BIOL 341L: Cell & Molecular Biology Lab

Khwaja Hossain, PhD

Spring 2024

1 Semester Hours

Contact Information: Office Room#: SB 136; Email: k.hossain@mayvillestate.edu; Phone: (701) 788-4728
Hours of Availability: F: 12:00 – 1:30 PM or by appointment
Instruction Mode: On-campus face to face
Time Zone: All times indicated throughout this syllabus reflect Central Standard Time (CST)
How to address your instructor- By Name Khwaja
Learning Management System: Blackboard
Meeting Time and Location: Th 10:00-11:50; Room- SB142 (Greenhouse)
Zoom: https://mayvillestate.zoom.us/j/93492380743

Course Objective: The lab course is designed to help students grasp the fundamentals of Cell Biology from a hands-on approach enhanced with technology. Objectives are:

1) To understand the structure of prokaryotic and eukaryotic cells and differences between them
2) To learn the methods of manipulating nucleic acid and conversion of nucleic acid to mRNA and protein
3) To comprehend the biological macromolecules and techniques of their utilization

The labs are aligned to Composite Science Education Program Approval Standards through North Dakota's Education Standards and Practices Board (ND ESPB):

- 13047.1 Composite Science Major/General Science The composite/general science program requires that environmental science be incorporated within other courses or as a separate course. The composite/general science program requires:1. Coursework in biology, chemistry, physics, and earth science, including: a. Minimum of twenty four semester hours in one area, b. Minimum of twelve semester hours in two other areas, c. Minimum of four semester hours in the fourth area, d. Courses must be from those that the institution allows toward graduation in the science major. 2. Study of mathematics through the pre-calculus level (college algebra and above) and statistics

Course Description: The lab content encompasses basic laboratory procedures in cell and tissue culture, chromosome staining and visualization, use of gel matrixes in separating and detecting nucleic acids and protein, and analysis of nucleic acids databases using different bioinformatics tools.

Purpose of the course: This course is designed to make students proficient in applying techniques in analyzing cell structure and identifying cell components.

Lab layout: The lab will consist of following experiments

1. Introduction to General Safety and Laboratory procedures
2. Exploring plant and animal cells
3. Cell Organelles
4. Cell Membrane and Cell Defense
5. Osmosis and diffusion
6. Energy conversion efficiency in different types of organism
7. Tissue & Cell culture
8. Study of Genomic databases for cell wall biogenesis pathways

   * Subject to change

Instructional Strategies:

Course materials such as background, laboratory instructions, and worksheets will be made available before the lab. These will help you understand the content of the chapters and you will participate in class lectures and discussion.

Required/recommended text: There is no required text, labs with worksheets will be posted on Blackboard before class with instructions/procedures to perform the lab. You will be submitting completed labs in Blackboard and worksheet before the next lab.

Instructional Technologies Utilized in this Course

- Blackboard®
- Zoom
- MS Office Suite (Mac programs/documents will not be accepted because they do not open)

Method of Evaluation/Grading

Quizzes and Exams

Student grades will be based on your performance in the lab assignments. For example, if you have 10 labs each worth 100 points. You have a total of 10x 100= 1000 points.
Lab grades will be posted one week after they are taken, as, if you take a test on a Saturday you can expect grades will be posted the following Saturday.

Grading Scale

Letter Grade	Total Points	Total Percent
A	900-1000 points	90-100%
B	800-899 points	80-89%
C	700-799 points	70-79%
D	600-699 points	60-69%
F	Less than 600 points	Less than 60%

Expectations & Protocols:

As a student in this class, you are expected to:

1. Complete assignments in a timely fashion. Late work will be accepted only on pre-approval and will be deducted 5 points per day.

2. Consider spending sufficient time on other documents posted in this course, if you have any questions contact me. The best way to contact me is by email. I check my email regularly during regular working hours (M-F, 8:00 am – 5:00 pm) and will reply to you as soon as I can during those hours. I seldom check my email during the nights and weekends, so my response may take a little longer during those times. I will, however, try to respond to you within 48 hours of receipt of your message. I will also be emailing you and posting to the Blackboard Announcement Forum whenever necessary either with announcements of assignments or other things. If you choose to call my office and I do not answer, please leave a detailed message and I will get back to you as soon as possible. Again, I do not check my office phone messages at night and over the weekend, so if you call during that time, I will not respond until the following workday.

Instructor/Student Communication

1) The best way to contact me is by email. I will also be emailing you and posting to the Moodle Announcement Forum whenever necessary either with announcements of assignments or other things. If you choose to call my office and I do not answer, please leave a detailed message and I will get back to you as soon as possible. If you choose to call my office and I do not answer, please leave a detailed message and I will get back to you as soon as possible.

2) I check my email regularly during regular working hours (M- F, 8:00 am – 5:00 pm) and will reply to you as soon as I can during those hours. I seldom check my email during the nights and weekends, so my response may take a little longer during those times. I will, however, try to respond to you within 48 hours of receipt of your message. Again, I do not check my office phone messages at night and over the weekend, so if you call during that time, I will not respond until the following workday.

Important Student Information

In the Announcements section of the Blackboard Institution Page, you can view and download the Important Student Information document for the current academic year. It includes information about:

- ✓ Land Acknowledgement Statement
- ✓ Academic Grievance Concerns and Instructor English Proficiency
- ✓ NetTutor - Online Tutoring Program
- ✓ Starfish - Student Success System
- ✓ Students with Documented Disabilities
- ✓ Student Learning Outcomes / Essential Learning Outcomes
- ✓ Academic Honesty
- ✓ Emergency Notification
- ✓ Continuity of Academic Instruction for a Pandemic or Emergency
- ✓ Family Educational Rights and Privacy Act of 1974 (FERPA)
- ✓ Diversity Statement (Title IX)

Starfish – Student Success System

Starfish is Mayville State's Student Success & Early Alert System the faculty and staff use to report feedback on your academic performance, attendance, etc. If you receive a Starfish notification (will be sent to your @mayvillestate.edu email from the Student Success Center), please read it immediately – it will contain important information for you.

We Care About Your Success

Throughout the term, you may receive emails from Starfish® regarding your course grades or academic performance. Please pay attention to these emails and consider taking the recommended actions. They are sent to help you be successful! You will also have the ability to reach out for help by "Raising your hand" in Starfish and choosing between the "I Have a Question" flag and the "I Need Help" flag. After the flag has been raised the appropriate faculty or staff will make contact to see how they can assist you.

Once again, we are here to help you be successful!

In addition, your instructor may: (1) request that you schedule an appointment by going to Starfish, or (2) recommend that you contact a specific campus resource, such as tutoring or counseling. You may also be contacted directly by one of these services.

So be sure to log in to Starfish AND check your MSU email inbox on a regular basis. This is where you'll be notified about your academic progress throughout the semester. If you have any questions, you can visit the Starfish webpage on MSU's site found in the "Current Students" tab and under the "Academic Information" list.

NetTutor - Online Tutoring Program

NetTutor is a free, online tutoring service that provides one-on-one virtual tutoring sessions with a professional tutor, as well as a Question Center which allows students to privately post a question and receive a personalized answer within 24-hours in a variety of subjects. NetTutor does not require you to schedule an appointment, you can just "drop in" online for a live, one-on-one tutoring session. NetTutor helps students progress in the classroom and beyond!

Students with Documented Disabilities

You have the right to be accommodated if you are a student with a documented disability. Visit the Student Success Center, or contact them at studentsuccess@mayvillestate.edu, to design a solution that will help you succeed.

As required by Section 504 of the Rehabilitation Act and the ADA, appropriate and reasonable accommodations will be made for all students with documented disabilities (LD, Orthopedic, Hearing, Visual, Speech, Psychological, ADD/ADHD, Health-Related, and other) who request those accommodations to ensure full access to the academic opportunities of Mayville State University. To receive services, students must disclose their disabilities, request accommodations, and provide documentation showing necessary accommodation to the Director of Student Success and Disability Support Services. Any information shared will remain confidential.

Additional Information

This classroom is a place where you will be treated with mutual respect, and the course instructor welcomes individuals of all ages, backgrounds, beliefs, ethnicities, genders, gender identities, gender expressions, national origins, religious affiliations, sexual orientations, ability – and other visible or non-visible differences. All members of this class are expected to contribute to a respectful, welcoming, and inclusive environment for every other member of the class. MSU is committed to providing a safe learning environment, free of harassment and discrimination as articulated in our university policies located on our website at http://www.mayvillestate.edu/about-msu/consumer-information/title-ix/. MSU's policies require me as a faculty member to share information about incidents of gender-based discrimination and harassment with MSU's Title IX coordinator, regardless of whether the incidents are stated to me in person or shared by students as part of their coursework.

Labs	**Date:**
Week 1 – Introduction & Syllabus Review	1/13/2024
Week 2 – Basic Concepts & Understanding of Molecular Biology	1/20/2024
Week 3 – Cell Division	1/27/2024
Week 4 – Mitochondria in Action	2/3/2024
Week 5 – Organellar Activity	2/10/2024
Week 6 – Stress & Cellular Membrane	2/17/2024
Week 7 – Glycolytic Pathway and Gene Analysis	2/24/2024
Week 8- DNA Extraction, Quantification, & Gel Electrophoresis	3/2/2024
Week 10 – SPRING BREAK	
Week 11 – DNA Extraction, Quantification, & Gel Electrophoresis	3/23/2024
Week 12 – Restriction Enzymes & Fragment Analysis	3/30/2024
Week 13- PCR Analysis	4/6/2024
Week 14 – PCR Analysis	4/13/2024
Week 15 – Cell Culture Techniques	4/20/2028
Week 16 – Understanding of CRISPR Analysis for Gene Editing	4/27/2027
Week 17 May 6 to May 10 Final Week	