**BIOL 1114: General Life I – Molecular & Cellular Concepts**
Fall 2024 (4 credits)
Lecture: Dillard Hall, Room 121
Lab: Bolin Hall, Room 214

**Instructor:** Dr. Timothy J. Pegg, Assistant Professor, Department of Biology

**Contact Information:**

*Office* –Pierce Hall, Room 101
*Email* – timothy.pegg@msutexas.edu

**Office Hours:**

*Tuesdays*, 8:30 - 10:00am
*Thursdays*, 2:00 - 4:30pm

*Additional times by appointment

**Lecture Class Times:**

*Tuesdays & Thursdays*, 11:00am-12:20pm

**Lab Class Times:**

| | | |
|---|---|---|
| Section 11A | = | *Tuesdays*, 1:30-3:20pm |
| Section 11B | = | *Tuesdays*, 4:00-5:50pm |
| Sections 11C, 1HA (Honors) | = | *Wednesdays*, 1:30-3:20pm |
| Section 11D | = | *Wednesdays*, 4:00-5:50pm |

**Required Texts:**

1. *Life: The Science of Biology, 12th Edition*, by Hillis, Heller, Hacker, Hall, Laskowski, Sadava
    a. *Hardback version* = 978-1319017644
    b. *Paperback version* = 978-1319342821
    c. *Looseleaf version* = ISBN-13: 978-1319307059

2. *Life I: Molecular and Cellular Concepts, BIOL 1114 Laboratory Manual, 3rd Edition*, by Dr. William Cook and Dr. Jon Scales
    a. Labs uploaded to D2L as required

## Course Description:

Life I – Molecular & Cellular Concepts is the first in a two-course sequence designed for students majoring in the natural sciences. It introduces the principles and concepts that describe living systems at the molecular and cellular levels, including scientific methods of inquiry; features distinguishing viruses, prokaryotic, and eukaryotic cells; membrane structure and transport; metabolic processes and pathways; and macromolecules within an evolutionary framework.

## Course Objectives:

1. Understand and use scientific methods of inquiry and reporting
2. Identify properties of the major molecules of life.
3. Recognize the similarities and differences among viruses, prokaryotic cells, and eukaryotic cells.
4. Describe the structure of cell membranes and mechanisms for movement across membranes.
5. Identify important metabolic pathways including substrate, products, and regulatory interactions.
6. Describe information flow from nucleic acids to proteins including chemicals structures, synthesis, and regulation.
7. Recognize the unity and diversity of life and their origin in evolution through natural selection.

## Course Policies:

Excused Absences

Email me at least 24 hours before a planned event or absence. You will be responsible for the work and material we cover in class. Final Exams will not be excused unless an extraordinary circumstance has occurred.

Absences Due to Co-Curricular Events or Religious Observances

Classes missed due to participation in college-sponsored co-curricular events or college-recognized religious observances are considered excused absences provided appropriate procedures are followed. The student must notify the instructor at the earliest possible time before the absence and arrange to make up missed work as defined by the instructor's syllabus.

Unexcused Absences

If a student has an unexcused absence from class on the day of an exam or quiz normally a make-up will not be allowed; however, the instructor may make exceptions under extraordinary circumstances. There will be no make-ups for missed quizzes.

Class Dismissal

The instructor may dismiss students from lecture and lab sections due to instances of significant disrespect, disruption, discriminatory or threatening behaviors. Return to class will be prohibited prior to meeting with the instructor and Biology Department Chair to discuss the incident. A second instance of dismissal will result in permanent removal from the course and an automatic assignment of an "F" grade for lecture and lab. Immediate removal from the course and assignment of an "F" grade will result from severe instances of class syllabus and MSU College policy violations, regardless of the number of previous instances.

Desire-to-Learn (D2L)

D2L will be used as a means of communicating, as a location where you can access resources (ex. PowerPoints) that are required or useful for success in the course, and where you will submit some required work products. You can log into D2L through the MSU Homepage. If you experience difficulties, please use links to technical help found in the D2L site.

Tentative Grading Policy

| | | |
|---|---|---|
| Quizzes | = | 20 points/ea. (220 total) |
| Lecture Exams | = | 100 points/ea. (300 total) |
| Final Exam | = | 150 points |
| Research Paper (Honors) | = | 100 points |
| Lab Assignments | = | 15 points/ea. (210 total) |
| Lab Exam | = | 100 points |

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**Total Possible = 980 points (1,080 points, Honors)**

| **Grading Scale** | | |
|---|---|---|
| **90 - 100%** | **=** | **A** |
| **80 – 89.9%** | **=** | **B** |
| **70 – 79.9%** | **=** | **C** |
| **60 – 69.9%** | **=** | **D** |
| **0 – 59.9%** | **=** | **F** |

Exams will cover materials from lectures and chapter readings. Material for the Final Exam will be drawn from previous exam question topics and chapters covered after comprehensive over the entire semester.

Quizzes will be posted to D2L at the end of each week and will be due before the Tuesday lecture period.

Honors students will have an additional 2-page, double-spaced research paper due by the week **before** the Final Exam. This paper will cover one of a select list of topics in Biology provided by the instructor. The paper structured in the form of a review article from a peer-reviewed journal. A rubric will be provided at a later date to assist in writing this assignment.

Lab assignments will consist of questions, drawings or reports specified in your lab handout. Lab assignments will be due at the start of subsequent lab period (submitted through D2L).

A lab exam with be given during the last week of classes. The lab exam and cover material from the entire semester.

Late Assignments

Late assignments and quizzes will not be accepted unless prior approval is obtained by the instructor or teaching assistant(s) at least 48 hours prior to a given deadline. Unexcused absence from a lab will result in a grade of "0" for that session. Exceptions may be made regarding extraordinary circumstances.

Extraordinary circumstances

In the case of extraordinary circumstances (documented medical emergency, natural disasters, etc.), the instructor reserves the right to resolve grading issues on an individual basis and in accordance with criteria stipulated in the 2023-2024 MSU Student Handbook.

Electronics in Class

Cell phones, computers and other electronic devices must be turned off in class unless prior permission has been obtained by the instructor, they serve as accommodation to an impairment or disability, or must remain active as a requirement for an occupation (EMT, another medical professional, etc.). Failure to abide by these restrictions may result in confiscation of the device until the end of class, or removal from the lecture or lab session.

Usage of Artificial Intelligence

Students submitting written documents, data or other inputs synthesized from artificial intelligence software (ex. ChatGPT, Jasper, Google Bard, etc.) will be given a "0" on assignments and may be failed from the course in accordance with MSU's policies on academic dishonesty and plagiarism.

Student Expectations:

Students have responsibilities for achieving the course objectives. Learning is a process that requires skills and strategies, and you must actively develop those that work best for you. In this course the foundation of academic success includes:

- Attending lecture and lab sessions
- Reading the assigned lecture chapters and laboratory handouts
- Submission of assignments by their assigned deadlines
- Asking your professor (Dr. Timothy Pegg) for assistance and clarification of topics in a timely manner (e.g. **not** the day before an exam)

**University Policies:**

Campus Carry Rules/Policies

Effective August 1, 2016, the Campus Carry law (TX Senate Bill 11) allows those licensed individuals to carry a concealed handgun in buildings on public university campuses, except in locations the University establishes as prohibited. The new Constitutional Carry law does not change this process. Concealed carry still requires a License to Carry permit, and openly carrying handguns is not allowed on college campuses. For more information, visit Campus Carry.

Active Shooter Information

The safety and security of our campus is the responsibility of everyone in our community. Each of us has an obligation to be prepared to appropriately respond to threats to our campus, such as an active aggressor. Please review the information provided by MSU Police Department regarding the options and strategies we can all use to stay safe during demanding situations. For more information, visit Safety / Emergency Procedures. Students are encouraged to watch the video entitled "*Run. Hide. Fight.*" which may be electronically accessed via the University police department's webpage: *"Run. Hide. Fight."*

Smoking/Tobacco Policy:

University policy prohibits the use of tobacco products in any building owned or operated by Midwestern State University. Adult students may smoke only in the outside designated-smoking areas at each location.

Alcohol and Drug Policy:

To comply with the Drug Free Schools and Communities Act of 1989 and subsequent amendments, students and employees of Midwestern State University are informed that strictly enforced policies are in place which prohibit the unlawful possession, use or distribution of any illicit drugs, including alcohol, on university property or as part of any university-sponsored activity. Students and employees are also subject to all applicable legal sanctions under local, state, and federal law for any offenses involving illicit drugs on university property or at university-sponsored activities. Please refer to the **2023-2024 Student Handbook** for further information.

Academic Dishonesty:

Dishonesty within the academic community is a profoundly serious matter because dishonesty destroys the basic trust necessary for a healthy educational environment. Academic dishonesty is any treatment or representation of work as if one were fully responsible for it when it is in fact the work of another person. Academic dishonesty includes cheating, plagiarism, theft, or improper manipulation of laboratory or research data or theft of services. A substantiated case of academic dishonesty may result in disciplinary action, including a failing grade on the project, a failing grade in the course, removal from the course, and/or expulsion from Midwestern State University. Please reference the **2023-2024 Student Handbook** for additional information.

Services for Students with Disabilities

In accordance with Section 504 of the Federal Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990, Midwestern State University endeavors to make reasonable accommodations to ensure equal opportunity for qualified persons with disabilities to participate in all educational, social, and recreational programs and activities. After notification of acceptance, students requiring accommodations should make application for such assistance through **Disability Support Services**, located in the **Clark Student Center, Room 168, (940) 397-4140**. Current documentation of disability will be required in order to provide appropriate services, and each request will be individually reviewed. For more details, please go to Disability Support Services.

Grade Appeal Process

To appeal a grade, consult the Midwestern State University 2023-2024 Student Handbook and visit the following checklists: the Grade Appeal Checklist provides the timeline for appealing from the instructor to the next in line (dean of the college). The Academic Honesty Checklist describes the timeline for appealing from the instructor to the next in line (chair of department) and who must be notified of academic honesty infractions.

**Tentative Lecture Schedule**

| Week | Day | Date | Topic | Ch. Assignment |
|---|---|---|---|---|
| 1 | T | 8/27 | Syllabus, Introduction, Studying Life | Ch. 1 |
| 1 | R | 8/29 | Studying Life, Small Mol. & Chemistry of Life | Ch. 1, 2 |
| 2 | T | 9/3 | Small Mol. & Chemistry of Life | Ch. 2 |
| 2 | R | 9/5 | Proteins, Carbohydrates, Lipids | Ch. 3 |
| 3 | T | 9/10 | Proteins, Carbohydrates, Lipids; Nucleic Acids | Ch. 3, 4 |
| 3 | R | 9/12 | Nucleic Acids and the Origin of Life | Ch. 4 |
| 4 | T | 9/17 | Cells: The Working Units of Life | Ch. 5 |
| 4 | R | 9/19 | Cells: The Working Units of Life | Ch. 5 |
| 5 | **T** | **9/24** | **Exam #1** | ---- |
| 5 | R | 9/26 | Cell Membranes | Ch. 6 |
| 6 | T | 10/1 | Cell Membranes; Cell Comm. and Multicellularity | Ch. 6, 7 |
| 6 | R | 10/3 | Cell C. and Multicellularity | Ch. 7 |
| 7 | T | 10/8 | Energy, Enzymes and Metabolism | Ch. 8 |
| 7 | R | 10/10 | Energy, Enzymes and Metabolism | Ch. 8 |
| 8 | T | 10/15 | Pathways that Harvest Chemical Energy | Ch. 9 |
| 8 | T | 10/17 | Pathways that Harvest Chemical Energy, II | Ch. 9 |
| 9 | **R** | **10/22** | **Exam #2** | ---- |
| 9 | R | 10/24 | Photosynthesis: Energy from Sunlight | Ch. 10 |
| 10 | T | 10/29 | Cell Cycle and Cell Division | Ch. 11 |
| 10 | R | 10/31 | Cell Cycle; Inheritance, Genes & Chromosomes | Ch. 11, 12 |
| 11 | T | 11/5 | Inheritance, Genes and Chromosomes | Ch. 12 |
| 11 | R | 11/7 | DNA and its Role in Heredity | Ch. 13 |
| 12 | T | 11/12 | DNA and its Role in Heredity | Ch. 13 |
| 12 | T | 11/14 | Mutation and Molecular Medicine | Ch. 15 |
| **13** | **R** | **11/19** | **Exam #3** | ---- |
| 13 | R | 11/21 | Regulation of Molecular Medicine | Ch. 16 |
| 14 | T | 11/26 | Genomes | Ch. 17 |
| **14** | **R** | **11/28** | **No Classes – Thanksgiving Holiday** | ---- |
| 15 | T | 12/3 | Genomes, Recombinant DNA and Biotechnology | Ch. 17, 18 |
| 15 | R | 12/5 | Recombinant DNA and Biotechnology | Ch. 18 |

**Final Exam: Tuesday, December 10, 1:00pm – 3:00pm**

**Tentative Lab Schedule**

| Week | Dates | Topic | Manual Pages |
|---|---|---|---|
| 1 | 8/27, 8/28 | How to Succeed as a Biology Major | 5-8 |
| 2 | 9/3, 9/4 | Quantitative Laboratory Skills | 9-16 |
| 3 | 9/10, 9/11 | No Lab | ---- |
| 4 | 9/17, 9/18 | Measuring Bacterial Growth | 17-24 |
| 5 | 9/24, 9/25 | Reporting Scientific Data | 25-30 |
| 6 | 10/1, 10/2 | Care and Use of Microscopes | 31-42 |
| 7 | 10/8, 10/9 | Measuring Enzyme Activity | 43-48 |
| 8 | 10/15, 10/16 | Cell Division I & II | 49-54, 55-58 |
| 9 | 10/22, 10/23 | Restriction Endonucleases & Gel Electrophoresis | 59-64 |
| 10 | 10/29, 10/30 | Polymerase Chain Reaction | 65-68 |
| 11 | 11/5, 11/6 | Bacterial Transformation | 77-82 |
| 12 | 11/12, 11/13 | Growth and Screening of Transformed Bacteria | 83-88 |
| 13 | 11/19, 11/20 | Analysis of PCR Products and Plasmid ID | 89-90 |
| **14** | **11/26, 11/27** | **No Lab Sections** - Mining Genetic Data HMWK | 69-76 |
| 15 | 12/3, 12/4 | Biology Topic Presentations | ---- |

**Life I: Molecular and Cellular Concepts** contains a laboratory course component. Attendance at, and active participation in, all lab meetings are mandatory and important for you to get the intended exposure to a variety of topics and the means and methods by which some of those topics are investigated. Review of lab activities prior to the start of each lab is highly recommended, as several of the activities will be fast-paced and challenging to participate in without any preparation.

***The lab manual includes pages for some labs that will be turned in for credit toward the final lab score. Questions based on lab activities will be incorporated into major exams.***

Safety is as important to successful lab experience as engaged attendance. To that end, **10% will be deducted** from each lab score for failure to be ready to begin on time, for failure to wear minimal personal protective equipment, failure to follow instructions, and/or for bringing food and drink into the lab without express permission of the instructor.

The schedule of laboratory activities is listed below. Adjustments to the schedule may be made as necessary.