

---

# BIOLOGY 314 – Cell Biology

## Fall 2022 Course Syllabus

**Instructor:**

Dr. Michael Steury

Email: [msteury@uwsp.edu](mailto:msteury@uwsp.edu)

Office: CBB 315

**Course Information:**

Lecture – MW – 2:00 – 3:15 PM CBB 165

Lab - Room 323, Chemistry Biology Building (CBB)

Section 01L1 – Tuesday: 11:00 AM – 1:50 PM

Section 01L2 – Tuesday: 2:00 PM – 4:50 PM

Office hours: Contact Dr. Steury to set up a one-on-one discussion via Zoom or in person

**Required Texts:** (Can be acquired at the university bookstore)

- Molecular Biology of the Cell, 7<sup>th</sup> edition (MBoC 7e) by Alberts, Johnson, Lewis, Morgan, Raff, Roberts and Walter (2022, Garland Science, New York/Oxford)
  - I do NOT recommend using older editions of this book for this course
- **Biology 314 Lab Manual** – purchase from the University book store
- A notebook dedicated just to this class is recommended

**Course Description and Objective:**

Cells are the building blocks of 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 both classroom and laboratory activities and show respect to your colleagues and myself during the semester. I look forward to our journey through cell biology and hope that you will find this class both rewarding and fun!

**Learning Outcomes:**

Upon completion of BIOL314, students will 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 mechanisms 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.
-

## Grading:

Grade Items	% of Course Grade
Exam I	16 %
Exam II	16 %
Exam III	16 %
Exam IV (Final)	16 %
Lecture Quizzes	10 %
Pre/Post-Lab Assignments	10 %
Literature Reports	16 %
<b>Total</b>	<b>100 %</b>

## **Grade Scale:**

<b>A ≥ 93%</b>	<b>B+ ≥ 87%</b>	<b>C+ ≥ 77%</b>	<b>D+ ≥ 67%</b>	<b>F ≤ 59%</b>
	<b>B ≥ 83%</b>	<b>C ≥ 73%</b>	<b>D ≥ 60%</b>	
<b>A- ≥ 90%</b>	<b>B- ≥ 80%</b>	<b>C- ≥ 70%</b>		

**Grades will be posted on Canvas**

## Exams/Quizzes/Assignments:

**Exams:** There will be four Exams given during the semester. The final exam will take place during finals week but will NOT be comprehensive. Lecture exams will include matching, multiple choice, short-answer and essay type questions. Exams will be designed to test your mastery of the material as well as your ability to apply critical-thinking skills. All exams must be taken for a grade. Missed exams can only be made up upon instructor acceptance of documentation for an excusable absence.

**Lecture/Lab quizzes:** Lecture quizzes will be given at the end of each week. These quizzes will cover only material from that week and are meant to be assess whether you have attended and incorporated the content from lecture or the prelab material. All quizzes will be completed on Canvas. Quizzes will not be allowed to be made up unless communicated in advance by an excusable absence.

**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. These are due BEFORE THE START of that weeks lab and will be uploaded to Canvas before you arrive. If you have completed all the required tasks you will receive full credit, if you have not completed the tasks or your answers are incomplete you may receive partial credit.

**Literature Reports:** Lab reports will be due during the semester reviewing primary literature articles of your choice about current lecture/lab topics. You will be expected to write clear and thorough findings. When applicable, you will be asked to interpret the data. You may be allowed one late report a semester (with a 50% point penalty), after that no late lab reports will be accepted.

Extra credit opportunities are not available to individuals, so please do not inquire about this. If extra credit is offered, it will be communicated and made available to the entire class.

---

### **Attendance Policy:**

- Your commitment to your courses will determine the your ultimate success!
- Attendance will not be formally recorded for lecture although it is strongly recommended that you attend each lecture in person. Lab attendance is mandatory and due to the intensive set up cannot be made up if missed. Any missed assignments cannot be made up without instructor approved documentation for an excusable absence.
- Excusable absences include illness, accident, family emergency, professional development activity, religious activity (see UWSP University Handbook Chapter 22), or university sanctioned event. Acceptable documentation is the instructor's discretion, but may be written or electronic documentation for the reason of absence. In the case you have an expected or unexpected absence, please contact the instructor **AS SOON AS POSSIBLE** to notify about the nature of the absence and determine if it can be excused.
- If you encounter a situation where you cannot attend class due to Covid-19 exposure or a required quarantine situation please contact me to make alternative arrangements.

Generally, missing any class will put you at a disadvantage in this and all courses. You are paying to attend this course and learn about Biology. Attending is the first step to getting your money's worth!

### **Academic Conduct:**

**Do not copy the work of other students; Do not represent the work of other students as your own; Do not share your work with other students**

You are responsible for the honest completion and representation of your work and for the respect of others' academic endeavors. Any action of cheating, plagiarism, or academic misconduct is subject to the penalties outlined in UWS University Community Rights and Responsibilities, Chapter 14. Please refer to the University Community Rights and Responsibilities rules and regulations for more information: <https://www.uwsp.edu/dos/Documents/CommunityRights.pdf#page=11>

Student assignments determined to be in violation of these policies will result in a grade of zero (0). Depending on the circumstance, students may receive further penalty in accordance with these policies.

### **Course Communication:**

Information about this course will be communicated through Canvas and/or sent to University email accounts. Students are responsible for/expected to check their University email regularly. If you use an email account other than your University account to contact the instructor, be sure your full name is included in the message!

### **Electronic Devices:**

Cell phones should be turned **OFF** and **NOT BE USED** during class times. No other communication or musical devices are allowed. Students needing an electronic language dictionary during exams may use one with permission from the instructor (see below). No video or audio recording of lectures is permitted without the prior permission from the instructor (see below).

### **Students Seeking Assistance & Students Disabilities:**

As the instructor, it is my goal to meet the educational needs of ALL STUDENTS and to provide the best learning environment possible.

---

---

Any students seeking/considering use of assistive technology, materials, or accommodations are encouraged to talk with the instructor at the beginning of the course. It is my goal to find the most effective way to teach all students. Students with a disability seeking accommodations should also register with the Disability and Assistive Technology Center (<https://www.uwsp.edu/disability/Pages/default.aspx>) in the Learning Resource Center (the Library).

## Suggested study habits:

It is often observed that people learn more when they encounter and interact with subject material in different ways. The following scale presents representative measures of how we might learn through different forms of interaction.

You learn:  
10% of what we **read**  
20% of what we **hear**  
30% of what we **see**  
40% of what we **see & hear**  
50% of what we **write**  
60% of what is **discussed**  
70% of what we **experience**, and  
95% of what we **teach**

### *Before each class:*

- a) Read the textbook chapters and summary sections that pertain to the info in the lecture slides (Powerpoint). While reading, take notes on the side of each slide to help clarify the information discussed in class. These notes can be used as lecture slide guide sheets.

### *Before the exam:*

- a) **Rewrite your notes!** For each lecture, continue developing your lecture slide guide sheets and write out the information that was covered for each slide. Try to describe any images/figures on the slide in your own words. Try to do this for each lecture BEFORE the next lecture. Then read it over once to see the whole picture or overall theme of that lecture. When appropriate, make a table of info to help compare concepts.
- b) **Anticipate exam questions.** Come up with 1-2 questions of your own from each slide to quiz yourself later. Definitions, short answers, problems, and comparisons are all good types of questions.
- c) **Study your notes.** At the end of each week you will have made lecture slide guide sheets that include your notes for that material. Before the week's lectures, read over your lecture slide guide sheets and highlight only the information you could not remember.
- d) **Focus your studies.** Before the exam you will have made a set of lecture slide guide sheets with the information you need to reinforce already highlighted. Focus on this highlighted material one or two days before the exam. Reread, highlight info that you are having trouble learning or remembering and say it out loud, to yourself, with another person from class, a friend or study group.
- e) **Practice questions.** At the end of each chapter, try the practice questions (suggested on D2L) before looking at the answers in the back of the book. Write down the ones you do not understand and ask the instructor for guidance with those problems.
- f) **Revisit your study questions.** Try to answer the questions that you generated for each slide. Study with someone in class and try to answer each other's questions.
- g) **Teach your peers.** If you can teach it to another person, then you know it!

### *The night before the exam:*

- a) **Value your sleep.** Being wakeful and well rested can help your performance on the exam. Be sure to get a good night's sleep before the exam. Cramming at the expense of sleep is not the best method.
- b) **Try to relax.** Study hard, but also seek ways to reduce your stress. Take breaks to help refocus your mind.

### *After the exam:*

- a) A good grade can result from **reading** the text and your notes, **listening** to lectures, **seeing** the words and figures, **writing** and **rewriting** notes from class, the **experience** of answering questions from the chapters or provided, and **discussing** topics with another person (saying it out loud).
- b) Your grade should reflect the amount of cumulative effort you put into your studying. Remember, for every hour of lecture, you should a lot two hours of designated studying time. In other words, for each exam you should be spending about 10-15 hrs studying! It isn't possible to effectively achieve that right before an exam.

**BIOL-314 COURSE SCHEDULE – Cell Biology, Steury**

	Date	Topic	Chapter	
September	7	Syllabus/Course Overview – What is a Cell? How do we visualize it?	9	Exam 1
	12	Plasma Membrane: Structure and Lipid Properties	10	
	14	Plasma Membrane: Proteins	3,10	
	19	Membrane Transport: Principles and Transporters	11	
	21	Membrane Transport: Channels and Electrical Properties	11	
	26	Intracellular Compartments and Nuclear Transport	12	
	28	Protein Transport into Mitochondria, chloroplasts and the ER	12	
October	3	<b>Exam 1</b>		Exam 2
	5	Membrane transport: Endocytosis and Exocytosis	13	
	10	Energy Conversion in the cell: The mitochondrion	14	
	12	Energy Conversion in the cell: Chloroplast and Photosynthesis	14	
	17	The cytoskeleton: function, actin and myosin	16	
	19	The cytoskeleton: microtubules and intermediate filaments	16	
	24	<b>Exam 2</b>		
	26	Gene expression: transcriptional controls and regulators	7	
31	Gene expression: cellular memory and post transcriptional control	7	Exam 3	
November	2	Cell Signaling I: Principles and G-protein coupled receptors		15
	7	Cell Signaling II: Enzyme coupled receptors and gene regulation		15
	9	Cell cycle: Mitosis		17
	14	Cell Cycle: Meiosis		17
	16	Cell Death		18
	21	<b>Exam 3</b>		
	23	Cell Junctions: Cell-to-cell and Cell-to-matrix		19
	28	Cell Junctions: Cell-to-matrix		19
	30	Cancer cell biology	20	
Dec.	5	Developmental Biology: Morphogenesis	21	Exam 4
	7	Developmental Biology: Neurogenesis	21	
	12	Tissue regeneration/Stem cell biology	22	
	14	Pathogens and Infection	23	
<b>EXAM 4 – 12/16 – 10:15 AM - 12:15 PM CBB 165</b>				

## Lab Schedule –

Wk	Lab Topic
2	Observations and Measurements of Cells Using Bright Field and Phase-Contrast Microscopy
3	Isolation and Erythrocyte Membranes and Observations of Normal, Crenated and Lysed Red Blood Cells
4	Separation and Analysis of Erythrocyte Membrane Proteins by SDS-PAGE and Detection of Glycosylated and Non-Glycosylated Forms of Aquaporin-1 with Immunoblotting Techniques
5	Protein Sorting and Vesicular Trafficking: GLUT4 Synthesis and Translocation in Mouse Embryonic Cells
6	Electron Transport in Mitochondria Isolated from Heart Muscle Tissue
7	Chemical Requirements for the Contraction of Glycerinated Muscle Myofibrils
8	Chemical Requirements for Recovered Motility in Demembrated Flagella
9	Amoeboid Movement in <i>Naegleria guberi</i>
10	Signal Transduction in Cellular Slime Mold <i>Dictyostelium discoideum</i>
11	Cell Signaling in Rat Adrenal Cells in Relation to Neuronal Differentiation
12	DNA Fragmentation in Human Leukemia HL-60 Cells during Apoptosis
13	Introduction to Mammalian Cell Culture: Adherent Cell Cultures and Role of Integrins
14	Investigations in Cancer Biology using Cultured Human Cell Lines

\*Course and/or lab schedule is subject to change. Any changes will be communicated to you by the professor\*