

**STATE UNIVERSITY OF NEW YORK  
COLLEGE OF TECHNOLOGY  
CANTON, NEW YORK**



**COURSE OUTLINE**

**BIOL 325 – Biology in Society**

**Prepared By: Ron Tavernier, PhD**

**School of Science, Health and Criminal Justice  
Science Department  
May 2015**

- A. **TITLE:** Biology in Society
- B. **COURSE NUMBER:** BIOL 325
- C. **CREDIT HOURS:** 3
- D. **WRITING INTENSIVE COURSE:** No
- E. **COURSE LENGTH:** 15 weeks
- F. **SEMESTER(S) OFFERED:** Spring, Winter, Summer
- G. **HOURS OF LECTURE, LABORATORY, RECITATION, TUTORIAL, ACTIVITY:**  
3 lecture hours per week
- H. **CATALOG DESCRIPTION:** This course is designed to develop critical thinking concerning the growing presence of biology in society. Students will apply biological principles and the scientific method to problems and decisions confronting society. Students will use and expand upon their basic biological knowledge of DNA, molecular biology and physiology to discuss the importance and ethical impact of the use of biology in society. General topics will include DNA technology, stem cells, medicine and forensic applications, specific topics discussed may vary from one semester to the next as new issues or developments warrant. The central goal of the course is to have students leave as highly informed citizens with a greater understanding of the science behind current biological applications.
- I. **PRE-REQUISITES/CO-REQUISITES:** Students must have received a grade of C or higher for one of the following courses or its equivalent: Introduction to Biology (BIOL 101), Introduction to Human Biology (BIOL 102), College Biology I (BIOL 105), Human Anatomy and Physiology I or II (BIOL 217/218).
- J. **GOALS (STUDENT LEARNING OUTCOMES):**  
By the end of this course, the student will be able to:

<i>Course Objective</i>	<i>Institutional SLO</i>
<b>1. Apply basic knowledge of DNA structure, function and inheritance to applications such as paternity testing, blood typing, recombinant DNA technology and genetically modified foods.</b>	<b>2. Crit. Thinking 3. Prof. Competence</b>
<b>2. Explain the molecular events underlying the use of certain medical techniques. Examples of these treatments include chemotherapy, vaccines, organ transplants, birth control and infertility treatments.</b>	<b>2. Crit. Thinking 3. Prof. Competence</b>
<b>3. Define the term stem cell, pluripotent, multipotent and totipotent. Describe the sources and qualities of various types of stem cells and state the benefits and challenges in the future application of stem cell therapy.</b>	<b>2. Crit. Thinking 3. Prof. Competence</b>

<p><b>4. Write responses to articles discussing biology, such as those found in scientific magazines and newspapers. Responses should contain proper scientific terminology and demonstrate a clear understanding of the scientific concepts and methodologies. Participate in discussions on the ethics of biology in society. Defend or oppose the use of biological techniques in society based on the scientific principles and merits.</b></p>	<p><b>1. Communication 2. Crit. Thinking 3. Prof. Competence</b></p>
<p><b>5. Describe the basic molecular and metabolic concepts underlying forensic science, including DNA evidence, blood alcohol, fingerprinting and drug testing.</b></p>	<p><b>1. Communication 2. Crit. Thinking 3. Prof. Competence</b></p>
<p><b>6. Organize ideas, explanations and examples coherently in a magazine article written for peers on a topic relevant to biology in society.</b></p>	<p><b>1. Communication 2. Crit. Thinking 3. Prof. Competence</b></p>

**K. TEXTS:** (If a text is used it should adhere to APA, MLA or ASA)  
**Required:** Campbell, Reece and Simon, Essential Biology, Second Edition, Benjamin Cummings, 2005

**Recommended:** Textbook from your 100 level Biology course, including but not limited to the following:

1. Audesirk, Audesirk and Byers, Life on Earth, Fourth Edition, Prentice Hall, 2006
2. Campbell and Reece, Biology, Seventh Edition, Benjamin Cummings, 2004
3. Mader, Human Biology, Ninth Edition, McGraw-Hill, 2005

**L. REFERENCES:**

1. Cummings, S. Current Perspectives in Genetics: Insights and Applications in Molecular, Classical, and Human Genetics, 2000 edition. Wadsworth Publishing.
2. Alberts, B., A. Johnson, J. Lewis, M. Raff, K. Roberts, and P. Walter. Molecular Biology of the Cell, 4<sup>th</sup> edition. Garland Publishing. 2002.
3. Hamer, D. Living With Our Genes: Why They Matter More Than You Think. Anchor. 1999.
4. Richards, J.E., and R.S. Hawley. The Human Genome: A User's Guide, 2nd edition. Elsevier Academic Press. 2005.
5. Stock, G. Redesigning Humans: Our Inevitable Genetic Future, 1<sup>st</sup> edition. Houghton Mifflin. 2002.
6. Various internet sites (changeable) - HumGen, Genetics Education Center, GenomicsHome (CDC), e.g.

**M. EQUIPMENT:**

**N. GRADING METHOD:** A-F

- |    |              |
|----|--------------|
| A  | 90 and above |
| B+ | 85 to 89     |
| B  | 80 to 84     |

C+	75 to 79
C	70 to 74
D+	65 to 69
D	60 to 64
F	60 and below

**O. MEASUREMENT CRITERIA/METHODS:**

- Term tests
- Final exam
- In-class written assignments
- Group Magazine Project
- Class participation
- Online participation through Blackboard

**P. DETAILED COURSE OUTLINE:**

**I. Unit One: DNA Technology**

- Back to Basics: Review of DNA structure and function
- Genetic Codominance: Blood typing
- DNA Biotechnology: Analysis of restriction fragment length polymorphisms for paternity testing, ethics and practical issues for DNA banks in law enforcement
- Recombinant DNA technology: Genetically modified foods, gene therapy and transgenic animals

**II. Unit Two: Forensic Science**

- DNA Evidence: Potential sources, use and misuse of data
- Fingerprinting: Physiological basis for fingerprints and practical applications
- Metabolic testing: Biochemical metabolites, blood alcohol and drug testing

**III. Unit Three: Medical Applications of Biological Principles**

- Chemotherapy: Cell cycle, cellular growth and division
- Organ Transplants: Immunological recognition of 'self' versus foreign biological components, use of alternative sources of organs
- Vaccines and Antibiotics: Innate immune response, viruses versus bacteria
- Botox: Use of toxins as medical treatment
- Herbal Supplements: Fact versus fiction
- Modern Reproduction: Hormonal mechanism of birth control, physiological basis of infertility, practicality and ethics of designer babies, human cloning

**IV. Unit Four: Stem Cells**

- Terminology: Proper use and application of stem cell terminology
- Embryonic Stem Cells: Sources, characteristics, benefits and drawbacks
- Adult Stem Cells: Sources, characteristics, benefits and drawbacks
- Umbilical Cord Stem Cells: Potential therapeutic use, private versus public banks, ethics
- Stem Cell Therapy: Current research, challenges and ethics