workflow and possibly the workflow of others, so please try to avoid being late.

If you miss lecture for any reason, you are responsible for obtaining any notes, announcements, reading material, or assignments from the instructor or a classmate. If you miss a lab or field trip, it may be difficult to arrange for you to make it up. Participation in lab and field activities is essential for your own success and for that of any student working with you. If an unavoidable emergency or illness prevents you from attending class or completing an assignment on time, please inform the instructor as soon as possible (preferably beforehand).

The Academy and not the instructor determines whether an absence is excused or unexcused. You are expected to attend every class, but you are allowed one unexcused absence without penalty. Each additional unexcused absence will be penalized as follows.

unexcused absence #1: 1% subtracted from the final grade

unexcused absence #2: 3% subtracted from the final grade

unexcused absence #3: 5% subtracted from the final grade

For example, if the final percentage from your assignments for the semester is 92% but you had three unexcused absences, your final percentage will be 87%. Missing class repeatedly is likely to make it very difficult for you to succeed in the course.

Safety

Please familiarize yourself with lab safety protocols and perform procedures with care. Because we hold class in a science lab, no food, gum, or drinks can be brought into the classroom. Your work area

should always be free of clutter and only have the necessary materials (pens/pencils, notebook, etc.). If there are glassware breakage or equipment problems, please notify the instructor immediately to ensure proper safety and equipment protocols are followed.

Please stay near the group during field excursions. Wear sturdy shoes and protective clothes. Watch your step. Watch for moving vehicles.

Academic conduct

You will prepare for each class meeting by completing the reading and any assignments that are due. Some assignments will be submitted on Canvas, and some assignments will be submitted in class.

Although some activities such as labs may be completed in pairs or groups of students, each student is individually responsible for submitting assignments with original writing (not copied from your lab mate or any other source). You are encouraged to discuss answers to lab activities with other class members, but the wording should not be the same. Do not share word processing files with each other, but make sure each student has access to the raw data for analysis.

You are expected to conduct yourself according to the Indiana Academy Student Handbook (<https://academy.bsu.edu/handbook/>), especially the Code of Conduct and the section on Academic Integrity. On writing assignments, please be sure to use your own wording and cite all sources of information, whether from the Internet or otherwise. If you are not sure how to cite something, ask the instructor. Note that language copied verbatim from a book, website, another student's paper, or any other source is considered plagiarism unless it is in quotation marks and cited. Plagiarism is a form of academic dishonesty. Please do not plagiarize or cheat in any other way. An infraction may result in a 0 for the assignment. Also, the instructor is required to report any ethics violations to the Academic Integrity Board or (the Director of Academic Affairs and your parents).

Classroom conduct

Please do not engage in conversations that are not relevant to the class. Please be considerate of other classmates. Keep any devices not used for classroom activities silenced or off. Your phone should be put away if it's not being used for class. Phones, tablets, and laptops can be used in class for class activities, but repeated use for non-class activities may result in a loss of that privilege. Please treat each other with respect and refrain from annoying behavior. Do not interrupt another student or the instructor. If you are having difficulty getting a word in, you can raise your hand. Examples of improper conduct include having extended conversations, working on assignments for other courses, sleeping, etc. Serious and/or chronic problems may be cause for dismissal from the course. A calculator (but not a phone) may be used for exams.

Late work

If an absence is excused (see the section on attendance above), the instructor will make every reasonable effort to ensure the student has the opportunity to make up any assignments associated with the absence. A student who has an excused absence on the day an assignment is due must communicate with the instructor about an appropriate due date for missed work. Each student may submit 1 homework assignment late (beyond a 24-h grace period) for an unexcused reason without penalty if the

student tells the instructor it will be late. If work is submitted late without communicating with the instructor, the instructor may deduct 30%. Additional unexcused late work may be graded, but a penalty of 10% per day late may be deducted from the score at the instructor's discretion. Unexcused late work for a given unit cannot be submitted after the unit exam is completed.

Laboratory assignments must be submitted within 24 h of the due date, or 30% may be deducted at the instructor's discretion. If a student misses a lab session because of an excused absence, additional time may be granted to allow the student to make up the lab activity or a substitute activity.

If an exam is missed, it is the student's responsibility to contact the instructor as soon as possible to set up a time to make it up. The exam must be made up within the week of your return.

Dual credit

You can enroll to receive dual credit for this course through Ball State University (for Biology 111: Principles of Biology, 4 credit hours). Accordingly, this course emulates the content and rigor of the Ball State course, which is designed for majors in biology, allied health, and other sciences. The content provides a strong foundation in introductory college-level biology. Topics include the physical and chemical organization of life, prokaryotic and eukaryotic cell structure and function, bioenergetics, cell division, genetics, gene expression, protein synthesis, and evolution.

Library research

Through your association with Ball State University, you have access to an academic research library with many useful materials. This includes online access to many peer-reviewed biological journals through bibliographic databases to which Ball State subscribes. To access these databases, go to <https://www.bsu.edu/library>, and scroll down to "Databases". The databases are listed in alphabetical order by the first letter. Two good ones to try are Academic Search Complete under "A" and JSTOR under "J". When you click on one of these databases, you will be prompted to log into your Ball State account. You can search for articles on particular topics and then access the full text of many articles from the journal publishers' websites.

Special circumstances

If you need accommodations because of a disability, have emergency medical information to share with me, or need special arrangements in case the building needs to be evacuated, please make an appointment with me as soon as possible.

If you are struggling with study habits, stress, and/or personal issues, I encourage you to discuss the situation with your SLC and/or contact the Guidance Office for help in dealing with these issues so that you can thrive at the Academy. Many resources are available for students, and important contact information is listed below:

For tutoring: Donald Winslow (donald.winslow@bsu.edu) to find an Academy student tutor for science
To find a tutor through Ball State: iaguidance@bsu.edu
phone: 765-285-2889; office: WA 160-D

Mental health: Dr. Mindy Wallpe (mcwallpe@bsu.edu)
phone: 765-285-5483; office: WA 160-C

Ball State University Inclusive Excellence Statement:

Ball State University aspires to be a university that attracts and retains a diverse faculty, staff, and student body. We are committed to ensuring that all members of the community are welcome, through valuing the various experiences and worldviews represented at Ball State and among those we serve. We promote a culture of respect and civil discourse as expressed in our [Beneficence Pledge](#) and through university resources found [here](#).

Schedule (subject to revision as needed)

14 August—Introduction to class, safety, Big Ideas
16 August—Introduction to biology, chemistry of life
17 August—Lab safety, introduction to science practices
18 August—Structure of water and hydrogen bonding
21 August—Elements of life
23 August—Molecular building blocks and biological macromolecules
24 August—Predator/prey selection simulation, math in biology, essay writing, rubric setting
25 August—Exam over Unit 1 (Chemistry of life)
28 August—Cell structure and function
30 August—Cell size
31 August—Laboratory activity with potato cells, cell size
1 September—Plasma membranes
6 September—Permeability
7 September—Exploring osmosis with dialysis tubing
8 September—Membrane transport
11 September—Facilitated diffusion
13 September—Tonicity and osmoregulation
14 September—Practice grading essays
15 September—Cellular mechanisms of transport
18 September—Cell compartmentalization
20 September—Exam over Unit 2 (Cells and the cell cycle)
21 September—Artificial selection laboratory
22 September—Cellular energetics
25 September—Introduction to metabolism
27 September—Enzyme structure
28 September—Enzyme computer probe laboratory
29 September—Enzyme catalysis
2 October—Environmental impacts on enzyme function
4 October—Cellular energy
5 October—Seed respiration laboratory
6 October—Parent-teacher conferences
12 October—Tuesday labs meet on Thursday so no AP Bio lab
13 October—Photosynthesis
16 October—Cellular respiration

18 October—Fitness
19 October—Photosynthesis lab with leaf disks
20 October—Exam over Unit 3 (Cellular energetics)
23 October—Cell communication and the cell cycle
25 October—Cell communication
26 October—Cell communication lab with termites and/or human case studies
27 October—Signal transduction
30 October—Changes in signal transduction pathways
1 November—Positive and negative feedback
2 November—Endocrine disease lab and/or human hormone case studies
3 November—The cell cycle
6 November—Cell cycle regulation
8 November—Exam over Unit 4 (Cell communication and the cell cycle)
9 November—Nerve signaling lab and/or human case studies on nerve signaling
10 November—Heredity
13 November—Meiosis
15 November—Meiosis and genetic diversity
16 November—Mitosis lab with slides and manipulatives
17 November—Mendelian genetics
27 November—Non-Mendelian genetics
29 November—Environmental effects on phenotype
30 November—Meiosis lab with slides and manipulatives
1 December—Chromosomal inheritance
4 December—Exam over Unit 5 (Heredity)
6 December—Chi-square analysis
7 December—Chi-square analysis laboratory
8 December—Yeast genetics lab
11 December—Review for final exam
13 December—Review for final exam
14 December—Planning fast plant crosses for next semester
15-20 December—Final exams