

The Indiana Academy for Science, Mathematics, and Humanities
AP Biology SCI04302.2
Spring 2024

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Office hours: M 2-4 PM, T 4-5 PM, W 2-4 PM, R 2-5 PM, F 2-4 PM or by appointment
Class meetings: in Burris 211, MWF 10-11 AM, Lab Thursday 10 AM-12 PM

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;
6. apply biological principles such as heredity, evolution, and system interactions.

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	3	70	210	21%
Constructed response (essay) exams	3	70	210	21%
Final exam			140	14%
Laboratory exercises			160	16%
Quizzes			80	8%
Homework			160	16%
Participation			40	4%
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).

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.

Academic honesty

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).

Artificial intelligence (AI) technology

Technologies referred to as “artificial intelligence” (AI) are becoming increasingly salient in our lives, sometimes with more emphasis on artificial than on intelligence. The original Turing test for artificial intelligence is to engage in dialogue with what we would now call a “chatbot”. If the discourse is indistinguishable from that of a human, then it is considered artificial intelligence. Modern language models such as ChatGPT exemplify this approach by stringing together words from human writing to sound intelligent (without necessarily being intelligent).

These tools can be very useful, from simple spellchecks to generating computer code. As you adopt these technologies, however, it is important to verify that information you gain is correct and to avoid presenting as your own work that was produced by software or anyone else. You can avoid these pitfalls if you use the auto-generated content as a starting point but not as a finished product. Find the original sources of information and cite those. AI has this nasty habit of making up references that don't exist, so don't rely on it.

Computers, phones, and other personal devices

It is helpful to bring a laptop or tablet to lab, as we will often use such devices for data analysis or other class activities. Personal devices should not be used for non-class purposes during classtime. This is distracting to yourself and others and interferes with the learning process.

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. Late assignments not associated with excused absences may be accepted at the instructor's discretion, but no credit will be awarded if the instructor does not receive the assignment with enough time to grade it.

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.

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.

Infectious disease outbreaks

There is always the potential for the outbreak of a dangerous strain of COVID-19 or another disease. There is currently no campus-wide mask mandate, but if the CDC declares another health emergency and BSU puts a mask mandate in place, this policy may change. If and when masks are required on the BSU campus, the Indiana Academy will then follow the same procedure. If some or all of us need to switch to online learning for any length of time, look for directions on Canvas.

Student accommodations and special circumstances

If you have an IEP or a 504 that provides accommodations, have emergency medical information to share, or need special arrangements in case the building needs to be evacuated, please make an appointment with the instructor 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 addressing these issues so that you can thrive at the Academy. Many resources are available for students, and important contact information is listed below:

For guidance: Meg Wright (mewright@bsu.edu), phone: 765-285-7407; office: WA183.

To find a tutor: Than Win (than.win@bsu.edu)

For 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](#). (<https://www.bsu.edu/campuslife/multicultural-center>)

Schedule (subject to revision as needed)

4 January	Model replication, transcription, and translation with manipulatives for molecules
5 January	DNA and RNA structure, DNA replication
8 January	Transcription and RNA processing, translation
10 January	Replication fork drawing and labeling (Winslow gone for solid waste meeting)
11 January	Human karyotype lab
12 January	Gene expression from genes to proteins to phenotypic differences among organisms
17 January	Errors in processing of genetic information, mutations, and genetic variation
18 January	Start fast plants for crosses
19 January	Gene regulation and expression, cell specialization
22 January	Fast plant crosses, environmental effects on mitosis lab
24 January	DNA tools and biotechnology
25 January	Fast plant crosses, bacterial transformation lab
26 January	Review session for Unit 6 exam
29 January	Unit 6 exam on gene regulation
31 January	Evolution—descent with modification
1 February	Electrophoresis lab (DNA analysis with restriction enzymes)
2 February	Microevolution—the evolution of populations
7 February	Hardy-Weinberg equilibrium and microevolutionary forces
8 February	Investigating common descent in the great apes and humans
9 February	Darwin and natural selection
12 February	Artificial selection
14 February	Evolution of love (Winslow gone for solid waste meeting)
15 February	Population genetics
16 February	Evidence for evolution
19 February	Cladogram exercise (Winslow gone at HASTI conference)
21 February	Common ancestry
22 February	Natural selection lab with brine shrimp
23 February	Environmental change and adaptation
26 February	Genetic diversity and natural selection
28 February	Speciation
29 February	Phylogenetic tree of bears, fast plants
1 March	Macroevolution and diversification of lineages
11 March	Phylogeny and the tree of life
13 March	BLAST worksheet (Winslow gone for solid waste meeting)
14 March	Envirothon in greenhouse across the street (no AP Biology class)
15 March	Origin and history of life, extinction
18 March	Continuing evolution

20 March	Variations in populations
21 March	Population genetics and evolution lab
22 March	Review session for Unit 7 exam
25 March	Unit 7 exam on evolution
27 March	Ecology and the ecological hierarchy
28 March	BLAST pre-lab exercises
29 March	Physiological ecology—response to environmental cues
3 April	Phenology (timing of life history events and behavior), growth, reproduction
4 April	BLAST investigative lab
5 April	Coordination of biological mechanisms and homeostasis
8 April	Energy input and material exchange
10 April	Ecology homework (Winslow gone for solid waste meeting)
11 April	Squirrel behavior lab (field excursion)
12 April	Population biology, population density and growth, competition and cooperation
15 April	Animal behavior and communication between organisms, crow foraging
17 April	Community ecology, species interactions, and biodiversity conservation
18 April	Transpiration lab
19 April	Ecosystem ecology and the biosphere, energy flow and nutrient cycling
22 April	Earth Day teach-in on ecological sustainability
24 April	State Envirothon contest at Purdue (no AP Biology class)
25 April	Wildflower walk (field excursion)
26 April	Disruptions to ecosystems and climate change, restoration ecology
29 April	Review session for Unit 8 exam
1 May	Unit 8 exam on ecology
2 May	Walk to White River (field excursion)
3 May	Review for final exam