

General Biology (BIO-005) Westmont College Spring 2019

Meeting Location and Time

Lecture: Clark Hall Room T

Section 1: Monday, Wednesday, and Friday 11:30 AM - 12:35 PM

Section 2: Monday, Wednesday, and Friday 12:45 PM - 01:50 PM

Laboratory: Whittier Science Room 101

Section 1: Wednesday 03:15PM - 06:15PM

Section 2: Thursday 08:30AM - 11:30AM

Section 3: Thursday 02:00PM - 05:00PM

Instructor and Office Hours

Instructor: Yi-Fan Lu, Ph.D.

Office: Biology Annex (same building as Dr. McQuade and Dr. Sparkman)

Office Hours: **TBD**

Phone: x6119; Email: ylu@westmont.edu

Course Introduction

Prerequisites: CHM 5. This course is the first semester of a two-semester introduction to Biology for those students who are planning to major in the sciences. The basic goal of the course, then, is for you to begin mastering the intellectual skills, the concepts, and the techniques that are required for active involvement in the scientific community as well as in the broader culture. Although there will be a substantial amount of information for you to learn in the course, it is important for you to understand that this process of maturing as a biologist is not simply a matter of memorizing facts. It is a process of improving your abilities, much as an athlete trains to compete in his or her sport. It is true; you will be mastering information and taking examinations, but you will also be learning how to work in a laboratory, how to ask questions and design experiments, how to think about the broader implications of biological principles, and how to communicate your ideas to others. As your "coaches" this semester, we are looking forward to working with you and helping you enter a world that has been a source both of challenge and of excitement for us through the years.

Biology 5 and the General Education Requirements. "Exploring the Life Sciences" is a requirement in the Common Inquiries section of the general education framework. Biology 5 and 6 both meet this requirement while, at the same time, providing a foundation for continued study of Biology at the upper division level. While one might argue that the entire Liberal Arts curriculum is a study of life, life scientists bring a particular focus to this enterprise. We view living organisms through the lens of the natural sciences, developing models of biological structure and function that are based on the analysis of matter and material processes. This course will give you the opportunity to develop your understanding of many of these models and to begin learning how to approach biological questions yourself through your work in the laboratory and in the field. In addition, because of Biology's focus, your study of life processes will inevitably lead you to questions to which Biology makes important contributions but which also require input from other disciplines. You will be considering some of these issues in

Biology 5 and 6, and the breadth of Westmont’s general education requirements will give you the opportunity to consider them from a variety of complementary perspectives as well. Specifically, through this course, you will develop competency that meets the General Education Learning Outcome(s) (GELOs): generalize how the scientific method can be used to investigate the physical and living world, among other outcomes, such as developing foundational knowledge, faith and science integration, and communication skills.

Student Learning Outcomes

Upon completion of this course, you will be able to:

Student Learning Outcome	Instructional Activity	Assessment
Describe fundamental principles of life processes from molecular, cellular, to organismal levels.	Lecture Discussion	Quiz Exams
Generalize how the scientific method can be used to investigate the physical and living world.	Lecture Discussion Laboratory experiments Independent project	Quiz Exams Laboratory reports Poster presentation
Develop basic understanding between scientific knowledge and the Christian faith	Lecture Discussion	Homework
Communicate scientific findings through oral presentations and scientific posters	Independent project Poster presentation	Poster presentation

Program Learning Outcomes (PLOs)

PLO #1. Students will effectively identify, and explain fundamental principles of life processes at different levels of structural organization.

Outcomes:

1. You will demonstrate your understanding of the following biological principles and phenomena.
 - a. Cell Structure and Function: includes biomolecule structure; structure and properties of biological membranes; structures and functions of cellular organelles and the cytoskeleton; membrane transport; respiration and photosynthesis; introduction to gene structure and expression; the cellular mechanisms and consequences of mitosis and meiosis.
 - b. Diversity of Multicellular Organisms: includes the structural and reproductive characteristics of land plants and an introduction to plant physiology and development. The animal kingdom will be considered in some detail next semester, along with an introduction to ecology and evolutionary biology.

Instructional activity: lectures, discussion

Assessment: quiz, homework, exams

PLO #2. Students will identify and describe how the scientific method can be used to investigate the physical and living world. Students will carry out scientific investigation in the lab and/or the field, with competence and confidence.

Outcomes:

1. You will locate biological literature that will provide information on a given subject.
2. You will be able to design and perform experiments with understanding, record data accurately, and interpret results using appropriate statistical analysis.

Instructional activity: laboratory exercises, independent project

Assessment: lab reports, lab notebooks, poster presentation

PLO #3. Students will be able to present the findings and implications of scientific research through written research reports, oral presentations and scientific posters.

Outcomes:

1. You will be able to communicate the results of an experiment using poster presentation methods.

Instructional activity: independent project

Assessment: poster presentation

PLO #4. Students will be able to identify and describe a wide range of controversies, positions, and approaches to the inter-disciplinary and theological implications of biological theory.

Objective:

1. You will be able to (a) explain the nature of biological investigation, (b) tell how the characteristics of this intellectual approach affect the types of questions that can be asked and the ways in which those questions are answered, and (c) describe ways in which science and faith have been related to one another.

Instructional activity: lecture, discussion

Assessment: homework

Course Material

Textbook: Mason, Losos, and Singer. 2017. Biology, 11th ed. McGraw-Hill.

Assignment and Grading

Midterm exams	36% (12% × 3)
Final exam	12%
Final exam – cumulative part	8%
Homework & quiz	15%
Attendance & class participation	4%
Lab assignments	25%
Total	100%

A+ 95-100%

A	92-94.9%
A-	90.0-91.9%
B+	87-89.9%
B	83-86.9%
B-	80.0-82.9%
C+	77-79.9%
C	73-76.9%
C-	70.0-72.9%
D+	67-69.9%
D	63-66.9%
D-	60.0-62.9%
F	≤59.9%

Course Policy

1. Expect Email Communication

Class announcement may be communicated in the class or through email. Please check your Westmont email regularly for both the class and college communications.

2. On-time submission of assignments

All assignments need to be submitted on time. Late submission will result in 10% reduction in grade per day.

3. Attendance

Lecture attendance is required and recorded. Except for sickness, pre-approved athletic events, or family emergencies, you are allowed to miss up to **three** classes per semester. According to Westmont's policy, > 3 absences will start to reduce your grade. For this class, you will lose the attendance and class participation portion (4% of the total grade) if you have more than three unexcused absence. Excessive absence (> 6 missing classes) may result in a withdraw from the class or a failing grade.

Laboratory attendance is required and recorded. Missing the lab session will result in the zero grade for that week's assignment (lab report, lab notebook, or project grade). Excessive absence (> 2 missing labs) may result in a withdraw from the class or a failing grade.

4. Class participation and attitude

All students are expected to actively participate in the classroom. A proactive attitude helps you to achieve the maximum learning outcome. Everyone in this class should establish and maintain a respectful, collaborative, and friendly environment to the classmates, lab partners, and instructor/guest lecturers. We will allocate the time for discussion. **Please do not chat or ask classmates questions during the lecture** because it could be disruptive to others.

1 Peter 2:17 (NIV): Show proper respect to everyone, love the family of believers, fear God, honor the emperor.

Mark 12:30,31 (NIV): Love the Lord your God with all your heart and with all your soul and with all your mind and with all your strength.' The second is this: 'Love your neighbor as yourself.' There is no commandment greater than these."

5. Technology usage

No cell phones are allowed to be used in class*. Laptops are allowed **only** if for the purpose related to the class (such as note-taking, software practicing, or look up class-related information). Please turn off unrelated applications, such as emails, messages, social media, movies, or games while using the laptop.

*Exceptions may be made on a case by case basis after discussion with the professor.

Tentative Lecture Schedule

Date	Textbook pages	Topic
Course Introduction		
Cell Structure and Function		
1/7		Course Introduction
1/9	1-8	Science: Method and Limitations
1/10	25-29; 36-37	Biomolecule Introduction
1/14	38-41	Lipids
1/16	44-53; 53-56	Proteins and Carbohydrates
1/18	59-63	Cell Theory
1/21		Martin Luther King's Birthday
1/23	63-73	Cell Structure 1
1/25	73-81	Cell Structure 2
1/28		Cell Structure 3
1/30	82-85	Intercellular Adhesion
2/1	88-96	Membrane Structure
2/4		Exam#1
2/6	96-104	Membrane Transport
Energy for Sustaining Cell Functions		
2/8	108-111	Energy
2/11	112-113; 123-124	Introduction to Metabolism
2/13	111-112; 113-119	Enzymes
2/15	125-130; 139-140	Glycolysis and Fermentation
2/18		Presidents' Day
2/20	130-133	Pyruvate Oxidation and Krebs Cycle
2/22	134-139	Oxidative Phosphorylation
2/25	134-139	Oxidative Phosphorylation
2/27	168-173; 178-180; 182	Cell Signaling and Metabolism
3/1	168-173; 178-180; 182	Cell Signaling and Metabolism
3/4		Exam#2

Information for Controlling Cell Functions

3/6	221-228; 231-232	Mendel and the Law of Segregation
3/8	221-228; 231-232	Mendel and the Law of Segregation
3/11	41-44, 256-263	DNA as the Genetic Material
3/13	41-44, 256-263	DNA as the Genetic Material
3/15	265-266; 278-281	Gene Function
3/18	189-198	Cell Division
3/20	189-198	Cell Division
3/22	198-204	Cell Cycle Regulation
3/25	198-204	Cell Cycle Regulation
3/27		
3/29	207-218	Sexual Reproduction and Meiosis
4/1		Exam#3

Multicellular Organisms 1: Plant Biology

4/3	588-589	Plant Kingdom Introduction
4/5	147-149; 151-155	Photosynthesis 1
4/8	156-163	Photosynthesis 2
4/10	590; 598-599	Seedless Plant Reproduction
4/12	610-616; 839-842; 847-848	Flowering Plant Reproduction
4/15	732-736; 748; 751-752	Plant Structure
4/17	740-741; 758-768	Plant Water Transport
4/19	804-808	Control of Plant Development
4/22	815-820	Plant Development 1
4/24	834-835	Plant Development 2

Final Exams

Section 1: Thursday, 5/2, 12:00-2:00 pm

Section 2: Tuesday, 4/30, 12:00-2:00 pm

Schedule Flexibility

The tentative schedule may not be final. The instructor reserves the right to adjust the syllabus or schedule according to the actual progress in the classroom.

Academic Integrity

All assignments, lab notebooks, and reports must be your own work. Any misrepresentation of the work that is not yours is considered an infraction of the academic integrity policy. **Useful tip: 1) Do not lend your work to other students. 2) If you use other people’s work, such as scholarly articles, please cite the source.**

Dishonesty of any kind may result in loss of credit for the work involved and the filing of a report with the Provost’s Office. Major or repeated infractions may result in dismissal from the course with a grade of F. Be familiar with the College’s plagiarism policy, found at:

<https://www.westmont.edu/office-provost/academic-program/academic-integrity-policy>

- **Exams**

During the exams, the use of electronic device, talking, and any form of communication are prohibited. Leaving and re-entering the classroom during the exam are not allowed.

- **Questions?**

Please consult with the instructor if you are not sure if certain activities are considered a potential violation of the academic integrity policy.

Academic Accommodations

Students who have been diagnosed with a disability are strongly encouraged to contact the Office of Disability Services as early as possible to discuss appropriate accommodations for this course. Formal accommodations will only be granted for students whose disabilities have been verified by the Office of Disability Services. These accommodations may be necessary to ensure your equal access to this course.

Please contact Sheri Noble, Director of Disability Services. (310A Voskuyl Library, 565-6186, snoble@westmont.edu) or visit the website for more information: http://www.westmont.edu/_offices/disability

Writing Support

Writers' Corner, Westmont’s writing center, is a creative space where student writers can find friendly “test readers” as they develop projects for professors, employers, and others. Tutors support peers as they mature into more skillful and confident writers. Tutorials are free of charge; come visit us in Voskuyl Library 215. Clients with appointments get first priority; drop-ins are also welcome. Make an appointment using WCOonline at <https://westmont.mywconline.com/>

Distribution of Course Material Outside the Class

Any distribution of the course materials outside the class requires instructor’s permission. While I am happy to share the knowledge with the broader audience, please direct requests to me directly or ask for my permission.