JEFFERSON COLLEGE

COURSE SYLLABUS

BIO102

CONCEPTS IN BIOLOGY

3 Credit Hours

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Revised Date: November 2005
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BIO102 CONCEPTS IN BIOLOGY

I. CATALOGUE DESCRIPTION

Prerequisite: None
3 semester hours credit.

Concepts in Biology is a non-laboratory course covering concepts common to all life forms. It focuses on structural and functional human systems. Concepts in Biology will partially fulfill the natural science requirement for the Associate of Arts degree. (F,S,Su)

II. GENERAL COURSE OBJECTIVES

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

A. Understand the process of science.

B. Explain basic chemical processes and their relation to functions occurring in the living world.

C. Identify the major components of cells, identify their functions, and explain their importance.

D. Explain and identify processes and components of the major systems in the human body.

E. Demonstrate an understanding of the processes directing genetics and evolution

F. Explain ecological principles and their role in our everyday life.

III. COURSE OUTLINE (course content will be drawn from this)

A. Introduction to Biology
   1. Characteristics of life
   2. Scientific method
   3. Chemical basis
   4. Cellular functions and components

B. Major Systems of the Human Body
   1. Identifying structures in each
   2. Identifying functions in each

C. Heredity and Evolution
   1. Perform simple calculations to determine outcome of offspring
   2. Identifying evolutionary outcomes

D. Ecology

1 Underlying influences
2. Species interactions
3. Human influences

IV. UNIT OBJECTIVES

A. Introduction to Biology
1. Know the characteristics of living things.
2. Know what characteristics distinguish living things from non-living things.
3. Know the scientific process.
4. Know what chemical components constitute living things.
5. Identify the two basic types of cells and describe their differences.
6. Identify and diagram the structures found in the cells.
7. Identify and describe the events occurring in the cell cycle.
8. Distinguish between RNA and DNA.
9. Explain the process behind DNA replication.
10. Explain the steps of protein synthesis.
11. List the types of biotechnology.
12. Identify the human male and female reproductive structures.
13. List the sequence of events that occur during the formation of gametes.
14. List and describe the sequence of events from fertilization to birth of a baby.

B. Major Structures of the Human Body
1. Know what nutrients are needed in the human diet.
2. Know how the energy content of food is measured.
3. Be able to plan a proper diet.
4. Know the effects and symptoms of eating disorders and starvation.
5. Know the dangers of being overweight.
6. Know the structures and functions of the human digestive system.
7. Identify the different components of blood.
8. Distinguish between arteries and veins.
9. Identify the components of the heart.
10. Be able to follow the flow of blood throughout the circulatory system.
11. Know what factors control heartbeat.
12. Know the functions of the lymphatic system.
13. Know the structures and functions of the human respiratory system.
14. Know the common respiratory system disorders.
15. Know the reactions and pathways of cellular respiration.
16. Identify the different nitrogenous wastes produced by particular animals.
17. Know the structures and functions of the human excretory system.
18. Know what biochemicals control kidney function.
19. Identify the common disorders of the excretory system.
20. Know the functions of the skeletal system.
21. Identify the major bones of the human skeletal system.

22. Know the major components of bone.
23. Know the process of bone growth.
24. Distinguish between the three main types of muscle cells.
25. Describe how skeletal muscles contract.
26. Know the functions of skeletal muscle components.
27. Know the different types of skeletal muscle fibers.
28. Know the effects of exercise on muscle.
29. Know the definition of a hormone.
30. Know some of the common hormones, which glands produce them, and their effects.
31. Identify the parts of a nerve.
32. Know the three types of nerves.
33. Know the processes behind the firing of a nerve.
34. Know how nerve impulses are transmitted between other nerves or muscles.
35. Know the major division of the human nervous system.
36. Know the functions of the spinal cord.
37. Know the structures and functions of the major structure of the human brain.
38. Be able to describe the functions of the major senses in the human and where the sense organs are located.

C. Heredity and Evolution
1. Know the origin of the science of modern genetics.
2. Understand and be able to work word problems in monohybrid and dihybrid crosses, sex linkage, and multiple alleles.
3. Understand linkage and crossing over.
4. Know the common genetic abnormalities in humans.
5. Understand Natural Selection.
6. Understand the Hardy-Weinberg Law.
7. Know the factors that can alter gene frequencies in a population.
8. Understand how new species arise.
9. Understand how species become extinct.
10. Know the different types of evidence for evolution.

D. Ecology
1. Know the basic concepts of food chains.
2. Understand the processes of ecological succession.
3. Know the basic land biomes.
4. Know the basic concepts of population ecology.
5. Know some of the impacts humans have on the environment.

V. METHOD OF INSTRUCTION

A. Lectures

B. Class Discussion

C. Videos

VI. REQUIRED TEXTBOOK(S) WITH PUBLICATION INFORMATION

Mader, S., Human Biology, 9th ed. McGraw Hill.

VII. REQUIRED MATERIALS (Student)

A. Writing Paper and Pens

B. No. 2 pencil for examinations

VIII. SUPPLEMENTAL REFERENCES

None.

IX. METHOD OF EVALUATION (Student)

A. Examinations

B. Short written paper and presentation covering a topic relating to human health