**1. COURSE TITLE:** Principles of Biology I TAG: **OSC003**

**2.** **COURSE NUMBER:** 1101 **CATALOG PREFIX:** BIOL

**3. PREREQUISITES:** H.S. biology within the last three years or

 Biology 1104 within the last three years

**4. COURSE TIME/LOCATION:** Online

**5. CREDIT HOURS:** 5 **LECTURE HOURS:** 4

 **LABORATORY HOURS:** 1 **LAB CONTACT HRS:** 3

**6. FACULTY CONTACT INFORMATION:**

**Instructor:**

**Email:**

**Phone:**

**Office Hours:**

**7. COURSE DESCRIPTION:**

Students will be exposed to modern concepts of the chemical, cellular, bases of life. Topics include: scientific methodology; chemistry of life; structure and function of cells; energy transformations; cellular reproduction; Mendelian genetics; DNA structure, function, replication; and the processes involved in protein synthesis; the influence of genetic material in life systems, human manipulations of DNA, fundamental concepts of the theory of evolution; biological diversity and evolutionary adaptations of organisms; bacteriology; and protists diversity.

Laboratory exercises emphasize experimental design and critical thinking. This course is for Associate of Science or pre-professional students wishing to transfer as biology majors.

**8. LEARNING OBJECTIVES:**

 Upon completion of this course the student will be able to:

 1. Describe the characteristics of life.

 2. Conduct investigations using the scientific method.

 3. Describe the structure and function of basic molecules.

 4. Recognize the structures and processes associated with eukaryotic cells.

 5. Diagram and describe the process of cellular respiration.

 6. Diagram and describe the process of photosynthesis.

 7. Make comparisons between photosynthesis and cell respiration.

 8. Describe the basic mechanisms of cellular communication.

 9. Diagram and describe the process of mitosis and meiosis.

 10. Work genetics problems using Mendel's Laws.

11. Recognize the concepts of gene linkage and chromosome.
 mapping and describe their estimation and importance to biology.

 12. Describe the structure and replication of nucleic acids.

 13. Outline and describe the processes involved in protein synthesis.

 14. Outline and describe some processes involved in regulation of gene
 expression including operons.

 15. Understand the basics of viral reproduction.

 16. Describe and perform basic biotechnology techniques.

 17. Describe the theory and processes of evolution.

 18. Describe the history of the theory of evolution.

 19. Recognize the evidences to evolution.

 20. Describe the current theories of how populations evolve.

 21. Describe the current theories of how new species originate.

 22. List the currently accepted sequence of major events in the history of earth.

 23. Describe the basic information relayed in a phylogenetic tree.

 24. Describe the basic cell structure and biochemistry of bacteria and archaea.

 25. Recognize the distinguishing characteristics of major taxa of protists.

**9. ADOPTED TEXT(S):**

Campbell Biology, 12th Ed with MyLab and Mastering Access

Urry, Cain, et. al

Pearson Publishing, 2021

 ISBN: 978-0-13-5855782

Investigating Biology Lab Manual

 9th Edition

 J. Morgan & M.E.B. Carter

 Pearson Education, 2017

ISBN: 978-0-13-447346-8 (Individual Textbook)

**10. OTHER REQUIRED BOOKS, SOFTWARE, AND MATERIALS:**

The materials that accompany the text.

**11. GRADING**

Grading will follow policy in college catalog.

|  |  |  |  |
| --- | --- | --- | --- |
| **A** | **90** | **–** | **100** |
| **B** | **80** | **–** | **89** |
| **C** | **70** | **–** | **79** |
| **D** | **60** | **–** | **69** |
| **F** | **0** | **–** | **59** |

**12. GRADING PROCEDURES OR ASSESSMENTS (SAMPLE):**

**Grades will be based on:**

6 tests, 100 points each 600

Final comprehensive exam 100

Lab assignments 150

Research Paper 50

Mastering Quiz Score 100

Total Possible Points: 1000

**13. COURSE METHODOLOGY**

This course may use lecture, discussion, video, and PowerPoint presentations. The course may include projects, research papers, and laboratory activities. Both written and online quizzes and exams may include chapter and workbook assignments, hand-in assignments, and distance learning assignments, to be used as appropriate to the course objectives.

**14. COURSE OUTLINE:**

 Chapter 1 - Introduction – Themes in the Study of Life

 Lab #1- Scientific Investigation

 Chapter 2 - Basic Chemistry – Chemical Context of Life

 Chapter 3 - Water and Life

 Lab #2- Biological Chemistry

 Chapter 4 - Elementary Organic Chemistry

 Chapter 5 - Organic Macromolecules

 Lab #3- Enzymes

 Chapter 6 - Basic Cell Biology

 Chapter 7 - Membrane Structure and Function

 Lab #4- Cells and Microscopy

 Chapter 8 - Introduction to Cellular Metabolism

 Chapter 9 - Cellular Respiration and Fermentation

 Lab #5- Cellular Energetics, Respiration, & Fermentation

 Chapter 10 - Photosynthesis

 Lab #6- Photosynthesis

 Chapter 11 - Cell Communication

 Chapter 12 - The Cell Cycle and Mitosis

 Chapter 13 - Meiosis and Sexual Life Cycles

 Lab #7- Cell Cycle

 Chapter 14 - Mendelian Genetics

 Chapter 15 - Chromosomes and Inheritance

 Lab #8- Mendelian Genetics

 Chapter 16 - DNA Structure and Replication

 Chapter 17 - Protein Synthesis

 Lab #9- DNA and its Replication

 Chapter 18 - Regulation of Gene Expression

 Chapter 19 - Viruses

 Chapter 20 - Biotechnology

 Lab #10- Biotechnology & Genomics

 Chapter 21 - Genomes and Their Evolution

 Chapter 22 - Overview of the Theory of Evolution

 Chapter 23 - Evolution of Populations

 Chapter 24 - The Origin of Species

 Chapter 25 - History of Life on Earth

 Chapter 26 - Phylogeny and the Tree of Life

 Chapter 27- Bacteria and Archaea

 Lab #11- Bacteriology

 Chapter 28- Protists

 Lab #12- Protists

 **SAMPLE** Course Calendar

Week One

Chapter 1 - Introduction – Themes in the Study of Life

 Chapter 2 - Basic Chemistry – Chemical Context of Life

 Lab #1- Scientific Investigation and Lab Safety

Week Two

 Chapter 2 - Basic Chemistry (cont)

 Chapter 3 - Water and Life

 Lab #2- Biological Chemistry

Week Three

 Chapter 4 - Elementary Organic Chemistry

 Chapter 5 - Organic Macromolecules

 Lab #3- Enzymes

Week Four

 Chapter 6 - Basic Cell Biology

 Chapter 7 - Membrane Structure and Function

 Lab #4- Cells and Microscopy

Week Five

 Chapter 8 - Introduction to Cellular Metabolism

 Chapter 9 - Cellular Respiration and Fermentation

 Lab #5- Cellular Energetics, Respiration, & Fermentation

Week Six

 Chapter 10 - Photosynthesis

 Chapter 11 - Cell Communication

 Lab #6- Photosynthesis

Week Seven

 Chapter 12 - The Cell Cycle and Mitosis

 Chapter 13 - Meiosis and Sexual Life Cycles

 Lab #7- Mitosis and Meiosis Lab

Week Eight

 Chapter 14 - Mendelian Genetics

 Chapter 15 - Chromosomes and Inheritance

 Lab #8- Mendelian Genetics

Week Nine

 Chapter 16 - DNA Structure and Replication

 Chapter 17 - Protein Synthesis

 Lab #9- DNA and its Replication

Week Ten

 Chapter 18 - Regulation of Gene Expression

 Chapter 19 - Viruses

 Lab #10- Biotechnology Lab

Week Eleven

 Chapter 20 - Biotechnology

 Chapter 21 - Genomes and Their Evolution

 Lab #11- Biotechnology Lab (cont.)

Week Twelve

 Chapter 22 - Overview of the Theory of Evolution

 Chapter 23 - Evolution of Populations

 Lab #12- Population evolution lab

Week Thirteen

 Chapter 24 - The Origin of Species

 Chapter 25 - History of Life on Earth

 Lab #13- Evolution lab

Week Fourteen

 Chapter 26 - Phylogeny and the Tree of Life

 Chapter 27- Bacteria and Archaea

 Lab #14- Bacteriology

Week Fifteen

 Chapter 28- Protists

 Lab #15- Protists

Lab Exam

Week Sixteen **FINAL EXAM**

**15. SPECIFIC MANAGEMENT REQUIREMENTS:**

Final grade in this course will be determined by mastery of course material. There will be quiz and lab assignments, periodic tests, and a comprehensive final exam. A grade for the laboratory component will be included in the calculation of the grade for the class.

**16.** **OTHER INFORMATION:**

**FERPA:** Students need to understand that your work may be seen by others. Others may see your work when being distributed, during group project work, or if it is chosen for demonstration purposes. Students also need to know that there is a strong possibility that your work may be submitted to other entities for the purpose of plagiarism checks.

**DISABILITIES**: Students with disabilities may contact the Disabilities Service Office, Central Campus, at 800-628-7722 or 937-393-3431.