

Biology 302: Cellular and Molecular Biology

Spring 2021 Syllabus

Course and Instructor Information

Lecture: Pre-recorded lectures will be posted to Canvas weekly. The format of the videos will be narrated PowerPoint slides and whiteboard diagrams. Some chapters will be covered in a single “lecture period” while others may take up to two lecture periods. Longer lecture videos will be spread across two “lecture periods.” When taught in-person, there are 150 minutes of lecture each week (two 75-minute lecture periods). You should anticipate having somewhere around 150 minutes of lecture video each week, although some weeks may be a little more and some weeks may be a little less. The length of time spent watching lecture videos may be increased depending on how often you pause or rewind the videos. Supplemental resources (videos, web sites, etc.) usually will also be provided in Canvas. These are intended to provide additional explanation and added visualization of the processes discussed in class. I highly recommend watching the supplemental videos as a study aid.

Professor: Dr. Matt Rogge
Office: CBB 345
Email: mrogge@uwsp.edu

Office hours: Tu 10:00-11:00 am (Virtual through Zoom)

Course Description This course will provide students with fundamental cellular and molecular biology concepts and is intended for students that do not intend on pursuing a career in cellular or molecular biology fields. All living things are composed of cells, which are the simplest unit of life. Although living things vary from simple unicellular microbes to complex multicellular plants and animals, cells operate in similar and predictable ways to carry out functions necessary for the perseverance of life. Cells are composed of various macromolecules that are used to build cellular structures and perform important functions within the cell. This course will begin with a discussion of the molecules involved in building a cell and then transition to explaining how these chemicals interact to carry out functions necessary for cellular activities.

Course Objectives

This course will...

- build on the knowledge of cell structure and function acquired from previous genetics and introductory biology courses
- compare eukaryotic and prokaryotic systems
- familiarize students with the flow of information from gene to protein and develop further understanding of how regulation occurs in the context of the cell
- discuss properties and functions of macromolecules that contribute to a cell’s ability to perform chemical, mechanical, and transport work

Student Learning Outcomes

- Relate processes of the central dogma of biology to cell structure and function
- Describe the role of proteins and their role in regulating cell function, cell division, and cell death
- Describe the structure of cell membranes, their role in regulating intracellular environments, and how they interact with the extracellular environment
- Describe the function of the cytoskeleton and its role in cell shape and movement
- Outline the processes of energy transformation and ATP production in cells
- Explain how signaling events occur within a cell

Required Textbook

Alberts et al., Essential Cell Biology. W. W. Norton & Company, Inc., New York, New York. Available from text rental.

Attendance

The entire course can be completed asynchronously, meaning there are no specific times or activities for which a student must be present.

Students are expected to complete all lecture activities in preparation for quizzes and exams by their due date and time. Graded exercises have a window of time in which they are available so that student schedules can be accommodated. Because of this flexibility, due dates and times **will not** be extended without a legitimate and documented reason.

Makeups for missed assignments will only be allowed in the event of illness or emergency, which **requires documentation**. The professor reserves the right to change the format of any makeup assignments, including exams. If you are aware ahead of time of a conflict with a scheduled exam, a **conversation** (email or Zoom) with the instructor is required **at least a week in advance** of the activity to discuss the situation and reasons for missing the activity. **A makeup assignment is not guaranteed to be allowed.**

If you become ill or have another legitimate excuse for not completing a course activity, let me know as soon as you can so that an alternative timeframe for completing assignments can be developed.

Grading

TOTAL COURSE POINTS: 470 POINTS

Course interaction

Students are required to participate in Zoom discussion sessions, participate in Canvas forum discussions, or complete a combination of the two throughout the semester. Participation will be broken up into 2-week increments: Weeks 1/2, Weeks 3/4, Weeks 5/6, Weeks 7/8, Weeks 10/11, Weeks 12/13, and Weeks 14/15.

There are no participation activities for Week 16, which is the last week of classes.

- **Biweekly** Zoom sessions will be held on Thursday morning (10:00-11:00 am) in Weeks 2, 4, 6, 8, 11, 13, and 15. The sessions will last approximately one hour and are student-driven, meaning that new material will not be presented during those sessions. These are intended for students to ask for clarification of the material covered, relationships to real-world events, or to have other relevant discussions related to the material covered in that 2-week block. Students can earn up to 10 points for participation in each Zoom discussion session. Each attending student must ask **at least one** unique question (5 points) and must be in attendance for the entire session (5 points) to receive full credit. **To receive credit for attending the entire session, your webcam must remain on for the entire session.** Students are not required to answer questions from other students during a Zoom session.
- **Weekly** Canvas forum discussions will be set up. Students can receive up to 5 points **per week** through participation in the discussion forums. To receive these points, a student must author a forum post that asks a question about a topic covered in lecture during that week (2.5 points). Each student must also attempt to answer another student's question about the material (2.5 points) in that week to receive the full point value for the week. A maximum of 5 points can be earned per week. To get the full 10 points for a 2-week block, the student must ask and answer a question in both of the weekly forum discussions for that 2-week block. While most forum questions will be answered by students (hopefully!), all questions will be answered by the instructor after a 48-hour window has passed (in other words, I will let the question sit for at least 48 hours before responding). If any student has a question that needs to be answered sooner, that questions should be asked in an email, during an office hour, or during a Zoom session. **Questions and answers must be posted by the Monday of the following week** (for example, to get points for the Week 3 forum discussion, a question and an answer to another student's question must be posted in the Week 3 forum by the Monday of Week 4).
- To earn the full 10 points in any given 2-week block (for example, Week 1/2, Week 3/4, Week 5/6, etc.), you must complete the requirements for **either** the Zoom discussion **or** the forum discussions for that 2-week block.

- If a student asks a question in both the Week 1 and Week 2 forums but does not answer another student's forum question in those forums, the student earns only 5 points for that 2-week period (5 of 10 points earned – 50%).
- If that same student attends the Week 2 Zoom session but does not participate (does not ask a question). The 5 points for attending the Zoom session **will not** be added to the 5 points from the forum discussion questions. Although there are 5 points for Zoom participation and 5 points for each question asked in the discussion forums, the student only partially **completed** the activities and will only receive partial credit. If the student attends the Zoom session **and** asks a question, however, then that student will receive the full 10 points for that block (the Zoom discussion requirements are fulfilled).
- Students can only receive the full 10 points in a 2-week block by **completing** one of the options for course interaction: 1) asking and answering questions in the forums for both weeks; or 2) attending and participating in the Zoom session in the second week of the 2-week block.
- It is not required that a student complete the same activity for every 2-week block. A student may earn 10 points for Weeks 1/2 by completing the forum discussion option and earn 10 points for weeks 3/4 by completing the Zoom discussion option. As long as the student completes one of the interaction activities during each 2-week block, the full 10 points will be awarded.
- The purpose of this requirement is to keep each student engaged throughout the semester. As such, a maximum of 10 points can be earned during any two-week interval. For example, completion of the Week 1 and Week 2 forum discussion is worth 10 points, but if a student also completes the Week 2 Zoom session (10 points), the student will receive a maximum of 10 points, not 20 points total (but GOOD JOB on being engaged!). Thus, when planning out how you want to participate in this requirement, you should view it in two-week intervals starting in Week 1.

Attendance at all (or as many as possible) Zoom sessions and participation in the Canvas forum discussions is encouraged. Engagement in discussion about the material is an important way to become more familiar with and better understand the material, in addition to recognizing how it applies to real-world situations.

Course Interaction Total Point Value: 70 points

Quizzes

Between exams, there will be online quizzes given through Canvas. There will be four quizzes, each worth 25 pts. The quizzes will be available to take 1-2 weeks before each exam, and you will have **four days** to complete the quiz once the quiz becomes available. You can take the quiz as many times as you want during those four days, but the grade you receive will be the **average score** of all your attempts. Each time you start the quiz, you will have **30 minutes** to complete it. The format of the quizzes will be any combination of multiple choice, true/false, matching, labeling, and ordering. Failure to take the quiz by 11:59 pm on the scheduled due date will result in zero points, and **no makeups or extensions are allowed**.

Quizzes Total Point Value: 100 points

Exams

There will be three exams during the semester (60 points each) and one during finals week (120 points). The semester exams cover the content covered since the previous exam, so the three 60-point exams are not cumulative. Realize, however, that information in later chapters builds on material from previous chapters, so some concepts will be repeated. In other words, view the semester continuously, not as units broken up by exams. The **Final Exam** will be worth 120 points, with 60 points coming from the last few chapters covered and 60 points of **cumulative** semester material. ***Prepare accordingly.*** The exams will be any combination of short answer, multiple choice, fill in the blank, labeling, and matching. Exams will be given in Canvas. The exams will become available at 12:00 am on the date of the exam and will be available until 11:59 pm on that same date. **You may only attempt each exam once.** For the 60-point exams, you will have **75 minutes** to complete each exam. For the final exam, you will have **150 minutes** to complete the exam. Failure to take the exam by 11:59 pm on the scheduled date will result in zero points, and **no makeups or extensions are allowed** without prior approval from the instructor.

Exams Total Point Value: 300 points

Canvas Quiz and Exam Settings

Because of the online nature of this course, I have limited ability to monitor academic integrity to ensure quizzes and exams are being taken by each student independently. Furthermore, my assumption is that students will use notes, the book, the internet, etc. while taking the quizzes and exams. As such, the quizzes and exams will be structured in a way that limits the usefulness of resources other than a student's personal knowledge of the material. In other words, you will have to know and understand the material, not rely on your notes and internet skills to answer the questions for you. This means each student must thoroughly study the material and ask questions about the material BEFORE exams and quizzes to ensure success on the exams and quizzes. In other words, do not assume that you will be able to look up the answer to most questions to get a good grade. Also note that **copying and pasting** information from internet sources is **PLAGIARISM** and will not be tolerated when answering short answer questions. The following Canvas settings will be used:

- **Randomized questions:** Quiz and lecture exam questions will be generated from a random set of questions, and individual students will not have the same questions as other students (the difficulty of different questions will be comparable). Possible answers for multiple choice, matching, etc. will also be given in a randomized order.
- **Time limits:** Quizzes and exams will have time limits for completion. Relying too heavily on looking up answers will take extra time and jeopardize your ability to complete all questions on these exercises. If you have a documented reason for needing more time on graded exercises, you can request extended testing times through the UWSP Disability and Assistive Technology Center (DATC; <https://www.uwsp.edu/datc/Pages/default.aspx>). Makeup assignments, extra credit, or bonus points **will not** be given if you run out of time on a quiz or exam.
- **One question at a time:** Quizzes and exams will be set up “one question at a time,” but you will be allowed to go back to previous questions if needed. Realize, however, that moving back and forth through the exam takes extra time.
- **Due dates/times:** Quizzes and exam are open for a period of time and have a definitive due date. If you have 75 minutes to complete an exam but start the exam 30 minutes before the time it is due, you will not have the full 75 minutes to complete the exam; you will only have 30 minutes. Once the due time occurs, Canvas will automatically submit your quiz/exam even if you have not completed it, and you will not have an opportunity to retake that quiz/exam or earn back any points missed. Thus, make sure you start the quiz/exam early enough to give yourself time to complete it before it is due.

Late Assignments

Participation assignments are due at 11:59 pm (before midnight) on the due date. Submitting anything after midnight will be assessed a 10% deduction with an additional 10% deducted for each additional day late. Quizzes and exams will be automatically submitted at 11:59 pm on the due date, so there will not be an opportunity to turn those assignments in late.

Final Grade Calculations

Grades will be calculated by dividing the total points received by the total points possible and multiplying by 100. The following scale will be used to assign a final grade.

93 to 100%	A	80 to 82%	B-	67 to 69%	D+
90 to 92%	A-	77 to 79%	C+	60 to 66%	D
87 to 89%	B+	73 to 76%	C	<60%	F
83 to 86%	B	70 to 72%	C-		

ROUNDING: Percentages with a decimal value of xx.50 or higher will be rounded up to the next whole percentage (e.g., 89.500% → 90%). Percentages with a decimal value less than xx.50 will be rounded down to the next whole percentage (e.g., 89.49999999% → 89%). **NO EXCEPTIONS.**

Expectations

You are responsible for viewing lectures and any supplemental material provided to ensure exposure to all the material covered. You are responsible for taking notes on the material to use for studying and asking questions for clarification of topics that you do not fully understand. I am more than willing and happy to work with you outside of class to further explain any topics. You can join office hours or email me to set up an appointment outside of office hours. If there is any way I can assist you in this class, do not hesitate to ask, and I will do my best to help.

UWSP values a safe, honest, respectful, and inviting learning environment. In order to ensure that each student has the opportunity to succeed, the University has developed a set of expectations for all students and instructors. This set of expectations is known as the *Rights and Responsibilities* document, and it is intended to help establish a positive living and learning environment at UWSP.

Academic integrity is central to the mission of higher education in general and UWSP in particular. Academic dishonesty (cheating, plagiarism, etc.) is taken very seriously. Don't do it! For more information, see the UWSP "Student Academic Standards and Disciplinary Procedures" section of the *Rights and Responsibilities* document, Chapter 14.

How to be successful in this class

- Develop good note-taking skills. Do not try to write down everything that is said. Sort through the information and make note of the important ideas and concepts being discussed.
- Reading and processing the information is the first step in learning the information. Learn to take notes with abbreviations so that you can spend enough time listening in addition to writing. Leave space in your notes so that you can go back and fill in more details later on.
- Be engaged in class activities. Process the information and put it in your own words. Answer questions when asked, even if you answer it in your head. If your answer is incorrect or lacking, make notes as to why.
- Do not study *for exams*. Studying that way promotes memorization, not understanding. Instead, study for learning and understanding.
- Do not simply try to memorize definitions. I will never ask you to define a term, and memorizing a definition is not sufficient for understanding biological concepts. You do, however, need to know what words mean in order to understand the questions I am asking on exams, so do not overlook the meaning of terms.
- Study frequently. Repetition is the key to learning *any* topic. Studying for 40 hours over the span of four weeks will be much more beneficial than studying for 40 hours the weekend before the exam.
- After you have studied and know some or most of the material, work with other students in the class and actively *discuss* the information. Explain mechanisms, theories, concepts, etc. to other students. The other students can help you fill in areas where you are deficient. You will find that explaining these things to someone else is one of the best ways to ensure you know and understand the information. Then have another student explain a different idea or concept and help them identify areas in which they are deficient.
- Begin studying your notes beginning with "big picture" ideas. Find the bigger concepts and make sure you have a basic understanding of those ideas. Once those bigger concepts are understood, add additional details relating to those ideas. By doing this, you construct "compartments" in your mind to store the details rather than simply trying to absorb all the details and hoping that they arrange themselves into a coherent idea. Ultimately, the difference between an A, a B, and a C is the level of detail that you know, but you should *begin* by focusing on the bigger picture.

- The level of detail that you will be required to know is the level of detail that I cover in lectures. The book has much more detailed information, which may help you better understand the material I cover, but I will not ask about the details I do not cover.
- When you do not understand something, **LOOK IN THE TEXTBOOK!** The book can give more detailed explanations and images that may help you better understand the material. Alternatively, use the internet. You have a wealth of information at your fingertips, use it! Watch the videos provided in the Supplementary section for each week. They contain animations and other explanations.
- When your notes do not make sense and the book does not help, schedule an appointment with me. I am here to help you learn. I do not expect you to be a molecular or cell biologist *before* taking the class. I understand that much of this material is new to you, and one or two lectures may not be enough for you to fully grasp the concepts. Do not be too stubborn to ask for help or you will risk falling behind.
- When answering short answer questions on exams, be sure you answer them ***clearly***. You should not expect me to interpret vague answers in your favor. Your ability to explain something clearly is related to your knowledge of the subject. If answers are not clear or direct, my interpretation is that you do not understand that topic very well.
- When I ask you to ***explain*** something, the answer should not be a one or two-word answer. A good explanation will incorporate answers to the following questions:
 - “**What** is happening?”
 - “**Why** is it happening?”
 - “**How** it is happening?”
 - Remember ***WHAT, WHY, and HOW***.
- Watch the following YouTube videos. The first is an hour-long lecture from psychology professor discussing how to study. The second is a 6 minute summary of the longer video.
 - <https://www.youtube.com/watch?v=IIU-zDU6aQ0>
 - <https://www.youtube.com/watch?v=23Xqu0jXlfs>

Access for all Students

The Americans with Disabilities Act (ADA) is a federal law requiring educational institutions to provide reasonable accommodations for students with disabilities. For more information about UWSP’s policies, see the University Handbook: <https://www.uwsp.edu/dos/Pages/handbook.aspx>

If you have a disability and require classroom and/or exam accommodations, please register with the Disability and Assistive Technology Center and then contact me **AT THE BEGINNING OF THE COURSE**. I am happy to help in any way that I can, but you need to be registered. For more information, please visit the Disability and Assistive Technology Center, located on the 6th floor of Albertson Hall (the Library).

Tentative Lecture Schedule

	Week	Dates	Topics of the Week	Chapter
Molecular Biology	1	Jan 26-29	Cells: The Fundamental Units of Life Chemical Components of Cells	1 2
	2	Feb 1-5	Chemical Components of Cells Energy, Catalysis, and Biosynthesis	2 3
	3	Feb 8-12	Quiz 1 (Chapters 1-2) available Feb 8-11 Energy, Catalysis, and Biosynthesis Protein Structure and Function	3 4
	4	Feb 15-19	DNA and Chromosome Structure DNA Replication and Repair	5 6
	5	Feb 22-26	EXAM 1 (Chapters 1-5) Feb 23 From DNA to Protein: How Cells Read the Genome	7
	6	Mar 1-5	From DNA to Protein: How Cells Read the Genome Control of Gene Expression	7 8
	7	Mar 8-12	Quiz 2 (Chapters 6-8) available Mar 8-11 How Genes and Genomes Evolve Analyzing the Structure and Function of Genes	9 10
Cell Biology	8	Mar 15-19	Membrane Structure EXAM 2 (Chapters 6-10) Mar 18	11
	9	Mar 22-26	SPRING BREAK – NO NEW MATERIAL	
	10	Mar 29-Apr 2	Transport Across Membranes Transport Across Membranes	12 12
	11	Apr 5-9	Quiz 3 (Chapters 11-12) available Apr 5-8 How Cells Obtain Energy from Food Energy Generation in Mitochondria and Chloroplasts	13 14
	12	Apr 12-16	Energy Generation in Mitochondria and Chloroplasts Intracellular Compartments and Protein Transport	14 15
	13	Apr 19-23	Cell Signaling EXAM 3 (Chapters 11-15) Apr 22	16
	14	Apr 26-30	Cell Signaling Cytoskeleton	16 17
	15	May 3-7	Quiz 4 (Chapters 16-17) Available May 3-6 The Cell-Division Cycle The Cell-Division Cycle and Sexual Reproduction	18 18/19
	16	May 10-14	Sexual Reproduction Cell Communities: Tissues, Stem Cells, and Cancer	19 20
	Finals	May 17-21	Final Exam Completed By Thursday of Finals Week	