BIOL 108: BIOLOGY OF CANCER

Citrus College Course Outline of Record

Heading	Value
Effective Term:	Spring 2022
Credits:	3
Total Contact Hours:	54
Lecture Hours :	54
Lab Hours:	0
Hours Arranged:	0
Outside of Class Hours:	108
Prerequisite:	Elementary algebra or higher or direct placement based on multiple measures.
Strongly Recommended:	ENGL 101.
District General Education:	B1. Natural Sciences - Life Sciences
Transferable to CSU:	Yes
Transferable to UC:	Yes - Approved
Grading Method:	Standard Letter

Catalog Course Description

This course aims to give students a basic and big picture understanding about cancer. Topics include the genetic basis, hallmark characteristics, causes and avenues of prevention, and treatments of cancer. It is the hope that students who take this class will be better equipped to educate others on how to prevent cancer and distinguish science from myth regarding the disease. 54 lecture hours.

Course Objectives

- Describe the necessary components of all cells and specifically the function of the nucleus
- Contrast the morphology of cancer cells from normal cells
- Explain the cell cycle and distinguish the stages of Interphase and Mitosis
- Explain the need for cell cycle regulators and checkpoints to maintain healthy cell reproduction
- Articulate how cancer cells evade cell cycle regulators and checkpoints
- Identify the structure of DNA and all its components
- Be able to explain the central dogma of gene expression
- Define mutation and how that may affect protein production
- Describe the normal functions of proto-oncogenes, tumor suppressor genes and DNA repair enzymes
- List and describe the three general ways of acquiring mutations in cancer-critical genes and which contributes to most cancers
- Describe semi-conservative DNA replication and associated enzymes
- Critically examine a known environmental cause (carcinogen) of cancer
- Explain how a healthy immune system combats cancer cells
- Describe immunotherapy and its use as a treatment for cancer

Major Course Content

1. Cellular Basis of Cancer
   a. Cell as basic unit of life
   b. Normal cell anatomy
   c. Cell cycle and division
      i. Protein kinases, cyclins, checkpoints
2. Molecular/Genetic Basis of Cancer
   a. DNA structure and function
   b. Central dogma of gene expression
   c. Mutations
   d. Cancer-critical genes: Tumor suppressor, proto-oncogenes, and DNA repair enzymes
3. Causes/Prevention
   a. Heredity
   b. Random mutation during replication
   c. Environmental causes/carcinogens
4. Treatments
   a. Traditional methods: radiation, chemotherapy, surgery
   b. Immunotherapy and the normal functioning of immune system
   c. Alternative treatments
5. Service Learning
   a. Cancer prevention education
   b. Experiences of people living with cancer

Suggested Reading Other Than Required Textbook

Students will read on-line resources (from American Cancer Institute and Cancer Treatment Center for America) and/or scholarly research on the causes and treatments for cancer.

Examples of Required Writing Assignments

Students will work in groups to write a 2-3 page research paper on either a cause or treatment of cancer after having accomplished on-line research of the topic.
Students will also submit regular on-line journal reflections on assigned videos and on their experiences in their service learning environment.

Examples of Outside Assignments

Students will construct a chart comparing the hallmark characteristics of normal healthy cells and cancerous cells.
Students will answer homework questions such as: (1) What are the main types of cancer-critical genes? (2) What is the consequence of a mutated p53 gene? (3) How does our immune system fight against cancer cells?
Service learning project (minimum of 10hrs/semester): Students will also be required to volunteer at a local organization that helps educate the public on how to prevent cancer or care for cancer patients. Students will submit weekly journal entries on their experiences.

Instruction Type(s)

Lecture, Online Education Lecture

IGETC Area 5: Physical and Biological Sciences

5B. Biological Science