

University of Arkansas - Fort Smith
5210 Grand Avenue
P. O. Box 3649
Fort Smith, AR 72913-3649
479-788-7000

General Syllabus

BIOL 4833 Biology of Cancer

Credit Hours: 3

Lecture Hours: 3

Laboratory Hours: 0

Prerequisite: BIOL 3803 Genetics

Effective Catalog: 2018~2019

I. Course Information

A. Catalog Description

An examination of the history of cancer study, and the genetic, molecular, and cellular processes involved in cancer biology.

B. Additional Information -None

II. Student Learning Outcomes

A. Subject Matter

Upon successful completion of this course, the student will be able to:

1. Summarize the biology and genetics of cells and organisms.
2. Appraise and evaluate the nature of cancer.
3. Analyze the role of viruses in oncogenesis.
4. Compare and contrast the role(s) of growth factors and receptors in cancer biology.
5. Summarize the cytoplasmic signaling networks and their association to cancer.
6. Compare and contrast the roles of tumor suppressor genes and oncogenes in oncogenesis and tumor progression.
7. Critically evaluate the cell cycle regulatory network and its association to cancer development.
8. Describe the processes of apoptosis and compare it to necrosis.
9. Appraise the multistep process of tumorigenesis.

B. University Learning Outcomes (ULO)

This course enhances student abilities in the following areas:

Analytical Skills

Critical Thinking Skills: Students will use critical thinking skills to draw conclusions as to the expected cellular outcomes due to the effects of particular genetic anomalies.

Communication Skills (written and oral)

Students will communicate proficiently by producing a written research paper.

Ethical Decision Making

Students will identify ethical dilemmas through analysis and critique of scientific experiments carried out to study oncogenesis.

III. Major Course Topics

- A. The nature of cancer
- B. Viruses that cause cancer
 - 1. RNA viruses
 - 2. DNA viruses
- C. Oncogenes
 - 1. cellular oncogenes/proto-oncogenes
 - 2. methods of oncogene activation
 - 3. functions of oncogenes
- D. Growth Factors and Oncogenesis
 - 1. growth factors
 - 2. receptors
- E. Cytoplasmic Signaling Networks and Oncogenesis
 - 1. intracellular signaling networks
- F. Tumor Suppressor Genes
 - 1. Retinoblastoma protein
 - 2. Loss of Heterozygosity
 - 3. functions of tumor suppressor genes
- G. Cell Cycle
 - 1. Cell cycle control via DNA virus proteins
 - 2. Cell cycle control via tumor suppressor genes
 - 3. Cell cycle control via oncogenes
- H. Apoptosis and Cell Death
 - 1. role of p53 in Apoptosis and cell death