BIOL 1114: General Life I – Molecular & Cellular Concepts
Spring 2023 (4 credits)
Lecture: Bolin Hall, Room 127
Lab: Bolin Hall, Room 214

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

Contact Information:

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Office Hours:

Mondays, Wednesdays & Fridays, 10:00am-12:00pm
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
Section 11C = Wednesdays, 1:30-3:20pm

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. *Looseleaf version* available at the MSU Bookstore

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:

The successful student will:

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. After 4 unexcused absences, you will be dropped from the course.

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.

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)
Final Lab Practical	=	100 points

Total Possible = 1040 points (1140 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 selected weeks and will be due before the following Tuesday lecture period. A total of 11 quizzes will be posted during the semester.

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 after the first exam. 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 listed in your lab manual. Answers to assigned lab questions will be due at the start of subsequent lab period (submitted through D2L). A total of 14 assignments will be collected over the semester.

A Lab Practical with be given the last day of each laboratory section. The practical exams will cover material from labs across the entire semester.

Late Assignments

Late assignments will not be accepted unless prior approval is obtained by the instructor, or extraordinary circumstances occur.

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 2021-2022 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 an accommodation to an impairment or disability, and/or must stay on as a requirement for an occupation (EMT, medical professionals, etc.)

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 class
- Reading the assigned material
- Asking your professor (Dr. Tim Pegg) for assistance and clarification of topics when required

University Policies:

Campus Carry Rules/Policies
Effective August 1, 2016, the Campus Carry law (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 difficult 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 strictly 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:

Please refer to the (2022-2023 Student Handbook)

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.

Academic Dishonesty:

Dishonesty within the academic community is a very 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 2022-2023 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 a 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 2021-2022 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	1/17	Syllabus, Introduction, Studying Life	Ch. 1
1	R	1/19	Studying Life, Small Mol. & Chemistry of Life	Ch. 1, 2
2	T	1/24	Small Mol. & Chemistry of Life	Ch. 2
2	R	1/26	Proteins, Carbohydrates, Lipids	Ch. 3
3	T	1/31	Proteins, Carbohydrates, Lipids; Nucleic Acids	Ch. 3, 4
3	R	2/02	Nucleic Acids and the Origin of Life	Ch. 4
4	T	2/07	Cells: The Working Units of Life	Ch. 5
4	**R**	**2/09**	**Exam #1**	**----**
5	T	2/14	Cells: The Working Units of Life	Ch. 5
5	R	2/16	Cell Membranes	Ch. 6
6	T	2/21	Cell Membranes; Cell Comm. and Multicellularity	Ch. 6, 7
6	R	2/23	Cell C. and Multicellularity	Ch. 7
7	T	2/28	Energy, Enzymes and Metabolism	Ch. 8
7	R	3/02	Energy, Enzymes and Metabolism	Ch. 8
8	T	3/07	Pathways that Harvest Chemical Energy	Ch. 9
8	**R**	**3/09**	**Exam #2**	**----**
9	**T**	**3/14**	**Spring Break – No Class**	**----**
9	**R**	**3/16**	**Spring Break – No Class**	**----**
10	T	3/21	Pathways that Harvest Chemical Energy	Ch. 9
10	R	3/23	Photosynthesis: Energy from Sunlight	Ch. 10
11	T	3/28	Cell Cycle and Cell Division	Ch. 11
11	R	3/30	Cell Cycle; Inheritance, Genes & Chromosomes	Ch. 11, 12
12	T	4/04	Inheritance, Genes and Chromosomes	Ch. 12
12	**R**	**4/06**	**Easter Holiday Break – No Class**	**----**
13	T	4/11	DNA and its Role in Heredity	Ch. 13
13	R	4/13	DNA and its Role in Heredity	Ch. 13
14	**T**	**4/18**	**Exam #3**	**----**
14	R	4/20	Mutation and Molecular Medicine	Ch. 15
15	T	4/25	Regulation of Gene Expression	Ch. 16
15	R	4/27	Genomes	Ch. 17
16	T	5/02	Genomes; Recombinant DNA and Biotechnology	Ch. 17, 18
16	R	5/04	Recombinant DNA and Biotechnology	Ch. 18

Final Exam: **Tuesday, May 9, 1:00pm – 3:00pm**

Tentative Lab Schedule:

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 = that will be turned in for credit toward the final lab score.

Questions based on lab activities may 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, and/or for bringing food or drink into the lab.

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

Week	Dates	Topic	Manual Pages
1	1/17, 1/18	How to Succeed as a Biology Major	5-8
2	1/24, 1/25	Quantitative Laboratory Skills	9-16
3	1/31, 2/01	Measuring Bacterial Growth	17-24
4	2/07, 2/08	Reporting Scientific Data	25-30
5	2/14, 2/15	Care and Use of Microscopes	31-42
6	2/21, 2/22	Measuring Enzyme Activity	43-48
7	2/28, 3/01	Cell Division I: Modeling Mitosis & Meiosis	49-54
8	3/07, 3/08	Cell Division II: Viewing Mitosis	55-58
9	3/14, 3/15	Restriction Endonucleases & Gel Electrophoresis	59-64
10	3/21, 3/22	Polymerase Chain Reaction	65-68
11	4/04, 4/05	Mining Genetic Data – NCBI	69-76
12	4/11, 4/12	Bacterial Transformation	77-82
13	4/18, 4/19	Growth and Screening of Transformed Bacteria	83-88
14	4/25, 4/26	Analysis of PCR Products and Plasmid ID	89-90
15	**5/2, 5/3**	**Final Lab Practical Exam**	**----**