# Course Syllabus: Life I – Molecular & Cellular Concepts
# BIOL 1114-102/1H1
# Fall 2021
# TR 11:00-12:20 - BO 100
# T, W, R 1:30-3:20; 4:00-5:50 - BO 214

## Contact Information

Instructor: Dr. Bill Cook
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## Course Description

Life I – Molecular & Cellular Concepts is the first in a three-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. This is a face-to-face class for which there is no on-line or hybrid option.

## 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.

## Textbook & Instructional Materials

*Life – The Science of Biology,* Hillis et al. 12th ed. (including access to the MacMillan *Achieve* site);
Life 1 Laboratory Manual, Cook & Scales, **3rd Edition**
*Achieve* access for this course is part of the **Courseware Access and Affordability Program** at MSU Texas. Enrolled students are charged for required *Achieve* access on their student account with the Business Office. Any student who wishes to **opt-out of the Program** and purchase the required course materials on their own must do so **prior to 09/07/21**. Opt-out instructions are sent to students' official my.msutexas.edu email address after the first day of class. Please contact the MSU Bookstore if you have any questions about the opt-out process.

## Instructor Office Hours

The instructor's office hours are posted outside his office and across the hall from the Biology office, BO 218. Feel free to visit Dr. Cook's office outside of posted office hours, as well.

## Covid-19 Considerations

Students testing positive for SARS-CoV-2 must be in isolation for two weeks. Students exposed to a person who has tested positive for SARS-CoV2 must quarantine for 10 or more days depending on testing. For mandatory reporting of a confirmed case of Covid-19 use this form: Covid-19 Case Reporting Form. Time in quarantine/isolation counts as an absence. Breaking quarantine/isolation to avoid absences will incur sanction by the county (as a fine), the university, or both. A faculty member may submit an instructor drop for students accruing too many absences.

## Student Handbook

Academic Misconduct Policy & Procedures

Academic Dishonesty: Cheating, collusion, and plagiarism (the act of using source material of other persons, either published or unpublished, without following the accepted techniques of crediting, or the submission for credit of work not the individual's to whom credit is given). Additional guidelines on procedures in these matters may be found in the Office of Student Conduct. 2020-2021 Student Handbook

Grading

Table 1a: Percent values of each score category in Life I

| Assignments | Percentage |
|---|---|
| Exams | 50% |
| Laboratory | 25% |
| Achieve | 25% |
| Total | 100% |

Table 1b: Percent values of each score category in Life I Lab

| Assignments | Percentage |
|---|---|
| Weekly Assignments | 70% |
| Communication Exercise: written, oral, visual | 5% |
| Written Pre-labs | 5% |
| Safety Compliance | 10% |
| Teamwork Evaluation | 10% |
| Total | 100% |

| Table 2:Grade Standards | |
|---|---|
| Grade | Percentages |
| A | 90 to 100% |
| B | 80 to 89.9% |
| C | 70 to 79.9% |
| D | 60 to 69.9% |
| F | Below 60% |

## Achieve Assignments

You will complete two chapter assignments, *Learning Curve* and *Summative Quiz*, for each chapter, through the MacMillan Achieve site that accompanies your textbook. Enroll in the Achieve platform through the D2L Content link and complete these exercises for each chapter covered in the course.

***Learning Curve*** is a game-based means of building your understanding of the subject you are studying. It presents you with a target score, which you must meet in order to earn credit (meet the target score: 100%; fall short of the target score: 0%). For each question, you may answer it or ask for a hint. Asking for a hint reduces the maximum possible score. If you answer the question incorrectly, you may try again, but for fewer points. Once you earn points, you can't lose them, so you and your understanding of the material will determine how long it will take you to reach the target score. I hope it would not occur to you to guess randomly; to do so incurs a penalty. Once you complete the challenge (earn the target score) you can continue to answer questions to further build your understanding. **For each chapter covered in the course, complete the *Learning Curve* exercise by Sunday, midnight, prior to the corresponding exam**.

For each chapter, a ***Summative (chapter) Quiz*** will enable you to demonstrate your understanding of the concepts. Each quiz will include 20 questions. You will have one attempt to complete each quiz and will not be able to save your progress and return at a later time. These quizzes should be completed after you have done sufficient preparation to feel confident that you understand the concepts covered in the chapter – think of it as a pre-exam.

The **deadline for both** *Learning Curve* and *Summative Quizzes* will be **midnight Sunday** prior to each scheduled exam. The combined scores from these exercises will comprise the Achieve assignment score.

## Achieve Extra Credit Opportunity

Two types of exercise offered by Achieve may contribute to an extra credit score. Together, your best Animation and Simulation scores will add **up to** 5% to your final course score. To earn extra credit these exercises must be completed for each chapter that offers either or both of them.

## Animations and Simulations

For each chapter that offers one or more Animations and/or Simulations complete at least one of each that is offered to earn extra credit. For chapters that offer more than one of these exercises, you may complete as many as you wish with the highest score in each category counted toward your final extra credit score. The **deadline for** Animations and Simulations will be **midnight, Sunday**, prior to each scheduled exam.

## Exams

Your comprehension of the material presented in the lecture portion of the course will be evaluated by four major exams. Scheduled exam dates are fixed (see below). Do not make doctor/dentist or other appointments on exam dates, as they will not constitute excusable absences. Cell phones, electronic dictionaries, calculators, or other electronic aids may not be used during exams. Personal effects will be placed in the front of the classroom during exams. There will be no comprehensive final exam.

## Laboratory

Each week a laboratory exercise will provide an opportunity to study some aspect of biology directly. These exercises are intended to enhance the learning that is occurring through the lecture portion of the course. Questions regarding the laboratory work will be incorporated into scheduled examinations that will be administered in the lecture setting. Laboratory exercises are found in the required Laboratory Manual, 3rd edition, available in the campus Bookstore.

## Extra Credit

Any extra credit that is awarded during the semester will be earned and not offered as a means of rescuing low scores at the last minute. Any extra credit opportunities will be made available to the entire class (see the Achieve Extra Credit Opportunity, above). **No a*d hoc* extra credit work for individuals will be offered or accepted**.

## Late Work

Assignments with due dates must be successfully submitted by the deadlines. Successful, timely submission, following the instructions accompanying each assignment, is part of the assignment and will not be waived.

## Desire-to-Learn (D2L)

D2L will be used as means of communicating and as a location where you can access resources that are required or useful for success in the course. You can log into D2L through the MSU Homepage. If you experience difficulties, please use links to technical help found in the D2L site. Two mandatory assignments will be completed in D2L, one in a Discussion forum and the other as a quiz in your lab D2L page.

## Attendance

From the 2020-2021 Student Handbook, p. 25: "Students are expected to attend all meetings of the classes in which they are enrolled. Although in general students are graded on intellectual effort and performance rather than attendance, absences may lower the student's grade where class attendance and class participation are deemed essential by the faculty member. In those classes where attendance is considered as part of the grade, the instructor should so inform students of the specifics in writing at the beginning of the semester in a syllabus or separate attendance policy statement. An instructor who has an attendance policy must keep records on a daily basis. The instructor must give the student a verbal or written warning prior to being dropped from the class. Instructor's records will stand as evidence of absences. A student with excessive absences may be dropped from a course by the instructor. Any individual faculty member or college has the authority to establish an attendance policy, providing the policy is in accordance with the General University Policies."

## Instructor Class Policies

Out of courtesy to classmates and the instructor, please observe the following guidelines:

1) Don't walk through the front of the classroom after class has begun or before class has ended.
2) Don't carry on conversations during lectures, videos, examinations or other official class activities.
3) At the beginning of each class period, turn off cell phones (smart or otherwise), pagers and other electronic devices that may make noise, disrupt or distract.

## 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.

## University Policies

Campus Carry Rules/Policies
Refer to: Campus Carry Rules and Policies

Smoking/Tobacco Policy
University policy strictly prohibits the use of tobacco products in any building owned or operated by WATC. 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.

## Grade Appeal Process

To appeal a grade, consult the Midwestern State University 2020-2021 Student Handbook
2020-2021 Student Handbook

Tentative Lecture Schedule

The topics to be considered in this course are listed below. Material covered on each scheduled examination will be material presented prior to that exam. If coverage of material varies from this tentative schedule, students will be responsible for material that *has* been presented to date.

| Date | Topic | Chapter(s) |
|---|---|---|
| Aug 24 | Introduction; Studying Life | 1 |
| Aug 26 | Studying Life; Small Molecules and the Chemistry of Life | 1; 2 |
| Aug 31 | Small Molecules and the Chemistry of Life | 2 |
| Sept 2 | Proteins, Carbohydrates, Lipids | 3 |
| Sept 7 | Proteins, Carbohydrates, Lipids; Nucleic Acids and the Origin of Life | 3; 4 |
| Sept 9 | Nucleic Acids and the Origin of Life | 4 |
| Sept 14 | *Examination #1* [Achieve CH 1-4 due September 12, Midnight] | |
| Sept 16 | Cells: The Working Units of Life; | 5 |
| Sept 21 | Cells: The Working Units of Life; Cell Membranes | 5; 6 |
| Sept 23 | Cell Membranes; Cell Communication and Multicellularity | 6; 7 |
| Sept 28 | Cell Communication and Multicellularity; | 7 |
| Sept 30 | Energy, Enzymes, and Metabolism | 8 |
| Oct 5 | E, E & M; Pathways that Harvest Chemical Energy | 8; 9 |
| Oct 7 | Pathways that Harvest Chemical Energy | 9 |
| Oct 12 | *Examination #2* [Achieve CH 5-9 due October 12, Midnight | |
| Oct 14 | Photosynthesis: Energy from Sunlight | 10 |
| Oct 19 | Photosynthesis: Energy from Sunlight | 10 |
| Oct 21 | Cell Cycle and Cell Division | 11 |
| Oct 26 | Cell Cycle and Cell Division; Inheritance, Genes & Chromosomes | 11, 12 |
| Oct 28 | Inheritance, Genes & Chromosomes | 12 |
| Nov 2 | DNA and its Role in Heredity | 13 |
| Nov 4 | From DNA to Protein: Gene Expression | 14 |
| Nov 9 | *Examination #3* [Achieve CH 10-13 due Nov 7, Midnight] | |
| Nov 11 | Gene Expression; Mutation and Molecular Medicine | 14; 15 |
| Nov 16 | Mutation and Mol. Medicine | 15 |
| Nov 18 | Regulation of Gene Expression | 16 |
| Nov 23 | Genomes | 17 |
| Nov 25 | Thanksgiving Break | |
| Nov 30 | Recomb. DNA and Biotechnology; Genes, Development, and Evolution | 18 |
| Dec 2 | Review/Exam Prep | |
| Dec 7 | *Final Examination* [Achieve CH 14-18 due December 5, Midnight] | |

Laboratory Schedule

Life I – Molecular and Cellular Concepts is a laboratory course. Attendance at, and active participation in, all lab meetings are mandatory and also 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 will be facilitated by a Pre-Lab exercise downloaded from D2L and completed *Prior To* the start of each lab. 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, and/or for bringing food or drink into the lab.**

| Date | Lab # | Exercise |
|---|---|---|
| Aug 24-26 | 1 | How to Succeed as a Biology Major |
| Aug 31-Sept 2 | 2 | Quantitative Laboratory Skills |
| Sept 7-9 | 3 | Measuring Bacterial Growth |
| Sept 14-16 | 4 | Reporting Scientific Data |
| Sept 21-23 | 5 | Care and Use of Microscopes |
| Sept 28-30 | 6 | Measuring Enzyme Activity |
| Oct 5-7 | 7 | Cell Division I: Modeling Mitosis and Meiosis |
| Oct 12-14 | 8 | Cell Division II: Viewing Mitosis and Meiosis |
| Oct 19-21 | 9 | Restriction Endonucleases and Gel Electrophoresis |
| Oct 26-28 | 10 | Polymerase Chain Reaction |
| Nov 2-4 | 11 | Bacterial Transformation |
| Nov 9-11 | 12 | Growth and Screening of Transformed Bacteria |
| Nov 16-18 | 13 | Analysis of Selected Bacterial Transformants |
| Nov 23-25 | | Thanksgiving Break |
| Nov 30-2 | 14 | Students Presentations of Recent Research |