BIOL B110

Biological Exploration I: Biochemical Basis of Disease

INSTRUCTORS

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COURSE OVERVIEW

Welcome to BIOL B110! BIOL B110 and BIOL B111 are **introductory-level** courses designed to encourage students to explore the field of biology at multiple levels of organization: molecular, biochemical, cellular, organismal and ecological. This year, we will **explore the ways molecular biology relates to the biochemical basis of disease**. An overview of topics we will cover:

- Biological definition of life and life's three domains (Archaea, Bacteria, Eucarya).
- The chemistry of life (carbon, water, macromolecules).
- Metabolism and energy intake and usage in the cell (respiration, photosynthesis).
- The central dogma of molecular biology (DNA > RNA > Proteins).
- Nucleic acid (DNA and RNA) structure, replication, and transcription.
- Protein synthesis and folding.
- How genetic mutations arise and their consequences.
- How cells reproduce (mitosis, meiosis, binary fission).
- Genetic basis of inheritance, focusing on classical (Mendelian) genetics.

WHERE AND WHEN?

Section 001: Mon, Wed, Fri 10:10 a.m.-11:00 a.m. Park Science Building **Room 180**

Section 002: Mon, Wed, Fri 11:10 a.m.-12:00 p.m. Park Science Building **Room 25**

Workshop days - Park Science Building **Room 100**

- Lab component[1]

COURSE PAGES AND CALENDAR

- **Moodle**[2] for all course documents, assignments, announcements, etc.
- **Piazza**[3] for questions/answers/discussions
- The **course calendar** will be provided separately and is also posted in the 'Course Overview' section on Moodle.

EXPECTED LEARNING OUTCOMES

By the end of this course, you will have:

- A **foundational knowledge** in biology, particularly in biochemistry, cell biology, molecular biology, and genetics.
- An appreciation for the **complexity of living beings** and the chemical basis for what we call life.
- An understanding of how cells function and the **molecular basis of heredity.**
- An understanding of how different aspects of an organism's biology can lead to disease: mutations, chromosomal abnormalities during cell division, viral and prion diseases, etc.
- The ability to **apply** this understanding to real life situations.
- Become familiar with the **scientific process**: hypothesis formation, experimental design, data analysis, interpretation, and conclusions.
- Strengthened your skills as **critical thinkers** and **scientifically literate** members of society.

COURSE STRUCTURE

- **Organized by week:** Each week will typically revolve around a ***central theme***, and all readings and assignments will be posted on Moodle under the appropriate section.
- **Pre-lecture readings:** Assigned readings will be provided. You are expected to complete these readings **prior to class** to become familiar with new terminology and concepts.
- A list of **key terms and concepts** will be provided each week. Use this list to guide you in your studies and in formulating questions (in class, in Piazza, or during office hours).
- We will post the **lecture slides** on Moodle in advance. We encourage you to download and/or print the slides to facilitate note taking in class.
- Most weeks will have **homeworks** and/or **in class workshops** which you will also find on Moodle (see below for further details).
- At the end of each week, there will be a **concept check mini-quiz (graded for completion)** posted on Moodle, to be completed no later than **Sunday at 11:59 pm**.

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[1] Please note that the laboratory component of this course is complementary to, but independent of the lecture, and the laboratory grade is determined solely by the laboratory instructor, Dr. Skirkanich.

[2] https://moodle.brynmawr.edu/course/view.php?id=2415

[3] https://piazza.com/class/krv3uxrvh5g2ec

- **TA-led student hours** will be offered twice a week (dates and times to be decided).

COURSE MATERIAL

Our textbook of choice is **Campbell Biology 11th edition** (ISBN: 978-0-13-409341-3). You may also use the 10th edition (ISBN: 978-0-321-77565-8). Relevant page numbers are indicated on the course calendar posted on Moodle. Copies of the textbook are **on reserve in Collier Library** in Park Science Building; PDFs of relevant pages will be provided on Moodle, as will any additional readings. You are strongly encouraged to use the textbook as a resource **to supplement material that is covered in lectures.** Be aware that lecture material may not be covered in the text, therefore, your text cannot replace lecture slides posted by the instructors.

ASSESSMENT AND GRADING

Work will be weighted as follows:

- Exams (2 midterms, one final): 35%
- Homework (7 in total, lowest grade dropped): 20%
- In-class workshops (9 in total, two lowest grades dropped): 7%
- **Participation and contributions** to the course: 8%
- Lab component: 30% (Dr. Skirkanich)

In general, grades in this class are assigned as follows:
93-100% = 4.0
89-92% = 3.7
85-88% = 3.3
81-84% 3.0
76-80% = 2.7
71-75% = 2.3
66-70% = 2.0

EXAMS

Midterms. There will be two midterms (worth 10% each). Students will be able **to pick up and return these exams at Collier Library** at any point during a five-day period when the library is open. Once the exam is picked up, students will have **90 minutes** to complete their checked-out exam and return it to the Collier front desk. These exams will be available on the designated Friday afternoon and must be completed by 10 a.m. the following Wednesday (see calendar)**.**
Collier Library hours: M-F: 9 am-10 pm; Sa, Sun: 10 am-10 pm (double check library hours for any last minute changes and plan accordingly).

Final exam (non-cumulative; worth 15%). Self-scheduled exam administered by Registrar's office.

Guidelines for exams:

- ***All exams will be closed book, closed notes, and non-collaborative. There will be no make-up exams.*** In the case of unforeseen circumstances that are out of your control, please contact the instructors as soon as possible.
- Exams will contain a mix of multiple choice, true/false, and short /long answer questions.
- When exams are returned to you, please take time to examine it immediately for mathematical accuracy. Also, please read the comments provided by your instructors. You have **one week from the time the exam is returned to request adjustments.** After that week, the score is considered final. If you request a revised grade, the entire exam will be re-graded.
- **How to succeed**: read textbook and go over lecture notes; submit concept-check mini-quizzes and homework on time; come up with questions (even if you think you don't have any) and post them on Piazza; use the 'key concepts' and/or 'learning goals' posted on Moodle to guide your studies. Note that the key concepts are a guideline to what is important but exams will require **to apply course material** rather than just share memorized facts.

WORKSHOPS

There are **nine workshops** scheduled throughout the semester that are designed to encourage active participation by students.

Guidelines for workshops:

- Workshop material will be posted on Moodle in advance. Please **carefully read and think about the questions before class,** where you will collaborate with a small group of your classmates to work through the questions.
- On workshop days **we will meet in Park 100**. Your **attendance on these days is mandatory.**
- **Your two lowest workshop grades will be dropped** (e.g., if you miss a workshop activity).

HOMEWORKS

Seven open note, open book homework sets will be assigned throughout the semester.

Guidelines for homeworks:

- Homework assignments will be posted on Moodle. They will typically include several multiple choice, true/false questions, and occasionally short and long-answer questions.
- **You must turn in hard paper copies of your homework in class on the due date indicated on the calendar.**
- The penalty for late homework is -10% for each day. Homeworks will not be accepted after five days after the due date.
- Post questions on **Piazza**. You are also encouraged to answer or comment on your classmates' questions. **You can do so anonymously and still get participation points.**

- You may work on these problem sets with your classmates, but you **must submit your own work.** Understanding the problems and being able to solve them independently will greatly facilitate your performance on the closed-book non-collaborative exams.
- **Your lowest homework grade will be dropped.**

PARTICIPATION AND CONTRIBUTIONS TO THE COURSE

Participation counts for 8% of your final grade.

Ways to participate/contribute:

- Attend lectures as regularly as possible.
- Ask/answer/comment in class and on Piazza (publicly or anonymously). You are expected to **ask and/or answer a minimum of five content-related questions on Piazza** this semester.
- Do all the pre-class preparation that is expected of you.
- Actively collaborate with classmates on workshops.
- Complete the concept check mini-quizzes on time (see below).
- Take the surveys we post on Moodle.
- Attend TA and instructors' office hours. You are not expected to attend office hours every week, but you are strongly encouraged to utilize this resource as often as you can.

Concept check mini-quizzes

- **Twelve concept-check mini-quizzes** will occur throughout the semester.
- They will be posted on Moodle on Friday and will be due on Sunday by 11:59 pm.
- These are graded for completion only, provided they are submitted by the stated deadline.
- These quizzes are for your own self-assessment as well as for your instructors to gauge your understanding of the material. If you realize your grasp of important concepts is suboptimal, good news! You still get your grade for completion and there is time to catch up before exams. How? Attend office hours, review notes, and ask questions on Piazza.

OFFICE HOURS, QUESTIONS, AND CONCERNS

- **TAs will hold two 1-hr office hour sessions every week**. These sessions will provide a forum for students to ask questions related to lecture material, homework, and workshops. The date and times for TA sessions will be posted on Moodle on a weekly basis.
- **Piazza** is the most efficient way to get **timely replies** from instructors and TAs on content related and course logistics questions, and they also benefit all members of the class.
- Dr. Bitarello and Dr. Chander will also offer office hours before exams (dates and times to be determined).
- Please be mindful that this course has 100+ enrolled students, so emailing is in most cases ineffective (since many of you have similar questions). For that reason, please consider using Piazza instead of email for general/content questions.
- For sensitive/personal matters/concerns about the course, students should **email <u>both</u>** Dr. Bitarello and Dr. Chander. We will try our best to respond to emails in a timely manner

between **9 a.m. and 5 p.m. Mon-Fri (EST).** ***Please do not wait until the last minute to inquire about matters of urgency.***

COURSE POLICIES

- **Use technology wisely**. We recognize that some students rely on or benefit from using their laptops/phones/tablets for notetaking, while others are distracted by digital devices. Please use silent mode and be mindful of others.
- If you arrive late to class or need to leave the classroom to visit the restroom, etc. try not to disturb others.
- Please refrain from engaging in non-Intro Bio related activities during class (ex. texting, etc).
- Please raise your hand to ask questions or make comments.
- **Video recording lectures is not allowed.** Audio recordings (*without video)* by individual students is allowed and may be shared with other members of Bio110 this semester. These audio recordings may not be shared outside of the Bio110 Fall 2021 community. The instructors will not video record you without your consent and knowledge.

HONOR CODE

All students in Bryn Mawr classes are bound by the Bryn Mawr College Honor Code. If you witness cheating by another student, you are expected to confront that person promptly but politely.

STUDENTS WITH LEARNING DIFFERENCES

Bryn Mawr College is committed to providing equal access to students with a documented disability. Students needing academic accommodations for a disability must first register with Access Services. Students can call 610-526-7516 to make an appointment with the Access Services Director, Deb Alder, or email her at dalder@brynmawr.edu to begin this confidential process. Once registered, students should schedule an appointment with the professor as early in the semester as possible to share the verification form and make appropriate arrangements. Please note that accommodations are not retroactive and require advance notice to implement. More information can be obtained at the Access Services website (http://www.brynmawr.edu/access-services/)

HOW TO STUDY AND ACADEMIC SUPPORT

Do you know how to study? This may seem trivial, but it actually isn't! There is a large body of studies on how we learn, and an overview of effective strategies can be crucial to your success in College. Bryn Mawr College has systems in place to help you achieve your best. We have posted below some good resources to get you started (if you find others, please share them on Piazza!):

- https://www.brynmawr.edu/academicsupport/academic-and-student-support-services
- https://www.uwo.ca/sdc/learning/selfhelp/resource_library/section_one.html
- https://learningcenter.unc.edu/tips-and-tools/studying-101-study-smarter-not-harder/
- https://open.lib.umn.edu/collegesuccess/chapter/1-3-how-you-learn/

HEALTH AND WELL-BEING

Don't burn out! College is a marathon, not a sprint. You will reap more benefits if you are consistent (attending classes, doing your assigned activities) than cramming an unreasonable amount of work into a short period of time. See the study tips above and take care of your physical and mental health. As a Bryn Mawr student, you have access to health services on campus, including mental health services. If you or someone you know if struggling, don't wait until it gets worse. Seek out the services available to you: https://www.brynmawr.edu/healthcenter/counseling-services/counseling-resources.

DIVERSITY AND INCLUSION STATEMENT

"I am, somehow, less interested in the weight and convolutions of Einstein's brain than in the near certainty that people of equal talent have lived and died in cotton fields and sweatshops."
-Stephen J. Gould

Science and everyday life cannot and should not be separated.
-Rosalind Franklin

In an ideal world, it would be possible for scientific practice to be done in a perfectly objective way, free of biases and preconceptions. However, it is not so. Scientists are flawed and human, and science is not free from that. We acknowledge that the history of science is also a history of who got the credit, and is dominated by white, male, colonialist, and racist ideas. We will try our best to acknowledge that by highlighting less known historical figures and providing a critical perspective on such matters whenever possible.

We see the diversity of backgrounds and identities our students bring as a strength: age, culture, disability, ethnicity, gender, nationality, religion, sexuality, socioeconomic status. We will try our best to provide an equitable learning environment for all students. We welcome and encourage students to reach out to us with any concerns or suggestions.

This syllabus is subject to change. While we will try our best to adhere to the schedule, occasionally changes may be necessary. If so, we will announce the change(s) both during lectures, in Moodle, and by e-mail.