

**Course Title:** DNA: Promise and Peril

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**Enforced requisite:** English Composition 3 or 3H.

**Description:**

The era is upon us when we will have the sequence of our entire genome available to each of us. In this course, we will consider the impact that the knowledge of this genomic sequence will have on our concepts of ourselves as individuals and of our place in the biological universe. We will explore how this information will influence concepts of race/ethnicity and gender. The ability of DNA-based forensics to identify specific individuals will be considered. As genes become commodities with value in the marketplace, we may find that someone else owns our genes. The cloning of humans for reproductive and therapeutic purposes will also be discussed. Much has been made of the medical implications of the Human Genome Project, but we will look at the influence of this information on our concepts of self and identity.

Textbook: Linda L. McCabe and Edward R.B. McCabe: DNA: Promise and Peril, Oakland: University of California Press, 2008.

**Course Outline:**

April 1, Tuesday DNA Sequence Does Not Equal Destiny, Chapter 1  
Biological Determinism and Genetic Determinism  
Dutch Hunger Winter  
Barker Hypothesis

April 3, Thursday What Is Genomics? Chapter 2  
21<sup>st</sup> Century as the Century of Biology  
The Stage Is Set for the Human Genome Project  
The Human Genome Project  
Impact of the Human Genome Project  
So, Why Genomics?

April 8, Tuesday Genetic Determinism, Chapter 3  
Does Anyone Really Believe in Genetic Determinism?  
Uncertainty in the Post-Genomic Era  
Study of Twins Can Determine Genetic Influences on Traits  
Concerns About Determinism in Behavioral Genetics  
Eugenics  
Does Genetic Testing Lead to Eugenics?

## Genetic Determinism in the Media

April 10, Thursday Evolution and Deconstruction in Human-Centered Biology, Chapter 4  
Copernican Revolution in Biology

Comparative Genomics

Conservation of *HOX* Genes

Coevolution of a Dairy Culture with Lactase Gene Variation

April 15, Tuesday, Race and Ethnicity: Your History Is Written in Your Genes, Chapter 5

Does the Term “Race” Have Any Validity for Humans?

Using “Recreational Genetics” to Search for Our Roots

Ethnocultural Group as Proxy for Individualized Medicine

April 17, Thursday, Race and Ethnicity: Your History Is Written in Your Genes, Chapter 5 Continued

Melungeon DNA Study

Maternal Lineages and Mitochondrial DNA

Patrilineal Relationships and Y Chromosome DNA

April 22, Tuesday, Gender Is a Spectrum, Not a Dichotomy, Chapter 6

The Question in the Delivery Room

Anatomic Sex

Genotypic Sex

April 24, Thursday, Gender Is a Spectrum, Not a Dichotomy, Chapter 6 Continued

Brain Sex

Gender of Rearing

Other Gender Categories

April 29, Tuesday, Genome-Based Forensics, Chapter 7

Forensic and Medical Testing Are Distinguished by the Uses of the Results

“DNA Fingerprinting” and Probabilities

Advantages and Disadvantages of DNA Analysis

Genetics of Forensic Analysis

May 1, Thursday, Genome-Based Forensics, Chapter 7 Continued

Early Forensic Cases Involved Direct Matches

DNA Databases Increase Reach of DNA Forensics

Indicting DNA

Reuniting Families

May 6, Tuesday, When Genes Belong to Groups and Not Individuals, Chapter 8

French DNA

Stigmatization

Genetic Testing and Research Focusing on the Ashkenazim  
Sickle Cell Disease  
Iceland's deCODE Genetics  
The Navajo – Leaders Make Decisions about Use of DNA Testing for Tribal Members

May 8, Thursday, Genes as Commodities: Ownership of Genes by Business Interests,  
Chapter 9  
Patenting Oneself  
Sample Ownership  
Informing Patients and Their Families  
Gene Patents  
Patient Advocacy Groups and Governments Regain Control

May 13, Tuesday, Protection Against Genetic Discrimination: The New Civil Right,  
Chapter 10  
Evidence of Genetic Discrimination  
Federal Genetic Nondiscrimination Legislation  
Genetic Discrimination in Employment  
Genetic Discrimination in Life Insurance  
Genetic Discrimination in Health Insurance

May 15, Thursday, Reproductive Technologies: On the Road to Designer Babies?  
Chapter 11  
Opinions of the US Public about Reproductive Technologies  
Treating Infertility: Assisted Reproduction Technology  
Diagnosis of Genetic Diseases in the Embryo and Fetus  
Designer Babies

May 20, Tuesday, Reproductive Cloning: From Farm Animals to Pets to Humans?  
Chapter 12  
Dolly, the Sheep  
Biological Problems with Cloned Animals  
Endorsement of Therapeutic Cloning but not Reproductive Cloning by US Panel  
Claims of Human Cloning  
Cloning Other Animals

May 22, Thursday, Therapeutic Cloning and Regenerative Medicine, Chapter 13  
Adult Stem Cells  
Embryonic Stem Cells  
Combining Therapeutic and Reproductive Cloning with Gene Therapy  
Policy Issues Related to Stem Cells

May 27, Tuesday, Gene Therapy: Can the Promise Be Fulfilled? Chapter 14  
Types of Gene Therapy  
Early Gene Therapy in the US

Death of Jesse Gelsinger  
SCID, Chronic Granulomatous Disease (CDG) and Hemophilia  
Germline Gene Therapy

May 29, Thursday, Large Population Assessments: The Foundation for Genomic  
Medicine, Chapter 15  
A New Paradigm in Medicine  
Impact of the Human Genome Project on Medicine  
Newborn Screening  
Policy Development in Newborn Screening

June 3, Tuesday, Large Population Assessments: The Foundation for Genomic Medicine,  
Chapter 15 Continued  
Population-Based Screening for Genetic Risk  
Pharmacogenomics

June 5, Thursday, Hidden Destiny, Chapter 16  
A Synthetic View of the Individual  
The Human Genome Project Provided Information, not Knowledge  
Genetic Determinism as a Paradigm  
Your Sense of Identity Is Unbounded by Genomics

**Attendance:** Students are required to attend the two lectures each week and their  
assigned discussion section.

### **How Students Will be Assessed a Grade:**

Grading will be based on your three papers, your attendance in lecture and your  
discussion section, and your participation in your discussion section. Each paper will be  
double spaced, with no more than a 1 inch margin top, bottom and sides, and at least five  
pages of text. There will be no footnotes. References will be cited in the text as Jones  
(1999) or (Jones, 1999). If there are two authors, the citation will read Jones and Smith  
(1999), or (Jones and Smith, 1999). If there are three or more authors, the citation will  
read Jones et al. (1999), or (Jones et al., 1999). Each paper will include a list of  
references at the end of the five pages or more of text. Your reference list will not count  
toward your five pages of text for each paper.

References will follow this format for journal articles:

A.J. Jones, L.K. Smith, and D.D. Johnson. The importance of genetics in everyday life.  
*Science*. 239:42-45, 2007.

Include the names of all authors, Title of the article, Name of Journal, Volume number,  
Inclusive pages, Year of publication.

References will follow this format for books:

A.J. Jones, L.K. Smith, and D.D. Johnson. *The Importance of Genetics in Everyday Life*. New York: Academic Press, 1995.

Include the names of all authors, Title of the book, City of publication, Publisher, Year of Publication.

References will follow this format for a chapter in an edited book:

A.J. Jones, L.K. Smith, and D.D. Johnson. The importance of genetics in everyday life. In S.P. Davis and R.L. Collins (Eds.) *Human Genetics*. New York: Academic Press, 2000, pp. 156-178.

Include the names of all authors of the chapter, Title of the chapter, Names of all editors, Title of the book, City of publication, Publisher, Year of publication, Inclusive pages.

You may cite one website in each of your papers. Please include the complete internet address.

Each of your papers will be a discussion of your opinion (supported by references) of the following topics. Please note the due dates for each topic.

Topic I: Genetic Testing Is the New Eugenics/Genetic Testing Is Not the New Eugenics  
April 22, Tuesday, First draft due at the beginning of lecture  
April 24, Thursday, You will receive comments on your first draft at the end of lecture  
May 1, Thursday, Final draft due incorporating the recommended changes at the beginning of lecture

Topic II: When Evidence at a Crime Scene Is Similar to an Individual in a Criminal DNA Database, the Individual's Relatives Should Be Questioned/When Evidence at a Crime Scene Is Similar to an Individual in a Criminal DNA Database, the Individual's Relatives Should Not Be Questioned  
May 8, Thursday, First draft due at the beginning of lecture  
May 13, Tuesday, You will receive comments on your first draft at the end of lecture  
May 20, Tuesday, Final draft due incorporating the recommended changes at the beginning of lecture

Topic III: Parents Have the Right to Enhance Their Infants Using Genetics/Parents Do Not Have the Right to Enhance Their Infants Using Genetics  
May 27, Tuesday, First draft due at the beginning of lecture  
May 29, Thursday, You will receive Comments on your first draft at the end of lecture  
June 5, Thursday, Final draft due incorporating the recommended changes at the beginning of lecture

Each paper is worth 25 points. A late paper will result in the loss of five points of your possible 25 points for the paper. Your paper will be graded as follows:

First draft:	Focus	0-2.5 points
	Organization	0-2.5 points
	Content	0-2.5 points
	Expression	0-2.5 points
	Clarity	0-2.5 points
Second draft:	Focus	0-2.5 points
	Organization	0-2.5 points
	Content	0-2.5 points
	Expression	0-2.5 points
	Clarity	0-2.5 points

The purpose of your papers is to allow you to explore several topics in depth by your reading of the textbook and reviewing the literature using PubMed, and through lecture and discussion. You will then clarify your position on a controversial topic and develop an organized expression of your opinion. You will support your viewpoint with logic and your references. No direct quotes will be permitted. You are to write using your own words. You will submit a draft of each paper that will be graded by your TA. You will then rewrite your draft in response to your TA's comments and submit your final paper. Your classmates, TA and instructors are available to help you with your research and your writing.

Twenty-five points of your grade will depend on attendance in lecture and your discussion section, and your participation in your discussion section. Attendance will be taken daily in lecture and in your section. Your TA will grade the quality of your participation in each meeting of your discussion section.

There will be no final exam.