

## Biology 314-Cell Biology

UW-Stevens Point

Fall 2019

**Instructor:** Dr. Ashley Driver

**Office:** CBB 307

**E-mail:** [adriver@uwsp.edu](mailto:adriver@uwsp.edu) (Please put 'BIO 314' in the subject line)

**Office Phone:** (715)-346-4256

**Lecture** (CBB 165): M W 9:30-10:45am

**Lab** (CBB 323): *Section 1* T 9:00-11:50am, *Section 2* T 2:00-4:50pm

**Office Hours:** Mondays from 1:00-2:00pm; Thursdays from 1:00-2:00pm, or by appointment.

**Course description:** Cells are the buildings blocks to life. During this course we will discuss the key features of cellular structure, function, and application to the field of biology. My goal as your instructor will be to provide you with the information necessary to create thoughtful and creative conclusions regarding these topics. Additionally, I will challenge you to use the scientific method to investigate various cell types and components in the laboratory environment. You are expected to attend and participate in classroom and laboratory activities and show respect to your colleagues and I during the semester. I look forward to our journey through cell biology and hope that you will find this class both rewarding and fun!

### By the end of the course a student should be able to:

- 1.) Identify biomolecules necessary for cellular function.
- 2.) Describe the structure and function of prokaryotic and eukaryotic cells.
- 3.) Understand the requirements needed for cells to create energy.
- 4.) Describe the processes involved in cellular transcription and signaling.
- 5.) Identify the main components required for cell shape, structure, and adhesion.
- 6.) Outline the process of growth, division, and death and how these are regulated.
- 7.) Give examples of how cells maintain their identity and how this impacts tissue formation.
- 8.) Understand how the application of cell biology impacts society through research and medicine.

**Textbook:** *Molecular Biology of the Cell, 6<sup>th</sup> edition* (MBoC 6e) by Alberts, Johnson, Lewis, Morgan, Raff, Roberts, and Walter (2015, Garland Science, New York/Oxford). The book should be available through the UWSP bookstore rental program at the Dreyfus University Center. Copies may also be available through Amazon rental. I do NOT advise using an older edition as there have been significant changes made to this book (due to growing knowledge in cell biology!!).

**Lab Manual:** "Experimental Cell Biology 2019" available at the bookstore.

### Point Distribution:

Exams (100 pts each x 4 exams)	400 points
Lecture Quizzes (11 quizzes, 1 drop)	50 points
Student Question Participation	6 points
Pre-Lab Preparation (12 labs)	24 points
Lab Reports (8 reports due)	100 points
Pre-Lab/Post-Lab Quizzes (11 quizzes, 1 drop)	<u>50 points</u>
	<b>630 points</b>

**Exams:** You will have four total exams in this course, each totaling 100 points. Exams are closed-notes, closed-book. These exams will be given in class on selected dates shown in the schedule. **Attendance is mandatory for exam sessions.**

**Lecture Quizzes:** Eleven 5-point quizzes covering lecture material will be posted on Canvas on Thursday evenings. You will have until the **following Sunday evening (at midnight CST)** to have these quizzes submitted with up to 3 total attempts to get full points. **You are expected to complete the quizzes independently. Sharing your quiz answers with other students or receiving quiz answers from other students constitutes academic dishonesty.** Due to these being available online for multiple days, **there will be no make-up quizzes.** Out of the 11 total quizzes, the lowest score will be dropped

**Student Question Participation:** During the semester you may be asked to submit questions on material being covered in the course. These questions will need to be submitted to me via e-mail ([adriver@uwsp.edu](mailto:adriver@uwsp.edu)) by a required deadline. Questions will be evaluated on both depth and accuracy. Failure to submit questions will result in a 0. No late questions will be accepted.

**Pre-Lab Preparation:** **You are expected to maintain a lab notebook.** This can be in the form of a spiral/bound notebook or binder with attached loose-leaf paper. Each lab has a “**pre-lab checklist**” where specific tasks are listed (e.g.- creating a hypothesis or drawing diagrams). At the beginning of each lab session I will be checking your notebooks to assess whether this has been completed. If you complete the pre-lab checklist fully, you get 2 points. If you have partial completion, 1 point. Incomplete pre-labs can include an insufficient hypothesis or lack of completing all bullet points. *Failure to complete pre-lab prior to lab session will result in a 0.*

**Lab Reports:** Lab reports will be due during the semester with varying point totals. You will be expected to write thorough and clear findings. Additionally, when applicable, you will be asked to interpret your data (i.e.- what do these results tell you? Why is this important?). *You are allowed one late lab report (up to 7 days after lab) with a 50% point reduction. After this, any late lab reports will get a 0.*

While many exam questions address materials covered in lecture, questions about experiments performed in the lab *are included on each of the four exams.* This includes the experiments for which students complete lab report forms for evaluation, as well as other experiments that do not require the completion of lab report forms.

Lab report forms are required for each of the following experiments. The point value of each form is indicated.

- *Experiment 2* (10 points)
- *Experiment 3* (10 points)
- *Experiment 4* ( 5 points)
- *Experiment 5* (10 points)
- *Experiment 6* (10 points): In-class lab report form
- *Experiment 7* (10 points): In-class lab report form
- *Experiment 8* (10 points): In-class lab report form
- *Experiment 9 and 10* (10 points)
- *Experiment 11* (10 points)
- *Experiment 12* (10 points)
- *Experiment 13* ( 5 points): In-class lab report form

Your attendance to lab sessions is **mandatory.** **Failure to attend the lab session will result in a 0 for your lab report grade.**

**Pre-Lab/Post-Lab Quizzes:** A total of eleven 5-point quizzes will be given during the laboratory session, with the lowest score dropped. **Lab quizzes cannot be made up without advance and approved notice of absence (see Absences).**

## Grading Scale:

91.0-100	A	81.0-88.9	B	71.0-78.9	C	60.0-68.9	D
90.0-90.9	A-	80.0-80.9	B-	70.0-70.9	C-	00.0-59.9	F
89.0-89.9	B+	79.0-79.9	C+	69.0-69.9	D+		

**Course grading:** Your grade in this course will be determined by dividing the total number of points that you earn by the total (600), then multiplying by 100, and rounding to the nearest 0.1%.

**Absences:** It is expected that you will *regularly* attend both lecture and laboratory sessions for this course. Success cannot be attained if you are not actively participating with your colleagues to understand the material.

- **If you are ill on the day of an exam or an in-class activity, you must contact me before class (if at all possible) and you should be prepared to provide documentation.** I must be notified of other conflicts, such as those arising from University sponsored athletic teams and student organizations, **at least two weeks prior to the event.**
- If you are a student athlete or student organization member whose team/organization will be traveling to away games/events on *any of the dates* on which in class activities or exams are scheduled, it is imperative that you provide me with your travel letter **as soon as you receive it** from your coach/advisor so we can schedule your makeup activities/exams.

**Electronic Devices:** Laptops will be allowed in lecture with the premise that they are used for the *sole purpose of accessing course material during class time*. It is expected that you stay on task and do not cause distraction during the class period. Moreover, it is expected that you will silence your cell phone during class and refrain from using text messaging/surfing the web/etc. during the class period. Please be respectful!

## Academic Policies:

Academic misconduct (as outlined and defined by Chapter 14 in the Academic Handbook. <https://www.uwsp.edu/acadaff/Pages/handbook.aspx>) will NOT be tolerated in this course. As a student you are expected to show integrity and honesty! Cheating or plagiarism related to any of the course assessments **will not be tolerated** and result in a score of zero for that assessment.

## Disability Services:

Any student who feels that he/she may need an accommodation based on the impact of a disability should contact the Disability and Assistive Technology Center (Room 609 Albertson Hall, [datctr@uwsp.edu](mailto:datctr@uwsp.edu)). If you have already registered with this office and would like to discuss your class accommodations for the semester, please set up an appointment to meet with me privately.

## Grade Discrepancies:

Grades will be posted on Canvas throughout the semester. If there are discrepancies on any assignments, quizzes, or exams they can be addressed with the instructor, in person, up to *one week* after the grade is posted (for online quizzes) or the assignment/exam/quiz is handed back in class. After this time, the grade will stand with whatever was originally granted.

**Emergencies:**

In the event of a medical emergency call 9-1-1. Offer assistance if trained and willing to do so. Guide emergency responders to victim.

In the event of a tornado warning, proceed to the first floor of the CBB Building where there is designated shelter rooms. In the event of a fire alarm, evacuate the building in a calm manner. Meet outside the building and notify instructor or emergency command personnel of any missing individuals.

Active Shooter/Code React – Run/Escape, Hide, Fight. If trapped hide, lock doors, turn off lights, spread out and remain quiet. Call 9-1-1 when it is safe to do so. Follow instructions of emergency responders.

See UW-Stevens Point Emergency Procedures at [www.uwsp.edu/rmgt/Pages/em/procedures](http://www.uwsp.edu/rmgt/Pages/em/procedures) for details on all emergency response at UW-Stevens Point.

## Recommendations for improving course performance...i.e.- “How can I achieve my goals for this course”

### 1.) Understand that as your professor, I do not hand out grades...*you earn them.*

You are accountable for your performance which goes beyond assignments or exams. You are observed for performance and interactions in lab and lecture periods. You are accountable to reach out to me should you have questions or need assistance. As your professor *I am your resource*, so make sure you are following through when you need it!

### 2.) Assess your learning methods.

Research has shown that individuals take in information in different ways. There are four main categories for learning styles (VARK; V: Visual, A: Aural, R: Reading/writing, K: Kinesthetic). In certain cases, you may be a combination of learning styles (requiring visual and kinesthetic). By understanding how you take information, it can improve your study and even lecture habits. There are online quizzes that can help you understand what learning style fits you best (<http://vark-learn.com/the-vark-questionnaire/>). It may be helpful to take the quiz and see if you have a definitive learning style or if you are multi-modal. Does this fit with your study habits? Could it change them?

### 3.) Assess how you study.

One of the biggest errors I see with students is that when they study, they do so in a passive way. That is, they study with the book or answers right in front of them. The issue with this is that it isn't requiring the person to create an answer from blank and may allow them to “cheat” themselves by looking at the answer and assuming they know it. I recommend to all of my students that they *study in a way that mimics a testing environment*. Put yourself *under pressure* to create an answer from nothing. For example: create practice questions while studying, then close your notes/book/etc. and attempt to answer these questions on a *blank* sheet of paper. Once you have completed a set of questions, *grade your answer*. Then go back over material you answered incorrectly, review material, and retest yourself. Another way to be more active in your studying is to form *study groups*. Meet at the library and test each other- have one person at the white board and another asking questions. *If you can teach it to your peers, you know it!*

### 4.) Find balance.

While regular attendance and studying are essential for this course, there are other factors you must keep in mind! SLEEP is absolutely necessary (and no, that short nap between cramming does not count!). It is recommended to get 7-8 hours of sleep to allow your body to rest and repair each day. Avoid cramming and stressing yourself out. *Don't believe me?* Well I hope you'd believe science, which has shown that lack of sleep is detrimental to brain cell function: <https://www.nature.com/articles/nm.4433>.

### 5.) Be realistic.

To succeed you must be realistic in terms of your input and expected output. You will need to both attend and engage in course sessions (whether it be lecture or lab). You will need to *regularly* (yes, on *at least* a *weekly* basis) review information in this course to stay on track. You may need to seek assistance with course material (tutoring, study groups, office hours). You should seek out the instructor if you have questions or concerns. I have posted office hours, but should those not fit your schedule, please e-mail me and we can set up an alternate time. *You are accountable for your performance* and should regularly review your progress to determine whether you are on track for your goals.

Date	Lecture Topic	Book Chapters	Lab topic ( <i>Lab Manual #</i> )
9/4	What is a cell? How do we visualize it?	Chapter 9	Administrative topics/lab safety
9/9	The plasma membrane: structure and lipid properties	Chapter 10	Visualizing cells ( <i>Experiment 1</i> )
9/11	The plasma membrane: proteins	Chapter 3,10	
9/16	Membrane transport: principles and transporters	Chapter 11	Membrane Isolation from red blood cells ( <i>Experiment 2</i> )
9/18	Membrane transport: channels and electrical properties	Chapter 11	
9/23	Intracellular compartments and nuclear transport	Chapter 12	Membrane protein isolation and detection ( <i>Experiment 3</i> )
9/25	<b>Exam 1</b>		
9/30	Protein transport into mitochondria, chloroplasts, and the ER	Chapter 12	Protein sorting and vesicular trafficking ( <i>Experiment 4</i> )
10/2	Membrane transport: Endocytosis and exocytosis	Chapter 13	
10/7	Energy conversion in the cell: The mitochondrion	Chapter 14	Electron transport in mitochondria ( <i>Experiment 5</i> )
10/9	Energy conversion in the cell: Chloroplasts and photosynthesis	Chapter 14	
10/14	The cytoskeleton: function, actin and myosin	Chapter 16	Myofibril structure and contraction ( <i>Experiment 6</i> )
10/16	The cytoskeleton: microtubules and intermediate filaments	Chapter 16	
10/21	<b>Exam 2</b>		Motility of demembrated flagella ( <i>Experiment 7</i> )
10/23	Gene expression: Transcriptional controls and regulators	Chapter 7	
10/28	Gene expression: Cellular memory and post-transcriptional control	Chapter 7	A study of ameoboid movement ( <i>Experiment 8</i> )
10/30	Cell signaling I: Principles and G-protein coupled receptors	Chapter 15	
11/4	Cell signaling II: Enzyme coupled receptors and gene regulation	Chapter 15	Cell Signaling in slime mold ( <i>Experiment 9</i> )
11/6	Cell Cycle: Mitosis	Chapter 17	
11/11	Cell Cycle: Meiosis	Chapter 17	Cell signaling in rat adrenal glands ( <i>Experiment 10</i> )
11/13	Cell Death	Chapter 18	
11/18	<b>Exam 3</b>		DNA fragmentation and cell apoptosis ( <i>Experiment 11</i> )
11/20	Cell Junctions: Cell-to-cell and Cell-to-matrix	Chapter 19	
11/25	Cell Junctions: Cell-to-matrix	Chapter 19	Adherent cell cultures and integrins ( <i>Experiment 12</i> )
11/27	Cancer Cell Biology	Chapter 20	
12/2	Developmental Biology: Morphogenesis	Chapter 21	Cancer cell characteristics ( <i>Experiment 13</i> )
12/4	Developmental Biology: Neurogenesis	Chapter 21	
12/9	Tissue regeneration/Stem cell biology	Chapter 22	Cancer cell characteristics ( <i>Experiment 13</i> )
12/11	Pathogens and Infection	Chapter 23	
	<b>FINAL EXAM- 12/17/2019 2:45-4:45PM in CBB 165</b>		