

Term Information

Effective Term Spring 2025

General Information

Course Bulletin Listing/Subject Area Biology
Fiscal Unit/Academic Org Introductory Biology - D0326
College/Academic Group Arts and Sciences
Level/Career Undergraduate
Course Number/Catalog 4901
Course Title Biological Capstone
Transcript Abbreviation Biology Capstone
Course Description A topical case study approach to integrating and synthesizing content across the life sciences.
Semester Credit Hours/Units Fixed: 2

Offering Information

Length Of Course 14 Week, 12 Week, 8 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 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 Biology 3501.xx or permission of instructor, and Rank 3 or 4 standing.
Exclusions Not open to students with credit for 3401.
Electronically Enforced Yes

Cross-Listings

Cross-Listings

Subject/CIP Code

Subject/CIP Code 26.0101
Subsidy Level Baccalaureate Course
Intended Rank Junior, Senior

Requirement/Elective Designation

Required for this unit's degrees, majors, and/or minors

Course Details

Course goals or learning objectives/outcomes

- 1.1 integrate facts and concepts from each of the themes to analyze biological phenomena.
- 1.2 analyze the fundamental interconnectedness of chemistry, physics, mathematics, and biology.
- 1.3 evaluate and reflect on the ethical implications of scientific and technological development on society.
- 2.1 evaluate the assumptions and methods of a study published in primary literature.
- 2.2 synthesize a persuasive scientific argument integrating multiple overarching themes from Goal 1 in an appropriate modality.
- 3.1 reflect on the role of biological sciences in society and how that role may be promoted.

Content Topic List

- Interaction and complexity of biological systems
 - Evolution
 - Information flow, exchange, and storage
 - Pathways and transformations of energy and matter
 - Structure and function
 - Scientific inquiry
 - Science/technology and society
 - Fundamental interconnectedness of chemistry, physics, mathematics, and biology
- No

Sought Concurrence

Attachments

- Biology 4901 Syllabus.pdf
(Syllabus. Owner: Andrews,Adam Lee)
- Biology Core Course Proposal 20240321.pdf: Cover letter and full proposal
(Other Supporting Documentation. Owner: Andrews,Adam Lee)

Comments

- The full proposal including both courses and the context for the Major and Minor is included for reference. *(by Andrews,Adam Lee on 04/01/2024 12:14 PM)*

Workflow Information

Status	User(s)	Date/Time	Step
Submitted	Andrews,Adam Lee	04/01/2024 12:14 PM	Submitted for Approval
Approved	Kulesza,Amy Elizabeth	04/01/2024 12:32 PM	Unit Approval
Pending Approval	Vankeerbergen,Bernadette Chantal	04/01/2024 12:32 PM	College Approval

Appendix G: Biology 4901 Syllabus



THE OHIO STATE UNIVERSITY

Biology 4901 *Biological Capstone* Autumn 2025 – 2 Credit Hours

Lecturer:

Email:

Office:

Student Hours:

other times scheduled by appointment

Course Coordinator:

Center for Life Sciences Education

Email:

Office:

Phone:

Class Meeting Schedule:

Lecture: Twice Weekly for 55 minutes

Prerequisites:

Biology 3501.xx or permission of instructor, and Rank 3 or 4 standing. Not open to students with credit for 3401.

Required Course Materials:

Our textbook will be the primary literature, both that provided to you on Carmen and that which you seek out to contribute to the class discussions.

Credit Hours and Work Expectation:

This is a 2-credit-hour course. According to Ohio State policy, students should expect around 2 hours per week of time spent on direct instruction in addition to 4 hours of homework to receive a grade of C average. [ASC Honors](#) provides an excellent guide to scheduling and study expectations.

Course Description:

From the Course Catalog: *A topical case study approach to integrating and synthesizing content across the life sciences.*

This offering of Biology 4901 will focus on Biotechnology as a theme to address the overarching principles that integrate the life sciences: biochemistry and macromolecules, cell biology, genetics, molecular biology, evolution, phylogenetics, and ecology. Students will understand how these principles interact in complex systems, how humans can manipulate those systems through development of technology, and the impacts of that technology on society.

Course Learning Outcomes:

Biology 4901 – <i>Biological Capstone</i>	
Goals	Expected Learning Outcomes
Goal 1: Students will integrate concepts related to the following overarching themes to analyze biological phenomena:	Successful students are able to ... 1.1 integrate facts and concepts from each of the themes to analyze biological phenomena.

<ul style="list-style-type: none"> • Interaction and complexity of biological systems • Evolution • Information flow, exchange, and storage • Pathways and transformations of energy and matter • Structure and function • Scientific inquiry • Science/technology and society • Fundamental interconnectedness of chemistry, physics, mathematics, and biology 	1.2 analyze the fundamental interconnectedness of chemistry, physics, mathematics, and biology.
	1.3 evaluate and reflect on the ethical implications of scientific and technological development on society.
Goal 2: Students will identify and evaluate primary literature to synthesize a persuasive scientific argument using an appropriate modality.	2.1 evaluate the assumptions and methods of a study published in primary literature.
	2.2 synthesize a persuasive scientific argument integrating multiple overarching themes from Goal 1 in an appropriate modality.
Goal 3: Students will value biology as an integral part of society and their everyday life.	3.1 reflect on the role of biological sciences in society and how that role may be promoted.

Grading and Evaluation:

Graded assignments may come in three forms, and students should note the expectations for each in the descriptions of our class assignments below:

- **Independent Work (↑):** Strictly non-collaborative, original-individual work. You may discuss this assignment only with your instructor. Discussions with other individuals, either in person or electronically, are strictly prohibited and constitute academic misconduct.
- **Required Collaboration (↑↑):** An explicit expectation for collaboration among students either in-class or outside (i.e., group work).
- **Optional Collaboration (↑↑↑):** Students are permitted, but not required, to discuss the assignment or ideas with each other. However, all submitted work must be one's original and individual creation.

Assignment	Points	Assignment Type
2 Exams (75 points each)	150	↑
Research Paper	75	↑
Scientific Poster	50	↑
Poster Peer Review	15	↑↑
Article Discussions (3 x 10 points)	30	↑↑
Article Evaluations (3 x 25 points)	75	↑
SALG	5	↑
Total Points Possible	415	

Exams (75 points each):

The exams will largely focus on the biotechnology content of the course. While the exams may include some multiple choice or similar question styles, the exams will largely be a short answer in format.

Research Paper (75 points total):

The research paper will focus on current literature in biotechnology research and be submitted individually in three parts. The paper will address skills in researching literature, evaluating sources, and

writing scientifically. Students will receive feedback on each portion and be expected to incorporate that feedback into a final paper.

- Introduction (10 points)
- Rough Draft (35 points)
- Final Draft (30 points)

Scientific Poster and Peer Review (65 points):

Students will present a summary of their research paper in the form of a Scientific Poster, which will be presented to the class during the last lectures in a traditional scientific poster session style event (50 points). Students will be expected to visit multiple posters and provide written feedback in the form of a peer review (15 points).

Article Discussions (3 x 10 = 30 points):

In multiple lectures, students will be expected to come prepared to discuss an assigned article and actively and in a meaningful way contribute to the discussion during at least three discussions. Participation will be monitored and assessed for credit.

Article Evaluations (3 x 25 = 75 points):

On three occasions noted in the course schedule, students will be asked to seek out a recent journal article, then provide a summary and evaluation of the article for a lay audience.

SALG (5 points):

At the end of the course, 5 points will be assigned based on participation in a survey, the Student Assessment of Learning Gains (SALG). Grades on the SALG will be based solely on completion.

Your Final Grade:

Your final grade will be based on the percentage of the 415 points that you earn during the course of the semester as described above. Please note that we do not grade the course on a curve and Carmen does not round averages up to the next nearest percentage point, so 92.11% and 92.97% both earn the grade of A-. Final letter grades will be determined by the university-approved grade scale below:

Grade Scale:

A	A-	B+	B	B-	C+	C	C-	D+	D	E
100 – 93.0%	92.9 – 90.0%	89.9 – 87.0%	86.9 – 83.0%	82.9 – 80.0%	79.9 – 77.0%	76.9 – 73.0%	72.9 – 70.0%	69.9 – 67.0%	66.9 – 60.0%	59.9 – 0%

Posting of Grades:

All grades will be posted on Carmen. After grades are posted you have 10 working days to challenge any grade or inquire regarding an unposted or missing grade. **After that time, grades are final.** To challenge or inquire about a missing grade, contact your laboratory instructor.

****IMPORTANT****

Make sure that all of your grades are properly posted on Carmen as you receive them. Challenges about grades, particularly after the end of the semester, will not be entertained after the 10-day grace period.

Late Assignments:

All assignments are due on the date and time prescribed in the course schedule. Late work will not be accepted except in rare (and documentable) circumstances.

Absences:

If you are too ill to take an exam or must miss for another legitimate unscheduled reason, you must contact the Course Coordinator within 24 hours of the exam. Make up exams will be given only to students who produce, at the make up or before, documentation of a legitimate reason (at the time of the absence) for missing the exam.

Valid excuses are limited to problems that are beyond the student's control, such as military duty, intercollegiate athletic or academic activities, funerals, etc. Medical excuses will be considered only if you have been treated by a medical professional on the day of the exam (excuses from the student health center website will not be accepted). Lack of transportation, loss of electricity, travel plans, etc. are not considered valid excuses. If you anticipate having to miss an exam due to attendance at a university sanctioned event or other qualifying conflict, you must contact the Course Coordinator at least one week in advance of the exam.

If you have no documentation to support your absence, or your absence from the exam is not for an excused reason, you will still be offered the opportunity for a makeup exam, with a 25% overall deduction on your exam score if arrangements are made within 24 hours of the original exam.

The format of makeup exams is at the discretion of the instructors. All makeup exams must be made up within one week of when the original exam was given.

Note: Check the date and time of the final examination now and make sure that this time does not conflict with your future plans. No early final exams will be given. The only makeup exam will be held on Wednesday, December xx at 9:00 a.m. and is available only in emergency situations and with prior approval of the Course Coordinator.

Excused absences include, but are not limited to:

1. Illness and injury
2. Mental health
3. Disability-related concerns
4. Military service
5. Death in the immediate family
6. Religious observance
7. Academic field trips
8. Participation in university sanctioned concert or athletic event
9. Participation in university disciplinary hearings

If you have a reason to miss class that is not listed above, please reach out to the instructor to discuss your options. It is the intention of the Center for Life Sciences Education to remain supportive of the needs of each of our students. Students who do not contact their instructor within 48 hours of the missed class will not be eligible for make-up work.

If you are isolating while waiting for a COVID-19 test result, please let me know immediately. Those testing positive for COVID-19 should refer to the [Safe and Healthy Buckeyes site](#) for resources. Beyond five days of the required COVID-19 isolation period, I may rely on Student Life Disability Services to establish further reasonable accommodations. You can connect with them at slds@osu.edu; 614-292-3307; or slds.osu.edu.

Accommodation of Special Needs:

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 us know immediately so that we can privately discuss options. To establish reasonable accommodations, we may request that you register with Student Life Disability Services. After registration, make arrangements with the Course

Coordinator as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. Only the course coordinator is authorized to complete SLDS accommodations. This will help us ensure that your individual needs will be met appropriately and fairly. SLDS contact information: slds@osu.edu; 614-292-3307; slds.osu.edu; 098 Baker Hall, 113 W. 12th Avenue.

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](#)

Weather or Other Short-Term Closing:

Should in-person classes be canceled, students will be notified as to which alternative methods of teaching will be offered to ensure continuity of instruction for this class. Communication will be via Carmen announcements and course-wide email.

Instructor Feedback and Response Expectations

- **Email response:** The CLSE's expectation of instructors is that emails will be responded to within one business day. If your email is sent during the evening or over the weekend, you may not receive a response until the next business day.

- **Class announcements:** I will send important class-wide messages through the Announcements tool in Carmen. Please check [your notification preferences](https://go.osu.edu/canvas-notifications) (go.osu.edu/canvas-notifications) to ensure you receive these messages.
- **Graded assignments:** Assignments will be graded and returned to you within one week after they were due. All scores are posted on Carmen no later than the day the graded assignment is returned.

Course Technology

For help with your password, university e-mail, Carmen, or any other technology issues, questions, or requests, contact the OSU IT Service Desk. Standard support hours are available at <https://ocio.osu.edu/help/hours>, and support for urgent issues is available 24x7.

- **Self-Service and Chat support:** <http://ocio.osu.edu/selfservice>
- **Phone:** 614-688-HELP (4357)
- **Email:** 8help@osu.edu
- **TDD:** 614-688-8743

Carmen

- Carmen, Ohio State's Learning Management System, will be used to host materials and activities throughout this course. To access Carmen, visit [Carmen.osu.edu](https://carmen.osu.edu). Log in to Carmen using your name.# and password. If you have not setup a name.# and password, visit my.osu.edu.
- Help guides on the use of Carmen can be found at <https://resourcecenter.odee.osu.edu/carmen>
- **This online course requires use of Carmen (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.**
- [Carmen accessibility](#)

CarmenZoom

- Office hours will be held through Ohio State's conferencing platform, CarmenZoom. A separate guide to accessing CarmenZoom and our office hours is posted on the course Carmen page under Files.
- Students may use the audio and video functions if a webcam and microphone are available. If not, there is still a chat function within CarmenZoom for the student to live chat with the professor or TA in the virtual office hours room.
- [Carmen Zoom](#) help guide

TurnItIn

- Students at The Ohio State University are accountable for the integrity of the work they submit. Therefore, you should be familiar with the guidelines provided by the [Committee on Academic Misconduct \(COAM\)](#) and [Section A of OSU's Code of Student Conduct](#) in order to meet the academic expectations concerning appropriate documentation of sources. In addition, OSU has made TurnItIn, a learning tool and plagiarism prevention system, available to instructors. For this class, you will submit your papers to TurnItIn from Carmen. When grading your work, I will interpret the originality report, following [Section A of OSU's Code of Student Conduct](#) as appropriate. For more information about TurnItIn, please see [the vendor's guide for students](#). Note that submitted final papers become part of the OSU database.
- Please know that I view TurnItIn first and foremost as a teaching tool to make you a better writer. You will see in your individual originality reports exactly what the instructors see. We WANT you to look at this report as soon as you submit your assignments. If you see an issue, please correct it right away, before we start grading the assignment. You can resubmit without penalty as many times as you want prior to the established due date for any assignment. After the due date, the late policy is in effect.

TopHat

- TopHat is a web-based response system that allows students to use their own devices provide responses in the classroom. This course uses Top Hat to promote active engagement, allow for synchronous feedback, and monitor attendance.
- [TopHat](#) help guide

Discussion and Communication Guidelines

The following are expectations for how we should communicate as a class. Above all, please remember to be respectful and thoughtful.

- **Tone and civility:** Let's maintain a supportive learning community where everyone feels safe and where people can disagree amicably. Remember that sarcasm doesn't always come across online and is not always appreciated in-person. The instructional team work very hard to provide a positive learning experience. Please keep this in mind and remain civilized and respectful in your class communications.
- **Citing your sources:** When we have academic discussions, please cite your sources to back up what you say.

Issue Resolution:

The CLSE believes that student concerns are usually most effectively addressed by the staff closest to the situation. Therefore, students are ordinarily expected to address issues or concerns first with their instructors. If the issue cannot be resolved by your instructor, or for some reason you feel that you absolutely cannot address your concern with your instructor, please feel free to contact the Course Coordinator or Assistant Director Adam Andrews (andrews.171@osu.edu).

Building Emergency Action Plan:

Each building on campus has a Building Emergency Action Plan (BEAP) outlining that specific building's specific procedures to be followed in the event of a range of emergency situations, including fire, weather, terrorism, chemical spills, etc. It is the role of every Buckeye to help keep each other safe and to be aware of these procedures. You can find all of the campus BEAPs at <https://dps.osu.edu/beap>.

Lyft Ride Smart:

Lyft Ride Smart at Ohio State offers eligible students discounted rides, inside the university-designated [service area](#), from 7 p.m. to 7 a.m. Prices may be impacted by distance, traffic, time of day, special events and prime time surcharges. To qualify for program discounts, users must select "shared ride" when booking in the Lyft app. For more information, visit: <https://ttm.osu.edu/ride-smart>.

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 or calling 614-292-5766. CCS is located on the 4th Floor of the Younklin 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.

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.

Diversity:

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.

Academic Misconduct:

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 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/csc/>. We will adhere to this policy.

- Unless otherwise specified for a particular assignment, all submitted work should be a student’s own unique effort. Collaborative efforts are not permitted unless expressly sanctioned for a particular assignment.
- Unless otherwise specified for a particular assignment, use of AI-generated materials for course submissions is not permitted.
- Reusing past work: In general, you are prohibited in university courses from turning in work from a past class to your current class, even if you modify it. If you want to build on past research or revisit a topic you’ve explored in previous courses, please discuss the situation with me.
- Using others’ verbatim words without the use of quotation marks *and* citation is plagiarism. Paraphrased work requires citation to denote the use of others’ ideas. Copying other’s words without quotation while using citations is still considered plagiarism.
- Use of any technology during a quiz or exam (including but not limited to cell phones, smart watches, headphones, electronic dictionaries, etc.) is strictly prohibited.

Copyrighted Class Materials:

© The Instructor’s lectures and all course materials, including power point presentations, tests, outlines, assignments, and similar materials, are protected by copyright. You may take notes and make copies of course materials for your own use. You may not and may not allow others to reproduce or distribute lecture notes and course materials publicly whether or not a fee is charged without the express written consent of the course instructor or course coordinator.

Course Schedule: Autumn 2025

Schedule and assignments subject to change with as much advance notice as possible

Week	Lecture Topic	Assignments Due
1	Introduction / Population and Environmental Genetics	
2	Population and Environmental Genetics Article Discussion	
3	Medical Technology Diagnostics	Article Evaluation 1 Due
4	Medical Technology Therapeutics	Research Paper Introduction Due
5	Medical Technology Therapeutics Article Discussion	
6	Gene Therapy Article Discussion	Article Evaluation 2 Due
7	Exam 1 Autumn Break – No second lecture	
8	Genetic Counseling Article Discussion	
9	CRISPR	Article Evaluation 3 Due

10	CRISPR Article Discussion	Research Paper Rough Draft Due
11	Vaccination Development Article Discussion	
12	Vaccination Development	
13	Agriculture Biotechnology	
14	Agriculture Biotechnology Article Discussion Happy Thanksgiving - No second lecture	Research Paper Final Draft Due
15	Poster Presentations	Poster Due Poster Peer Review SALG Due
Finals	Final Exam	