

BIO 20 Course Outline as of Summer 2021**CATALOG INFORMATION**

Dept and Nbr: BIO 20 Title: HUMAN GENETICS

Full Title: Human Genetics

Last Reviewed: 9/23/2024

Units	Course Hours per Week		Nbr of Weeks		Course Hours Total	
Maximum	3.00	Lecture Scheduled	3.00	17.5	Lecture Scheduled	52.50
Minimum	3.00	Lab Scheduled	0	6	Lab Scheduled	0
		Contact DHR	0		Contact DHR	0
		Contact Total	3.00		Contact Total	52.50
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 105.00

Total Student Learning Hours: 157.50

Title 5 Category: AA Degree Applicable

Grading: Grade or P/NP

Repeatability: 00 - Two Repeats if Grade was D, F, NC, or NP

Also Listed As:

Formerly:

Catalog Description:

Mechanisms of heredity with specific reference to humans. Course includes current genetic technologies and their ethical and societal consequences.

Prerequisites/Corequisites:**Recommended Preparation:****Limits on Enrollment:****Schedule of Classes Information:**

Description: Mechanisms of heredity with specific reference to humans. Course includes current genetic technologies and their ethical and societal consequences. (Grade or P/NP)

Prerequisites/Corequisites:

Recommended:

Limits on Enrollment:

Transfer Credit: CSU;UC.

Repeatability: Two Repeats if Grade was D, F, NC, or NP

ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

AS Degree:	Area		Effective:	Inactive:
	C	Natural Sciences	Fall 2020	
	C	Natural Sciences	Fall 1981	Summer 2011
CSU GE:	Transfer Area		Effective:	Inactive:
	B2	Life Science	Fall 2020	
	B2	Life Science	Fall 1981	Summer 2011
IGETC:	Transfer Area		Effective:	Inactive:
	5B	Biological Sciences	Fall 2020	
	5B	Biological Sciences	Fall 1981	Summer 2011
CSU Transfer:	Transferable	Effective:	Fall 2020	Inactive:
UC Transfer:	Transferable	Effective:	Fall 2020	Inactive:

CID:

Certificate/Major Applicable:

Major Applicable Course

COURSE CONTENT

Student Learning Outcomes:

At the conclusion of this course, the student should be able to:

1. Explain the roles of DNA in the transmission of genetic characteristics between generations.
2. Predict the outcome of genetic crosses using Mendelian and other principles.
3. Critically analyze the impact of recent technological advances in genetics.

Objectives:

At the conclusion of this course, the student should be able to:

1. Describe cellular organization and structure.
2. Explain the role of chromosomes, DNA, and RNA in cell function and information transfer.
3. Describe the roles of DNA and genes in reproduction, development, and disease.
4. Solve problems based on Mendelian inheritance.
5. Describe extensions and exceptions to Mendel's laws.
6. Explain the role of genetic changes in evolution.
7. Describe recent advances in genetics such as recombinant DNA, genetic engineering, and the human genome project and how they are applied in gene therapy, genetic testing, and the creation of genetically-modified organisms.
8. Evaluate how new technologies impact the individual, family and society.
9. Examine the history of eugenics and its current manifestations.

Topics and Scope:

- I. Scientific Method
- II. Cell Structure and Function
- III. Gene Expression
 - A. Structure and function of DNA and RNA
 - B. Protein synthesis

- C. Regulation of gene expression
- IV. Reproduction
 - A. Mitosis
 - B. Meiosis
 - C. Human reproduction and development
- V. Mendelian Inheritance
- VI. Beyond Mendelian Inheritance
 - A. Sex-linkage
 - B. Epigenetics
 - C. Environmental impacts
 - D. Other topics
- VII. Mutation and Genetic Disease
- VIII. Evolution
 - A. Theory of natural selection
 - B. Role of mutation
- IX. Race and Eugenics
 - A. Historical perspective
 - B. Reproductive choice and the new eugenics
- X. The Human Microbiome
- XI. Recent Developments in Genetics and Genetic Technology (at least five topics selected from the following)
 - A. Recombinant DNA
 - B. Genetic engineering
 - C. Genome sequencing
 - D. Gene therapy
 - E. Preimplantation genetic diagnosis
 - F. Genetic testing
 - G. Clustered Regularly Interspaced Short Palindromic Repeats (CRISPR)/Cas9
 - H. Polymerase chain reaction (PCR)
 - I. Gene chips
 - J. Ancient DNA
 - K. Other recent developments
- XII. Bioethics - Societal Impacts of the Science and Technology of Genetics

Assignment:

1. Readings: 15-35 pages/week may include textbooks, scientific journals, and articles from newspapers, magazines, and the Internet
2. Homework: 2-4 assignments; may include problem sets, case studies, and/or written descriptions or discussions of lecture topics in short essay format
3. Oral reports: 1-2; research an approved topic and present a 5-10 minute report to the class
4. Formal assessment: 2-3 midterms and 1 final exam, including objective type questions, genetics problems, and essay questions
5. Research papers: 2-3 research papers of 3-5 pages in length on current topics
6. Participation: regularly participate in class discussions on current topics

Methods of Evaluation/Basis of Grade:

Writing: Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

Research papers, homework (short essays)

Writing
20 - 40%

Problem Solving: Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Homework problems, case studies

Problem solving
10 - 20%

Skill Demonstrations: All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

None

Skill Demonstrations
0 - 0%

Exams: All forms of formal testing, other than skill performance exams.

Midterms and final exam; may include multiple choice, true/false, matching items, completion, genetics problems, and/or essays

Exams
40 - 60%

Other: Includes any assessment tools that do not logically fit into the above categories.

Attendance, participation in group work, oral reports

Other Category
10 - 20%

Representative Textbooks and Materials:

Human Genetics: Concepts And Applications. 11th ed. Lewis, Ricki. McGraw-Hill. 2015 (classic)

Recommended Books:

Human Heredity: Principles & Issues. 11th ed. Cummings, Michael. Cengage Learning. 2015 (classic)

Cartoon Guide To Genetics. Updated edition. Gonick, Larry and Wheelis, Mark. Harper Collins. 1991 (classic)