



THE OHIO STATE UNIVERSITY
COLLEGE OF ENGINEERING

Engineering Principles in Cancer

MECHENG 5550

Credit Hours:

3.00

Course Levels:

Undergraduate (1000-5000 level)

Graduate (5000-8000 level)

Course Components:

Lecture

Course Description:

The purpose of this course is to introduce engineering principles in the context of cancer progression and therapy.

Prerequisites and Co-requisites:

Prereq: 3500, 3503, or CBE 2420, or permission of instructor.

Course Goals / Objectives:

- Interdisciplinary approach (engineering, science, and medicine) towards understanding concepts from tumor biology
 - Introduction to cancer research for students with quantitative scientific and engineering backgrounds
 - Introduction to engineered tools for addressing complex tumor biology
 - Understanding of scientific literature: Students will acquire an understanding of the primary cancer research literature to successfully prepare the grant proposal and group presentations.
 - Synthesis of scientific ideas and projects: Students will generate, justify the significance to cancer research, and defend a research topic/objective/hypothesis that that is to be novel in substance or approach
 - Understanding of research design and methods: The grant proposal format also necessitates that the proposed design of experiments be logical, cohesive, and directly tests the validity of the selected hypothesis
 - Ability to engage in scientific communication: The grant proposal and quizzes are exercises in written communication, the presentations exhibit oral communication, and class participation displays interpersonal communication
 - Ability to collaborate and work on teams: Students will be required to collaborate as a team for the final presentation
 - Exercises in critical thinking in preparation for Graduate-level studies
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Course Topics:

- Tumor Biology and Microenvironment
 - Transport Phenomena
 - Mechanics of Tumor Angiogenesis and Metastasis
 - Cancer Therapy and Detection
 - Scientific Review Meetings
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Designation:

Elective