

# COCONINO COMMUNITY COLLEGE

## COURSE OUTLINE

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Date: Nov 1, 1999

General Education Outcomes reviewed by: Ana Novak-Goodman

Date: Mar 23, 2001

Revised by: Maxie Ingo

Spring 2004

Revised by: Maxie Ingo


Spring 2006

Revised by: Bryan Bates

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Status: Permanent

### A. Identification:

1. Subject: Biology
2. Course Number: BIO 181  BIO 1181
3. Course Title: Unity of Life I: Life of the Cell
4. Credit Hrs: 4
5. Catalog Description:

An introductory course for Biology MAJORS emphasizing central principles related to cellular and molecular processes in the cell. Course will include molecular structure, cell structure, reproduction, metabolism molecular genetics and evolution. CHM 130 or higher recommended. Prerequisite: \*ENG 100 and MAT 121, MAT 122, or placement test score(s) beyond prerequisite course(s). General Education: Physical and Biological Sciences Three lecture; three lab.

### B. Course Goals:

To provide learners with:

1. The opportunity to improve their mathematical, written and oral presentation skills
2. Use of the scientific method from making careful observations, designing good experiments, recognizing assumptions and the presentation of results
3. The use of scientific instrumentation and an understanding of how these instruments function
4. A foundation in the core concepts of Biology necessary for continued work in the field
5. A recognition of the necessity for and implications of information acquired through various scientific fields into biology

### C. Course Outcomes:

Students will:

1. Identify the characteristics common to all life
2. Apply the scientific method to previous research and in their lab studies
3. Read and interpret the Periodic Table of Elements
4. Construct molecular models and identify bond structures of common compounds utilized by life forms
5. Apply fundamental laws of physics (energy, work, efficiency, thermodynamics) to life processes

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Student Outcomes list

6. Describe, identify and explain oxidation/ reduction reactions
7. Recognize and analyze the role of enzymes and cofactors, inhibition and activation, and energy transport molecules in cell processes
8. Describe and define the significance of early experiments in biomolecular structure and attribute this knowledge to the organization of classification systems
9. Define the cell theory and its significance
10. Catalogue those forces that restrict cell size and function, and the adaptations that cells have made to compensate for those forces
11. Compare and contrast prokaryotic and eukaryotic structure
12. Identify and define the functional operation of organelles found in eukaryotic structures
13. Compare and contrast in detail photosynthesis and respiration
14. Compare and contrast in written detail asexual/ mitotic reproduction with sexual/ meiotic reproduction
15. Outline Mendel's laws and apply those principles to basic issues in genetics
16. Diagram chromosome structure and re-construct DNA replication, translation and transcription
17. Solve several genetics problems through application of skills and concepts covered above
18. Describe in writing several different mechanisms by which genes and the encrypted code are altered in the natural world
19. Describe how humans have manipulated DNA through biotechnology and apply these research findings to agriculture, medicine, cloning and ethics
20. Present with visual aides result of a lab research project

D. Course Assessment:

Will include:

1. Comprehensive final exam
2. Instructor evaluated lab report/project.

E. Course Content:

Will include:

1. Scientific method
2. Characteristics of Life
3. Periodic Table and properties of elements
4. Chemical bonds: ionic, covalent & polar covalent
5. Mathematical measurements/ models of work, efficiency, energy, energy conversions, thermodynamics
6. Metabolic reactions: redox, pH, proton transfer, phosphorylation
7. Enzyme mediated reactions
8. Cell theory, organelles, structure & size limitations
9. Classification schema
10. Eukarya vs. prokarya
11. Metabolic activities: photosynthesis & respiration
12. Mitosis vs. meiosis cell reproduction

13. Mendellian genetics
14. Chromosome structure and protein synthesis
15. Monohybrid and dihybrid genetics problems
16. Gene mutations and alterations, genetic variability
17. Biotechnology

**\*Course has additional pre or co requisite(s)**