Biological Sciences
SOUTHEASTERN LOUISIANA UNIVERSITY

BIOL 1510-General Biology I
Southeastern Louisiana University Dual Enrollment 2024-2025 Academic Year

Instructor of Record: Rosemary Becker Clark
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Office Hours: by appointment
Office: Thelma Ryan Hall 421B
Course materials: Canvas, access through @southeastern.edu account
Rental Textbook: *Biology*, *13th Edition*. *P. Raven, G. Johnson, K. Mason, J. Losos, and T. Duncan*
Prerequisite: Must be eligible to enroll in ENGL 101 and MATH 161.

BIOL 1510 is a hybrid course with all content delivered online through Canvas OR face-to-face by Southeastern faculty. The Southeastern instructor of record will develop course content and provide lectures, worksheets, and outlines that act as study guides through Canvas. Ungraded instructional assignments, ungraded quizzes that are similar to exams, and chapter outlines to help prepare students to complete the graded assignments in Connect and the exams in Canvas which are also provided by the Southeastern instructor of record. The high school teachers will act as a facilitator and assist with student registration and enrollment, proctor exams as necessary, and through supplemental instruction, serve as a daily learning resource for students as they assimilate course content. The students' final course grades are assigned by the instructor of record.

***Connect* (by McGraw-Hill) is the companion site to our textbook**

Student Learning Course Outcomes: After the completion of this course, students will be able to:
- CO1: Describe characteristics of living things and core concepts in Biology.
- CO2: Describe elements, atoms, chemical bonds, properties of water, and molecules important to life;
- CO3: Identify structures and functions of prokaryotic and eukaryotic cells;
- CO4: Describe the make-up of the cell membrane and how various molecules may cross it;
- CO5: Discuss the flow of energy and electrons in two major metabolic pathways: cellular respiration and photosynthesis;
- CO6: Describe the cell cycle and compare mitosis and meiosis;
- CO7: Relate meiosis and sexual reproduction to genes, chromosomes, inheritance, and human genetics;
- CO8: Describe DNA structure and its replication;
- CO9: Discuss steps of transcription, translation, and the regulation of gene expression;
- CO10: Describe and apply various DNA technologies.

Exams: There will be five 100-point exams including a final exam. Each of the four-unit exams have 50 questions worth 2 points each. The final exam has 75 questions worth 1.3 points each. Only the four highest exam grades will be used to calculate your final grade. The first four exams will cover material from the each unit of the course. The final exam is comprehensive and will cover the entire course. Exams will be administered via Canvas and grades will be posted on Canvas. There will be 400 total points from exams; 67% of you course grade is from exams.

Assignments and Chapter Checkouts: Assignments worth up to 10 points will be given at the instructor of record's discretion. Assignments are designed to test your understanding of material that has been presented. There is a Chapter Checkout for every chapter. You are required to complete these by the date of the respective exam. Assignments and Chapter Checkouts are available in Connect via Canvas. There are 197 points from Connect; 33% of your course grade is from work in Connect.

Grade scale: [90-100% = A] [80-89% = B] [70-79% = C] [60-69% = D] [< 60% = F]
Grades will be posted in Canvas at the completion of the unit. Final grades will be posted in Workday..

Make-ups: There will be no individual make-up exams given to students without a valid excuse. Students that possess a valid medical excuse or school excuse may be allowed to take a make-up exam (alternative assessment methods maybe used at my discretion). **Make-ups will only be allowed within 1 week of the excused absence**. There will be **no make-ups for in class work** and no extensions for outside class assignments without valid excuses or prior consent of the instructor. (You get to drop your lowest exam).

Academic Dishonesty: Schools agree that the first incident of academic dishonesty in any course by any student in any manner will result in a grade of 0 on the assessment in question. The second incident will result in the student's failing the Southeastern portion of the course. Southeastern's Academic Dishonesty Policy:

> Students are expected to maintain the highest standards of academic integrity. Behavior that violates these standards is not acceptable. Examples are the use of unauthorized material, communication with fellow students during an examination, attempting to benefit from the work of another student and similar behavior that defeats the intent of an examination or other class work. Cheating on examinations, plagiarism, improper acknowledgement of sources in essays, and the use of a single essay or paper in more than one course without permission are considered very serious offenses and shall be grounds for disciplinary action as outlined in the current General Catalogue of Southeastern Louisiana University
> http://www.southeastern.edu/resources/policies/policy_detail/acad_integrity.html

Attendance: Students should refer to the University policy on attendance as stated in the current SLU catalogue. Attendance will be taken at the beginning of each class. If you cannot attend lectures regularly, you should consider dropping the class. **It is your responsibility to complete and file drop forms with you high school course coordinator if you wish to withdraw from the class.** The last day to withdraw from the class for Fall semester classes is Friday, November 1st, 2024, and for Year-long and Spring semester classes is Friday, April 4, 2025**.**

Grade Appeals: Should a student have a concern about a final grade posted for a dual enrollment course, the Grade Appeals policy should be followed below. Please note that a student has 30 days to make a written appeal to the Southeastern Instructor of Record:

> After a final course grade is recorded in the Records and Registration Office, a change of grade must be approved in sequence by the instructor of record, the instructor's department head, and the academic dean of the College of Science and Technology. In the event of a contested final course grade, a student's written appeal of the grade must be submitted to the instructor within **thirty (30)** calendar days of final grades for the term being due. The grade appeal should also be submitted to Dr. Jeffrey Temple, Assistant Vice President for Academic Programs. For more information about grade appeals, see
> http://www.southeastern.edu/resources/policies/policy_detail/instruction_practices.html

Technology Requirements: This course requires a computer, a secure internet connection (do not use hotspots or wifi), use of Adobe Reader (for PDF files), Respondus Lockdown Browser (can be downloaded from Southeastern's website), a webcam and a location/room where the student can complete exams alone. IF Respondus Monitor is required there is a $10-15 fee to be paid by the student upon the first assignment. Assistance with programs is provided within the on-campus labs and also virtually through the "Student Links" section of Canvas. **Warning: For online exams, make sure you a have a secure internet connection utilizing an ethernet cable. Wifi strength can vary causing connection issues which may result in your answers not being saved

Computer and digital literacy expectations: Students should be able to use Canvas as well as the programs mentioned above in the Technology Requirements section. Additionally, students should understand proper "Netiquette" and remain respectful of classmates and the instructor at all times.

Netiquette: When participating in online discussions, as well as e-mail, and in class participation, you are expected to be respectful to fellow students and faculty members in tone and civility. Whether the communication be via electronic means, telephone, or face-to-face use of correct English is required, as opposed to net acronyms. Make sure to include your name, high school, and course and section number in all email communication. I will respond within 24 hours to email sent Monday-Friday at noon.

Important dates for the semester:
http://www.southeastern.edu/future_students/dual_enrollment/calendar/index.html

	Fall Only 2023	**Year Long 2023-2024**	**Spring Only 2024**
SLATE Deadline	August 12/14	August 12/14	
First day of class	August 21	August 21	January 21
Last day to DROP	September 6	September 6	February 5
Last day to confirm rosters			
Exam 1	September 13	October 11	February 14
Exam 2	October 11	December 13	March 14
Last day to Withdraw	November 1	April 4	April 4
Exam 3	November 8	March 14	April 11
Exam 4	December 6	May 9	May 9
Final Exam	December 13	May 16	May 16

Material to be covered on exams given through Canvas:

Exam I Material:

- Chapter 1: The Science of Biology
- Chapter 2: The Nature of Molecules and the Properties of Water
- Chapter 3: The Chemical Building Blocks of Life
- Chapter 4: Cell Structure

Exam II Material:

- Chapter 5: Membranes
- Chapter 6: Energy and Metabolism
- Chapter 7: How Cells Harvest Energy
- Chapter 8: Photosynthesis

Exam III Material:

- Chapter 10: How Cells Divide
- Chapter 11: Sexual Reproduction and Meiosis
- Chapter 12: Patterns of Inheritance
- Chapter 13: The Chromosomal Basis of Inheritance, and Human Genetics

Exam IV Material:

- Chapter 14: DNA: The Genetic Basis of Inheritance
- Chapter 15: Genes and How They Work
- Chapter 16: Control of Gene Expression
- Chapter 17: Biotechnology

Final Exam Material:

- Chapters 1-8, 10-17

Learning Objectives by Chapter and associated Course Outcomes:

Chapter 1:

1.1 Describe the characteristics of living systems. (CO1)
1.2 Characterize the hierarchical organization of living systems. (CO1)
1.3 Discuss the core concepts of biology, and give examples. (CO1)

Chapter 2:

2.1 Define an element based on its subatomic particles. (CO2)
2.2 Describe the relationship between atomic structure, electron location, and chemical properties. (CO2)
2.3 Predict which elements are likely to form ions and ionic bonds. (CO2)
2.4 Explain how molecules are formed from atoms joined by covalent bonds and contrast polar and nonpolar covalent bonds. (CO2)
2.5 Identify the characteristics of water, the role of hydrogen bonds, and give examples. (CO2)

Chapter 3:

3.1 Explain how the structure of the carbon atom allows it to form diverse structures. (CO2)
3.2 Demonstrate an understanding of the role of water in forming and breaking covalent bonds in large organic molecules and polymers. (CO2)
3.3 Describe the structure and function of simple and complex carbohydrates. (CO2)
3.4 Compare and contrast the functions and structures of DNA and RNA and their component nucleotides. (CO2)
3.5 List the main functions of proteins and describe the structures of amino acids and proteins. (CO2)
3.6 Describe the structure of 3 types of lipids and explain functions. (CO2)

Chapter 4:

4.1 Discuss Cell Theory and factors that limit cell size. (CO3)
4.2 Compare and contrast (1) prokaryotic and eukaryotic cells including the three domains of life, four kingdoms, and give examples. (CO3)
4.3 Describe prokaryotic cell structure (CO3)
4.4 Describe the structure of the nucleus, chromosomes, and ribosomes, and explain their functions. (CO3)
4.5 Identify the parts of the endomembrane system and describe their roles in the cell. (CO3)
4.6 Compare and contrast the structures and functions of mitochondria and chloroplasts. (CO3)
4.7 Describe the three types of cytoskeletal fibers and functions of each. (CO3)
4.8 Compare and contrast (1) the extracellular components of plant and animal cells and (2) the cell junctions of plant and animal cells. (CO3)

Chapter 5:

- 5.1 Explain the fluid mosaic model, describing the components of the membrane. (CO4)
- 5.2 Discuss how membrane structure results in selective permeability. (CO4)
- 5.3 Define and use examples to demonstrate the processes of diffusion, facilitated diffusion, and osmosis. (CO4)
- 5.4 Describe the process of active transport. (CO4)
- 5.5 Explain how a cell uses the membrane and vesicles for bulk transport. (CO4)

Chapter 6:

- 6.1 Identify the source of Energy in the Biosphere. (CO5)
- 6.2 Describe the nature of Redox Reactions. (CO5)
- 6.3 Define the first two laws of thermodynamics. (CO5)
- 6.4 Explain what is meant by G (free energy) and relate it to the following: spontaneous reactions, capacity to do work, stability, and exergonic and endergonic reactions. (CO5)
- 6.5 Describe the ATP cycle and use examples to illustrate the reaction coupling. (CO5)
- 6.6 Explain how enzymes speed up metabolic reactions and factors affecting enzyme activity. (CO5)

Chapter 7:

- 7.1 Explain how the redox reactions of catabolic pathways yield energy by oxidizing organic fuels. (CO5)
- 7.2 Trace the pathway of glucose oxidation during glycolysis and describe energy yield. (CO5)
- 7.3 Describe the oxidation of pyruvate and the citric acid cycle and the flow of carbon and electrons in these steps. (CO5)
- 7.4 Identify the steps of oxidative phosphorylation, the electron transport chain, and chemiosmosis and account for the total ATP produced per glucose molecule during cellular respiration. (CO5)
- 7.5 Compare aerobic cellular respiration, anaerobic cellular respiration, and fermentation. (CO5)
- 7.6 Name two types of fermentation and explain how they regenerate NAD^+ and produce ATP. (CO5)

Chapter 8:

- 8.1 Specify where photosynthesis occurs and describe, in general, how it converts light energy into chemical energy. (CO5)
- 8.2 Trace the sequence of events during the light dependent reactions that convert solar energy to chemical energy and the role of pigments. (CO5)
- 8.3 Explain how the light-independent reactions, the Calvin cycle, uses chemical energy to reduce CO_2 to sugar, and identify alternative mechanisms of carbon fixation that have evolved in hot, arid climates. (CO5)
- 8.4 Summarize photosynthesis and the energy cycle with cellular respiration. (CO5)

Chapter 10:

- 10.1 Describe the process of binary fission. (CO 6)
- 10.2 Explain the terms chromosome and chromatin and compare sister chromatids to homologous pairs of chromosomes. (CO 6)
- 10.3 Describe the events of interphase, mitosis, and cytokinesis of the eukaryotic cell cycle. (CO 6)
- 10.4 Identify three checkpoints that control the cell cycle and explain how they operate. (CO 6)
- 10.5 Distinguish between proto-oncogenes and tumor-suppressor genes. (CO 6)

Chapter 11:

- 11.1 Describe the role of meiosis in sexual reproduction with respect to inheritance of chromosomes by offspring. (CO7)
- 11.2 Describe how homologous pairs pair during meiosis and randomly orient on the metaphase plate. (CO6)
- 11.3 Describe the stages of meiosis, focusing on prophase I, anaphase I, and anaphase II, explaining how the process reduces the number of chromosome sets. (CO6)
- 11.4 Compare and contrast mitosis and meiosis. (CO6)

Chapter 12:

- 12.1 Explain Mendel's two principles of inheritance: Principle of Segregation and Principle of Independent Assortment. (CO7)
- 12.2 Use Punnett squares (or the laws of probability) to solve complex genetics problems. (CO7)
- 12.3 Use examples to show how genetic inheritance patterns are affected by complete dominance, incomplete dominance, codominance, multiple alleles, pleiotropy, epistasis, and polygenic inheritance. (CO7)

Chapter 13:

- 13.1 Describe autosomes and sex chromosomes; compare male and female sex chromosomes and the effects of X inactivation in female mammals. (CO7)
- 13.2 Explain how linkage of genes and crossing over affect inheritance. (CO7)
- 13.3 Explain what a pedigree is and use examples to show how human traits follow patterns of inheritance. Describe inheritance patterns for autosomal dominant, autosomal recessive, and x-linked recessive traits. (CO7)

Chapter 14:

- 14.1 Discuss evidence that DNA is the genetic material and describe its structure. (CO8)
- 14.2 Explain the Watson-Crick structure and complementary pairing for DNA structure and function. (CO8)
- 14.3 Describe the process of DNA replication, compare prokaryotic and eukaryotic replication. (CO8)

Chapter 15:

- 15.1 Describe the process of gene expression. (CO9)
- 15.2 Explain transcription, including initiation, elongation and termination, and a description of important molecules involved in that process. (CO9)
- 15.3 Trace the steps involved in eukaryotic RNA processing. (CO9)
- 15.4 Explain translation, including initiation, elongation and termination, and a description of important molecules involved in that process. (CO9)
- 15.5 Identify different types of mutations and how they can affect protein structure and function. (CO9)

Chapter 16:

- 16.1 Identify when gene expression is usually controlled comparing prokaryotic and eukaryotic control. (CO9)
- 16.2 Explain how regulatory proteins affect operons in transcriptional regulation in prokaryotes. (CO9)
- 16.3 Explain how transcription factors affect transcriptional regulation in eukaryotes. (CO9)
- 16.4 Describe the stages of eukaryotic gene expression and the regulation that can occur at each stage. (CO9)

Chapter 17:

- 17.1 Describe how restriction endonucleases and ligases are used to make recombinant DNA. (CO10)
- 17.2 Explain how DNA fragments can be separated with gel electrophoresis and why this is useful. (CO10)
- 17.3 Describe how reverse transcriptase is used to make cDNA and how cDNA and genomic DNA can be stored in libraries. (CO10)
- 17.4 Describe Polymerase Chain Reaction (PCR) and compare it to DNA replication. (CO10)
- 17.5 Define a transgenic organism and how they are used to study gene function with knockout, knock-in, and conditional knockout mice. (CO10)