

**Medgar Evers College
Department of Biology**

BIOL 211: Biotechnology and Society

Course Description:

This introductory non-technical three credit course will focus on the impact of biotechnology in our society and global environment. Basic concepts of DNA science and genetic engineering will be introduced as a foundation to understand and appreciate impact of modern biotechnology on agriculture, Fisheries, medicine, industry and environment.

Place of Course in the Curriculum (Target Audience):

Flexible core in the Scientific World for mostly non-biology majors.

Course Objective(s):

1. Be Aware of historical development of modern biotechnology
2. Able to Understand basic properties of DNA, RNA and Protein
3. Able to describe gene cloning in layman's term
4. Able to understand global and ethical issues related to biotechnology research
5. Be aware of impacts of biotechnology in agriculture, medicine, industry and environment.
6. Understand the science and controversy surrounding reproductive cloning and genetically modified crops
7. Understand intellectual property and patents
8. Able to analyze and discuss the manipulation of life and its effect on social, economic and political process today.

Learning Outcomes: When the student completes this course he/she should be able to:

At the completion of this course, students will be able to understand common terms and techniques that are being used in DNA Science and Biotechnology. They should be able to articulate the impact of biotechnology product and processes in our society. They should learn enough to be able to take part in debates on various social issues involving biotechnology.

Textbook:

Sharon Walker. 2007. Biotechnology Demystified. McGraw Hill, New York

References:

Ellyn Daugherty. 2007. *Biotechnology –Science for the new millennium.* Paradigm Publishing, Inc., St. Paul, MN.

Susan R. Barnum 2006. *Biotechnology – an introduction.* Brooks/Cole, Belmont, CA 94002.

Assigned Readings:

- **Sean Poulter**, “Human Genes in Your Food: Rice crops to be genetically modified with human DNA,” *Daily Mail*, March 6, 2007.
- **Charis Thompson**, “ Strategic Naturalizing: Kinship in an Infertility Clinic, :175-202 in S. Franklin and S. Mckinnon, eds. *Relative Values: Reconfiguring Kingship Studies*, 2001.
- **Rudolf Jaenish**, Congressional Testimony on Cloning, 24 January 2002.
- **Andrew Kimbrell**, Congressional Testimony on Cloning, 5 February 2002.
- **Judy Norsigian**, Congressional Testimony on Cloning, 5 March 2002.
- **Christopher Reeve**, Congressional Testimony on Cloning, 7 March 2002.
- **Kerr, Cunningham-Burley, and Amos**, “The New Genetics and Health: Mobilizing Lay Expertise,” *Public Understanding of Science* 7:41 -60, 1998
- **Rebecca Skloot**, “Taking the Least of You” *New York Times*, April 16, 2006.
- **Catherine Waldby**, “Umbilical Cord Blood: From Social Gift to Venture Capital,” *Biosocieties* 1, 2006.
- **Sally Smith Hughes**, “Making Dollars out of DNA: The First Major Patent in Biotechnology and the Commercialization of Molecular Biology, 1974-1980,” *Isis* 92:541-575, September 201.
- **Diamond v. Chakrabarty**, 447 U.S. 303. (Lexis-Nexis, enter case number or names “get a cast”).
- **Daniel Kyles**, “Of Mice & Money: the Story of the World’s First Animal Patent,” *Daedalus* 131:78-88

The textbook and references along with some of the assigned readings are available in the College Bookstore. The assigned readings should be obtained by you. They will be used and discussed during the course.

Reserves:

The books, articles, software, or other items listed have been placed on reserve at the Charles Evan Innis Memorial Library.

Grading: The grades in this course are based on the scores earned by you on homework assignments, laboratory reports, examinations, and the final examination.

Homework, Assignments	20%
Examinations (2)	30%
Final Examination	50%

Grading Scale:

97.1 – 100	A+
93.0 – 97.0	A
90.0 – 92.9	A-
87.1 – 89.9	B+
83.0 – 87.0	B
80.0 – 82.9	B-
77.1 – 79.9	C+
73.0 – 77.0	C
70.0 – 72.9	C-
67.1 – 69.9	D+
63.0 – 67.0	D
60.0 – 62.9	D-
0 – 59.9	F

Office Hours:

Office – AB1 Room 406
 MWF 3:00 – 4:00 p.m..
 Others by appointment

Policies

1. Regular and punctual attendance. All students have the responsibility to attend class regularly and to participate fully in the work of the course. “Students who are absent from a course for a number of times equivalent to two full weeks of class meetings may be denied credit for the course. In addition, the Office of the Registrar is required to assign a grade of WU for students who do not attend class at least once in the first three weeks of the course and once in the fourth or fifth weeks.”
2. Maintain discipline and professionalism while discussing and interacting with others in the class.
3. No food and drink and no cellphone use during the class.
4. No make-up tests without acceptable medical and or legal reasons

5. term paper should be between ten and fifteen pages including illustrations and references. It should be organized with a cover page, summary or abstract, introduction, body of the paper and references. There should be at least two references of original paper published in peer-reviewed research journals. Copy of one such research article must be attached with the paper. Both hard copy and electronic version of the paper are due on the day of final exam. Points will be deducted at the rate of two points per day's lateness.
6. No cheating (misrepresentation in academic work) and plagiarism (representation of another person's work, words, or ideas as your own) will be tolerated. Academic dishonesty is punishable by failure of the test, term paper or other assignment on which cheating and or plagiarism occurred. Please consult the MEC Academic Dishonesty Policy and Procedure Handbook for specific regulation and procedures related to academic integrity.

Course Outline

1. Biotechnology – historical development
2. DNA Science- an overview of DNA structure, replication
3. DNA Science – How gene functions-DNA to RNA to Protein
4. Understanding the inheritance of genes
5. A general review of Molecular cloning techniques
6. Protein Engineering and its application
7. Application of biotechnology in agriculture
8. Biotechnology in Medicine
9. Impact of Biotechnology on environment
- 10 Genetic testing and reproductive technologies
- 11 Gene therapy
- 12 DNA in forensic science
- 13 Stem cell technology and social implications
- 14 Modern Biotechnology- moral and ethical perspectives.