

JEFFERSON COLLEGE
COURSE SYLLABUS

BIO102
CONCEPTS IN BIOLOGY
3 Credit Hours

Prepared by:
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Revised Date:
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Minor Revision or Update by: Fran Moore
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Ms. Linda Abernathy, Division Chair, Math, Science & Business
Ms. Shirley Davenport, Dean, Arts & Science Education

BIO102 Concepts in Biology

I. CATALOG DESCRIPTION

- A. Course pre-requisites/co-requisites: Reading proficiency
- B. 3 semester credit hours
- C. 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, O)
- D. Curricular alignment:
 - Fulfills part of the Natural Sciences (Biological Sciences) CORE requirement for AA, AAT, AFA, select AS, and select AAS degrees; MOTR BIOL 100 Essentials in Biology equivalent.
 - Elective course applies toward AA or AAT degree.

II. EXPECTED LEARNING OUTCOMES/CORRESPONDING ASSESSMENT MEASURES

Expected Learning Outcomes	Assessment Measures
Know the characteristics of living things; list and describe the steps of the scientific method; know the chemical components of life; identify and contrast the two types of cells; identify and diagram structures of a cell; describe the various functions of cellular structures; identify and describe the phases of mitosis; distinguish cancer cells from other cells and know their characteristics; compare and contrast meiosis and mitosis; know the differences between DNA and RNA; understand DNA replication; list the steps involved in protein synthesis and know different mutations which can occur in the process; discuss types of biotechnology	Classroom lecture and discussion, group work, individual in-class activities, assignments, quizzes and exams
Investigate the tissues and organs of animals; relate structure to function of tissue types	Classroom lecture and discussion, group work, individual in-class activities, assignments, quizzes and exams

<p>Understand the structure and function of the skeleton and muscles; investigate how the skeletal and muscular system works together to produce movement; identify the major bones of the body; know the two major types of bone structure; contrast cartilage and bone; understand bone growth and contrast it with bone repair; distinguish the three muscle cell types; explain the process of muscle contraction; know the different types of energy resources used in muscle contraction; investigate how exercise affects the body</p>	<p>Classroom lecture and discussion, group work, individual in-class activities, assignments, quizzes and exams</p>
<p>Identify the components of the cardiovascular system and the functions for each; diagram and memorize major parts and vessels of the heart; diagram the flow of blood through the cardiovascular system; measure heart rates and blood pressure; diagram the electrical conduction of heartbeat; examine the effects of aging and cardiovascular disease on the body; identify the structures and functions of the respiratory system; recognize how the cardiovascular and respiratory systems work together in maintaining homeostasis; recognize various respiratory disorders and investigate the effects of smoking</p>	<p>Classroom lecture and discussion, group work, individual in-class activities, assignments, quizzes and exams</p>
<p>Identify the components and functions of the lymphatic system; contrast innate and adaptive immunity; describe antigens and antibodies; recognize and describe allergic reactions; understand how vaccines provide immunity</p>	<p>Classroom lecture and discussion, group work, individual in-class activities, assignments, quizzes and exams</p>
<p>List the functions of the digestive system; identify major events of digestion and the basic physiology of each digestive organ including major secretions beginning with the mouth and swallowing; explain various ways nutrients and water are absorbed by the body; know the main stages of cellular respiration; outline a balanced diet and its importance; discuss the functions of vitamins and minerals; identify symptoms and know the dangers of eating disorders, starvation, and obesity; know the structures and functions of the excretory system; explain the basic structures and process of urine formation and micturition</p>	<p>Classroom lecture and discussion, group work, individual in-class activities, assignments, quizzes and exams</p>

<p>Know the structure and functions of the nervous system; distinguish between the cell types in the nervous system; identify the parts of a nerve; know the three types of nerves; understand the process of nerve conduction between nerves and muscles; know the divisions of the nervous system; label the regions of the brain and describe each function; know where the types of sense organs are located.</p>	<p>Classroom lecture and discussion, group work, individual in-class activities, assignments, quizzes and exams</p>
<p>Identify the structures and functions of the reproductive system; explain spermatogenesis and oogenesis; list the components of the male and female reproductive system and describe the function of each; discuss the events that occur during the ovarian and menstrual cycle; describe hormonal mechanisms regulating male and female reproductive activities; discuss the production, storage, and transport of sex cells; describe the anatomical, physiological, and hormonal changes that accompany pregnancy; discuss the changes in reproductive systems in male and females occurring at puberty and with aging</p>	<p>Classroom lecture and discussion, group work, individual in-class activities, assignments, quizzes and exams</p>
<p>Contrast somatic and gametic cells; discuss meiotic abnormalities resulting in genetic defects including causes and characteristics of various syndromes; relate basic principles of genetics to the inheritance of human traits; describe the process of fertilization; know the stages of embryonic and fetal development; describe the process of labor and delivery; list the stages of development</p>	<p>Classroom lecture and discussion, group work, individual in-class activities, assignments, quizzes and exams</p>
<p>Know the origin of the science of modern genetics; perform Punnett analyses on mono and dihybrid crosses, blood typing, and sex-linked traits; understand linkage and crossing over; define natural selection; understand the Hardy-Weinberg Law; describe factors altering gene frequencies in a population; define diversity; understand how new species arise and go extinct; know Darwin's Theory of Evolution; know the biological evidence for evolution; know the evolution of man; contrast micro and macroevolution</p>	<p>Classroom lecture and discussion, group work, individual in-class activities, assignments, quizzes and exams</p>
<p>Discuss the biological origins of life; compare and contrast the kingdoms of life; contrast sexual reproduction in flowering plants to that in animals</p>	<p>Classroom lecture and discussion, group work, individual in-class activities, assignments, quizzes and exams</p>

<p>Understand ecological relationships; know the concepts of food chains; understand the processes of ecological succession; define and investigate types of biomes; know the concepts of population ecology; identify and describe various human activities affecting the environment; propose ideas for conserving and maintaining biodiversity; understand ecological restoration and sustainability practices</p>	<p>Classroom lecture and discussion, group work, individual in-class activities, assignments, quizzes and exams</p>
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III. COURSE OUTLINE

- A. Introduction to biology
 - 1. Characteristics of life
 - 2. Scientific method
 - 3. Chemical basis
 - 4. Cell structures
 - 5. Cellular functions
 - 6. Cell cycle
 - 7. DNA & RNA
 - 8. DNA replication
 - 9. Protein synthesis
 - 10. Mutation
 - 11. Biotechnology
 - 12. Meiosis

- B. Major systems of the human body
 - 1. Anatomical structures in each system
 - 2. Functions in each system

- C. Heredity and evolution
 - 1. Genetic determinations
 - 2. Identifying evolutionary outcomes

- D. Ecology
 - 1. Underlying influences
 - 2. Species interactions
 - 3. Human influences

IV. METHODS OF INSTRUCTION

- A. Lecture
- B. PowerPoint presentations
- C. Classroom discussions
- D. Group work

- E. Textbook readings
- F. Classroom exercises
- G. Videos
- H. Presentations

V. REQUIRED TEXTBOOK

Starr, C. *Biology: today and tomorrow* (current edition). Belmont: Brooks Cole.

VI. REQUIRED MATERIALS

Pencils (number 2), and paper

VII. SUPPLEMENTAL REFERENCES

Course website on Blackboard

VIII. METHODS OF EVALUATION

A. Distribution of final grade

Students are evaluated by four exams, a final exam, quizzes, exercises, a paper, and a presentation

B. Assignment of final letter grade:

- C. 90-100% = A
- 80-89% = B
- 70-79% = C
- 60-69% = D
- Below 60% = F

D. Attendance policy

Student attendance is mandatory. There are no excused absences. If a student misses more than 15% of total class meeting time in a semester, the student may be prohibited from attending the class by the instructor. In such cases, the student must officially withdraw from the course by the designated withdrawal date in order to reduce the possibility of receiving a grade of "F" for the course.

No make-up exams are given, however, students are allowed to drop their lowest exam grade. Students arriving more than 10 minutes late will not be allowed to take the test, and that test will result in a grade of zero. The final exam is mandatory and cannot be made up.

IX. ADA AA STATEMENT

Any student requiring special accommodations should inform the instructor and the Coordinator of Disability Support Services (Library phone 636-481-3169).

X. ACADEMIC HONESTY STATEMENT

All students are responsible for complying with campus policies as stated in the Student Handbook (see College website, <http://www.jeffco.edu>).

XI. ATTENDANCE STATEMENT

Regular and punctual attendance is expected of all students. Any one of these four options may result in the student being removed from the class and an administrative withdrawal being processed: (1) Student fails to begin class; (2) Student ceases participation for at least two consecutive weeks; (3) Student misses 15 percent or more of the coursework; and/or (4) Student misses 15 percent or more of the course as defined by the instructor. Students earn their financial aid by regularly attending and actively participating in their coursework. If a student does not actively participate, he/she may have to return financial aid funds. Consult the College Catalog or a Student Financial Services representative for more details.

XII. OUTSIDE OF CLASS ACADEMICALLY RELATED ACTIVITIES

The U.S. Department of Education mandates that students be made aware of expectations regarding coursework to be completed outside the classroom. Students are expected to spend substantial time outside of class meetings engaging in academically related activities such as reading, studying, and completing assignments. Specifically, time spent on academically related activities outside of class combined with time spent in class meetings is expected to be a minimum of 37.5 hours over the duration of the term for each credit hour.