



SYLLABUS

CATALOG DESCRIPTION

An introduction to the basic processes of living organisms. Topics to be covered will include cell structure and function, cellular reproduction, metabolism, photosynthesis, the basic chemical processes, introductory biochemistry, energetics, enzyme structure and function, protein synthesis, and basic Mendelian genetics. Course includes 1 credit hour lab component. [NM Common Course Number BIOL 1214, Area III; Laboratory Science]

Prerequisites: MATH 095, (RDNG 099 or RDNG 113), and ENGL 099 or appropriate Math, Reading, and English Accuplacer scores.

Semester Offered: Fall, Spring and Summer

Common Student Learning Outcomes

Upon successful completion of San Juan College programs and degrees, the student will demonstrate competency in...

BROAD AND SPECIALIZED LEARNING

Students will actively and independently acquire, apply, and adapt skills and knowledge with an awareness of global contexts.

CRITICAL THINKING

Students will think analytically and creatively to explore ideas, make connections, draw conclusions and solve problems.

CULTURAL AND CIVIC ENGAGEMENT

Students will act purposefully, reflectively, and ethically in diverse and complex environments.

EFFECTIVE COMMUNICATION

Students will exchange ideas and information with clarity in multiple contexts.

INFORMATION LITERACY

Students will be able to recognize when information is needed and have the ability to locate, evaluate, and use it effectively.

INTEGRATING TECHNOLOGIES

Students will demonstrate fluency in the application and use of technologies in multiple contexts.

Student work from this class may be randomly selected and used anonymously for assessment of course, program, and/or institutional learning outcomes. For more information, please refer to the Dean of the appropriate School.

General Learning Outcomes

Upon successful completion of the course, the student will be able to...

1. The basic biochemistry of life.
2. Cell structure and function.
3. Cellular respiration and energetics.
4. Protein synthesis.
5. Genetics.

Specific Learning Outcomes

Upon successful completion of the course, the student will be able to...

1. Describe properties associated with life.
2. Diagram and explain electron configurations of given elements and how they influence the chemical behavior of atoms.
3. Distinguish between non-polar covalent, polar covalent and ionic bonds.
4. Explain the five characteristics of water that are properties resulting from hydrogen bonding, and how water contributes to the fitness of the environment to support life.
5. Explain how carbon's electron configuration determines the kinds and number of bonds carbon will form as well as how this configuration contributes to the diversity and complexity of organic molecules.
6. Describe the unique properties, building block molecules and the biological importance of the four major classes of biomolecules (carbohydrates, lipids, proteins and nucleic acids).
7. Identify and distinguish between the cellular structure and function of both prokaryotic and eukaryotic cells and their component parts.
8. Diagram the structure and describe the biochemistry of the phospholipid membrane and how it influences cellular transport.
9. Predict how biological molecules will behave in relation to phospholipid membranes.
10. Illustrate and outline the importance of energy and how it is exchanged in the catabolic and anabolic pathways of cellular metabolism.
11. Define the First and Second Laws of Thermodynamics.
12. Explain the function of enzymes and catalysts in relationship to cellular metabolism.
13. Describe the significance of ATP and its relationship to cellular metabolism.
14. Define oxidation and reduction and explain how redox reactions are involved with energy exchanges at a cellular level.
15. Diagram and explain the processes of carbohydrate cellular respiration including glycolysis, the Krebs cycle, the electron transport chain and fermentation.
16. Diagram and explain the pathways of photosynthesis: both light and dark reactions.
17. Differentiate between cell division in prokaryotes and eukaryotes.
18. List the stages of the cell cycle.
19. Describe and diagram the sequence of events that occur during each stage of mitosis and meiosis, and relate the functions of each to sexual and asexual reproduction.
20. List the sources of genetic variation.
21. Describe monohybrid and dihybrid crosses to determine genotypic and phenotypic ratios according to Mendel's laws of inheritance.
22. Describe the mechanism of DNA replication.
23. Diagram and explain the flow of genetic information in a cell from genotype to phenotype.
24. Describe protein synthesis.
25. Predict the sequence of amino acids in proteins based on the genetic code.