BUTTE COLLEGE
COURSE OUTLINE

I. **CATALOG DESCRIPTION**

BIOL 9 - Current Issues in Biology **3 Unit(s)**

Prerequisite(s): NONE
Recommended Prep: Reading Level IV; English Level IV; Math Level IV
Transfer Status: CSU/UC
51 hours Lecture

This course is an introduction to the understanding of basic biological principles and how each of these principles affects daily human life. Biological principles include the scientific method, biological macromolecules, cell structure and function, cell division, genetics, DNA structure and function, metabolism, evolution, and ecology. Issues covered include nutrition, stem cell research, cancer, genetic diseases, cloning, genetic engineering, gene therapy, ecological diversity, invasive species, sustainability, and the impact of humans on the environment.

II. **OBJECTIVES**

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

A. Design and conduct an experiment utilizing the scientific method. Identify characteristics that differentiate science as a distinctive way of knowing.
B. Identify the structure and function of biologically important macromolecules and describe the role of macromolecules in the nutrition of the human population.
C. Explain how each cellular structure affects cellular function and discuss the problems resulting from flawed cellular structure and function.
D. Solve inheritance problems, including calculations of genotype and phenotype ratios of offspring.
E. Describe the structure and function of DNA (including DNA replication and Protein Synthesis) and discuss recent discoveries related to DNA structure and function.
F. Explain the mechanism of natural selection and the genetic basis of evolution. Apply this understanding to classic and current examples of evolution.
G. Define sustainability, illustrate examples of sustainable practices, and discuss the impact of humans on ecosystems.
H. Compare and contrast the processes of photosynthesis and respiration and discuss how these metabolic pathways contribute to global biogeochemical cycles and energy flow.
I. Discuss sensitive topics (such as stem cell research and genetic engineering) from an informed position using scientific evidence.

III. **COURSE CONTENT**

A. **Unit Titles/Suggested Time Schedule**

Lecture

Topics	Hours
1. Scientific Method: The process of the scientific method and the completion of a small individual research project. Proper data collection and presentation.	5.00
2. Macromolecules: Structure and function of carbohydrates, lipids, nucleic acids, and proteins.	4.00
3. Macromolecules: Role of lipids, carbohydrates, nucleic acids, and proteins in human health.	2.00
4. The Cell: Structure and function of organelles in cellular processes.	3.00

5. Cell Division: cell division, the cell cycle, and cancer.	4.00
6. Genetics: Mendelian genetics, pedigrees, genetic disorders.	4.00
7. DNA Structure and Function: DNA replication and protein synthesis.	4.00
8. Biotechnology: Stem cells, cloning, genetic engineering, gene therapy.	4.00
9. Metabolism: Photosynthesis and respiration.	4.00
10. Ecosystems: Nutrient cycles and food webs; importance of biodiversity.	3.00
11. Evolutionary principles: Natural selection, and the role of DNA in evolution.	3.00
12. Evolution: Microevolution, and speciation.	4.00
13. Ecology: The biosphere, growth of populations, interaction among organisms.	4.00
14. Ecology: Sustainability, the role of humans in the environment.	3.00
Total Hours	51.00

IV. METHODS OF INSTRUCTION

A. Lecture
B. Homework: Students are required to complete two hours of outside-of-class homework for each hour of lecture
C. Discussion
D. Reading Assignments
E. Multimedia Presentations
F. Individual Research Project

V. METHODS OF EVALUATION

A. Exams/Tests
B. Projects
C. Homework
D. Written Assignments
E. Class Discussion

VI. EXAMPLES OF ASSIGNMENTS

A. Reading Assignments
   1. Read about mitosis and meiosis in the textbook and the online links listed in the "web links" document. Describe the steps of each process as shown in the table provided by the instructor. Write a paragraph comparing and contrasting mitosis and meiosis.
   2. Read about stem cells in the textbook and online links listed in the "web links" document. Write a 300 word paragraph describing the processes of cell replacement therapy and Somatic Cell Nuclear Transfer. Be prepared to discuss the differences between therapeutic and reproductive cloning.

B. Writing Assignments
   1. Research the health concerns related to trans fats and write a 300 word paragraph summarizing your findings. One potential solution is to ban trans fats. Write a paragraph outlining the pros and cons of such a ban and your position on this idea. Be sure to use evidence to back up your position.
   2. Go to: http://www.cancer.gov/cancertopics. Pick one of the cancer types listed and read the information provided. Write a 300 word paragraph summarizing your findings. Include: risk factors, diagnosis, treatments, and other relevant information.

C. Out-of-Class Assignments
   1. Conduct a small research project regarding how distractions affect short term memory.

Explain your experimental design and conclusions to the class (be sure to include control and test groups; dependent, independent, and control variable). Discuss how your experiment could be improved and comment on the experimental design of other students.

2. Visit a public park. Analyze the following characteristics of the park: plant and animal diversity; soil type; abiotic resources; and visible or likely examples of mutualism, commensalism, parasitism, and competition. Write a 2 page summary of your findings.

VII. **RECOMMENDED MATERIALS OF INSTRUCTION**

Textbooks:

A. Cain, Damman, Lue, Yoon. Discover Biology. 5th Edition. Norton, 2012.

Materials Other Than Textbooks:

A. Journal articles and online resources

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