

# **COURSE OUTLINE**

**BIOL-103**

**Human Heredity**

**3 Semester Hours**

**Science Core Course**

## **HOWARD COMMUNITY COLLEGE**

### **Description**

Human Heredity is an introductory life science course designed for students who are not majoring in the life sciences. Topics in the course include the basic principles of inheritance, a survey of human hereditary characteristics and disorders, and genetic technology and gene manipulation. Current scientific and bioethical questions regarding the present and future applications of genetic analysis and genetic engineering will be considered. (3 hours lecture)

### **Statement on General Education and Liberal Learning**

A liberal education prepares students to lead ethical, productive, and creative lives and to understand how the pursuit of lifelong learning and critical thinking fosters good citizenship. General education courses form the core of a liberal education within the higher education curriculum and provide a coherent intellectual experience for all students by introducing the fundamental concepts and methods of inquiry in the areas of mathematics, the physical and natural sciences, the social sciences, the arts and the humanities, and composition. This course is part of the general education core experience at Howard Community College.

### **Overall Course Objectives**

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

1. Describe the basic principles of human inheritance.
2. Given the name of a human genetic disorder, be able to access and interpret the information provided in Mckusick's Mendelian Inheritance in Man. Be able to explain the information in simple terms to someone less familiar with the science of heredity.
3. Explain the relationship between DNA, genes, proteins, and traits, and be able to illustrate this relationship with specific examples of genetic traits or disorders.
4. Explain the mechanisms and outcomes of genetic mutations.
5. Describe the usefulness of chromosomal analysis in human genetics using specific examples.
6. Explain the basic principles involved in the genetics of immunity and cancer.
7. Identify the principle techniques used in modern gene technology and genetic engineering.
8. Be aware of the controversial issues involved in the application of genetic technology and genetic engineering, and form a personal opinion on these subjects based on scientific and ethical considerations.

## **Major Topics**

1. Introduction to Genetics
2. Cells
3. Chromosomes and Mitosis
4. Meiosis
5. Transmission of Genes
6. Pedigree Analysis
7. Polygenes and Multifactorial Inheritance
8. Cytogenetics
9. Development and Sex Determination
10. DNA Structure and Chromosomes
11. DNA Structure
12. Gene Expression—how proteins are made
13. From Proteins to Phenotypes
14. Mutation
15. Cloning and Recombinant DNA
16. Applications of DNA Technology
17. Genes and Cancer
18. Genetics of Behavior
19. Genetic Screening and Counseling

## **Course Requirements**

Grading/exams: Grading procedures will be determined by the individual faculty member but will include the following: tests, homework assignments, and final exam.

Writing: Homework assignments will include short essays on specific topics related to human inheritance and bioethics.

## **Other Course Information**

This course is a Science core course, Science elective and an Arts and Sciences elective.