Syllabus
Cell 3134 Section 0001 & 0002
Term: Spring 2026

Instructor: Brent Bill, Ph.D.
Office: HPR109 Phone: 903-565-5883 Email: Canvas Email System
(The **best** way to contact me is to use the Canvas email system.)
Office Hours: Monday 10:00 AM- 11:30, Tuesday 12:30 PM-2:00 PM or by appointment.

Course Overview:
Modern principles used to study cell structure, number and components. We focus on macromolecule purification, electrophoresis,

Course Objectives:
This course provides the laboratory component for Cell 3334. It is highly suggested but not required that you take this at the same time as the lecture. Biology 3134 is an intensive course with a lot of material. It will be **critical that you keep up** with reading, studying, and completing assignments. This lab is designed to provide you with key marketable skills that are required to be a practicing biologist and to meet National Standards suggested by the America Society of Cell Biologists. By the end of this course, student should be prepared for upper division laboratory experiences or to work in a faculty member's lab. It is expected that you will be able to find online information on genes and proteins, develop basic laboratory skills and technique, learn to work with precision equipment, and be able to write, graph, and report your findings utilizing an electronic laboratory notebook.

Student Learning Outcomes:

1) Be able to access biological information from the published literature and online databases (NCBI).
2) Be able to utilize a citation manager to cite information properly.
3) Understand how to work safely in a biological laboratory and describe practices associated with sterile technique.
4) Be able to reliably use pipettes with accuracy and precision.
5) Understand the concepts of *in vitro* cell culture and perform basic cell manipulations and counting.
6) Understand basic concepts in microscopy (light, fluorescent, and confocal) and be able to image with bright and fluorescent microscopes.
7) Describe the structure and function of antibodies. Discuss how they are used specifically for immunohistochemistry and western blotting.
8) Be able to utilize online databases and tools to obtain and align protein sequences. Understand the significance of shared homology.
9) Describe methodologies for both RNA and DNA isolation.

10) Understand the concept and perform Reverse Transcriptase-Polymerase Chain Reactions.
11) Be able to perform gel electrophoresis and understand it utilization in assessing DNA.
12) Understand how restriction enzymes cut and can be utilized for biological experiments.
13) Describe the process of PCR cloning. Explain how blue-white selection and antibiotic selection are used to obtain the proper piece of DNA.
14) Analyze DNA sequences (Sanger) via online tools.

Required Textbooks and Readings:

1) BASIC CELL AND MOLECULAR BIOLOGY 4e: WHAT WE KNOW AND HOW WE FOUND OUT Gerald Bergtrom, 2020, *University of Wisconsin - Milwaukee*, bergtrom@uwm.edu, University of Wisconsin Milwaukee UWM Digital Commons. This text is open source and is available for free in Canvas.

2) Dr. Bill's 2025 Cell Biology Lab Manual: Each section will be provided in Canvas as handouts.

    a. Author: Bill, Brent R.
    b. Title: Cell Biology 3134 Lab Manual
    c. Publication Date: 2026

Special Course Notes: --

1) Regular Canvas access is required. carefully read all announcements. Canvas and student email should be checked **DAILY** for new announcements or messages. All official communication should be through the Canvas email system.

    a. On Canvas you will find lectures, assignments, discussion board posts, and much more that will be essential for you as you complete this course. Dates are tentative and subject to change; therefore, it is critical to pay attention to class announcements and in lectures. Proper notice through the Canvas Announcement System will be provided if this occurs. Course grades will be maintained in Canvas. **Please note that the percentage at the end of the grade book display will not necessarily be a good indicator of your grade in the class (see below).**

2) The faculty recommends obtaining Microsoft office from the University for all work.

3) This course requires you to use external websites (Benchling and NCBI) and a citation manager (Lean Library) to complete homework. These are free to use but require access to the internet.

Assignments and point values:

1.	Midterm Exam	100
2.	Final Exam	100
3.	Weekly activity	50
4.	Quizzes	100
5.	Benchling: Lab Notebook	100
Total Points		**450**

Grading Scale:

A	405 or greater
B	360 to 404
C	315 to 359
D	275 to 314
F	below 274

Late Work: **No late work will be accepted!** All assignment due dates are listed. Part of learning to be a scientist is learning time management. When you are in a job or working on grants - deadlines are final! If you miss the deadline, you cannot submit; therefore, this will be good practice for your future career. If for some reason you cannot attend class or turn in an assignment, please reach out to Dr. Bill to determine if a deadline extension can be granted.

Make-Up Exams

You must take the exams on the scheduled dates. Please check your calendars now, so that you do not have conflicts. If an absence cannot be avoided, the professor must be notified in advance. If a student is unable to take an exam when scheduled, following appropriate documentation of the absence, the professor will arrange a make-up exam or have you take an online version depending on the nature of the absence. Dr. Bill does not guarantee that the exam will be the same format or questions as the in-person exam.

Acceptable Documentation: University Note: Have your professor or coach email me a letter explaining the reason for the absence due to a prescheduled University excused absence or civil documentation: If there are other extenuating circumstances, please provide the obituary, police report, court documents, or other evidence explaining the absence.

If you are sick do not attend class or meet in person with your group. Email Dr. Bill, and we can make alternative arrangements. Zoom is available via Canvas, so that you could meet with your groups virtually.

Attendance Policy:

Given the hands-on nature of this course, we expect you to be in class. It is my belief that you cannot learn to work in a lab without performing the experiments. Therefore, you are required to attend:

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1 unexcused absence = - 25 points
2 unexcused absences = - 125 points, i.e. the max you could get is a C
3 unexcused absences = - 250 points, i.e. You will fail the course.
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Documentation

- University Note: Have your professor or coach email me a letter explaining the reason for the absence due to a prescheduled University excused absence.
- Doctors Note: If you are sick, please bring proof of your appointment, and have the doctor explain that you were indeed sick and should not or could not attend class. A note from the University COVID response team will work as well.
- Civil documentation: If there are other extenuating circumstances, please provide the obituary, police report, court documents, or other evidence explaining the absence.

Graded Course Requirements Information *TEC 51.9705 (HB 2504):*

Prelab Video Quizzes: Rather than doing the pre-laboratory lecture in class, I will record pre-laboratory lectures. Following these pre-laboratory lectures, students take associated quizzes posted in Canvas. You can take each quiz as many times as you like prior to the laboratory. The scores are averaged, so it is best to watch the video, take notes on it, and then take the quiz. That way you can maximize your score. This material will be assessed on the exams.

In Class Activities: At the beginning of class, we will use practice datasets and handouts to practice the analyses that you will be doing on the data that you will be collecting. You will work through this in groups prior to starting the lab to verify that you are comfortable with the analysis.

Lab Notebooks: We will be using the Benchling Web-based electronic notebook (https://www.benchling.com) for class. Formats will be discussed in class. This platform will allow us to have a record of your experiences and data in the laboratory. You will be expected turn in your notebook entries each week on Canvas. Your teaching assistant will assess your notebook based on the quality of your entry and accurate representations and analyses of your data.

Exam Policies:

Exam questions will be drawn from the video lectures, the lab manual, and from your practical experience gained in the lab. There will be two parts to each exam. The first part will be closed book and assess your knowledge on the content, while the second part will be open book/computer. I will expect you to perform the analyses you performed in class on a new dataset. Please note students often think they do not need to prepare due to the open nature of part 2; however, the more you prepare the less intense the experience is. My goal is to put you in a situation that will be similar to a job.

You are expected to follow the **University Honor Code**. All forms of cheating will be prosecuted harshly. Please note - cell phones are not allowed during the first part of the exam. Phones

should be kept on the table in front of you face down during the exam. The usage of a phone during the exam is grounds for an automatic 0. The professor may video the exams to validate any instances of cheating.

Extra Credit:
There will be opportunities to receive up to 25 points extra credit.

1) Make a Music Video about a biological topic that we covered in class. This video should be informative about the technique as well as entertaining because we will watch these either in class or in future classes:). You can work by yourself or in groups of up to 4 people. All members will receive the 25 points extra credit.

Or

2) You must find a paper in a journal that describes a technique that we have talked about or performed in class. You should compare their methodology with that you used in class. For appropriate journals see the techniques journal links below. Please answer the following questions (5 points each):

a) What technique did you choose to look at further?
b) What are the benefits of their procedure, or what hurdle are they trying to overcome?
c) How is their technique different than the one we used in lab?
d) Use Mendeley to Cite the paper appropriately using the Cell Format.

Class Expectations

- Be Courteous and on time for classes, with assignments, and when meeting with group members.
- Silence cell phones and other electronic devices, and do not answer your phone while in class.
- Discussion is welcomed during the at any time during the lab, so please feel free to ask/answer questions, seek clarification, etc. If you need extra help, or we are pressed for time during class, please see me during office hours or ask the question in the Q&A. If I do not get questions - I will assume you understand, and I can move on.
- Please do not hesitate to ask questions! Please realize, that if submitted via email, I may not receive the question and answer it immediately; however, I will try my best. For example, if you email me the night before the exam at 11:45 P.M., you may not get an answer until the next day, which may not be prior to the exam.
- If I am meeting with someone, please wait your turn. Do not just walk in and sit down. In some instances, we are discussing grades or other private matters, and it is unprofessional to interrupt.

- Due to unforeseen circumstances, I may use zoom office hours instead of in-person, If working with a student I may turn on the waiting room feature, if so please hang out until I can bring you in.
- Participate: Staying actively engaged in the activities and labs will increase your retention. It also helps me to understand if the class is understanding the material. Therefore, throughout the activities if there are questions please ask the teaching assistant or myself, and if common problems we may take them to the board.
- You will be tested on your ability to work in the lab. Therefore, it is critical you are involved and being a good lab partner!

Calendar of Topics, Readings, and Tentative Due Dates

Week #	*Class Topic*	*Readings*	*Assignments Due*
Week 1 S1: 1-14 S2: 1-15	Lab 1: Introduction to the lab (syllabus), NCBI, OMIM, Pubmed, LeanLibrary, Safety Tour, and Pipetting Basics.	Lab Manual Intro and Pipetting	Safety Quiz Safety Acknowldgement Contact Lens Waiver
Week 2 S1: 1-21 S2: 1-22	Cell Counting and imaging.	Lab Manual Cell Counting CMB4: Chapter 18: The Cytoskeleton	Benchling: Entry for Lab 1. Upload UT Tyler Biological Safety Video Lecture 1
Please note: 1/26 is the Census Date. I will be required to report attendance at this point. Please see https://www.uttyler.edu/registrar/policies/census_date.php for further details regarding Census.			
Week 3 S1: 1-28 S2: 1-29	Protein Extraction and Quantitation	Lab Manual: Protein Extraction	Benchling: Entry for Cell Counting and Staining Video Lecture 2
Week 4 S1: 2-4 S2: 2-5	SDS-PAGE and Western Blotting Started	Lab Manual: SDS PAGE	Benchling: Entry for Protein Video Lecture 3
Week 5 S1: 2-11 S2: 2-12	Western Blot Development, Immunohistochemistry.	Lab Manual: Western Blot and IHC	Benchling: Entry SDS-PAGE and Western. Video Lecture 4
Week 6 S1: 2-18 S2: 2-19	Bioinformatics	Lab Manual Bioinformatics	Benchling: Entry for Western Blot and IHC. Video Lecture 5
Week 7	Study week – No class		Benchling: Entry for Bioinformatics
Please note: Tuesday, 3-2 is the Last Day to Register for Spring Graduation.			
Week 8 S1: 3-4 S2: 3-5	Midterm Exam		

Spring Break! Officially March 9-13.			
Week 9 S1: 3-18 S2: 3-19	RNA Isolation	Lab Manual: RNA Isolation CMB4e: Chapter 12.5, 12.5.1, 15.2	Labster: RNA Isolation Video Lecture 6
Week 10 S1: 3-25 S2: 3-26	RT-PCR	Lab Manual RT-PCR CMB4e: Chapter 15.5	Benchling: Entry for RNA Isolation Video Lecture 7
Please note that 3/30 is the last day to withdraw from classes (W).			
Week 11 S1: 4-1 S2: 4-2	Plasmid Minipreps, Restriction Digests, and Agarose Gel Electrophoresis	Lab Manual: Minipreps, Digests, and Gels.	Benchling: Entry for RT-PCR Video Lecture 8
Week 12 S1: 4-8 S2: 4-9	Bioinformatics: Sanger Sequence Analysis and Primer Design	Lab Manual: Sanger Sequencing and Primer Design. CMB4e: Chapter 15.3	Benchling: Entry for Minipreps, Digests, and Gels. Vidoe Lecture 9
Week 13	No Class: Study week		Benchling: Entry for Sequence analysis and primer Design.
Week 14 S1: 4-22 S2: 4-23	Final Exam		
Fall Commencement: 5/1/26 or 5/2/26			
Final Grades Due: 5/5 (grades available shortly after)			