



**THE OHIO STATE UNIVERSITY**  
COLLEGE OF ENGINEERING

# Engineering Principles in Cancer

## CBE 5550

**Credit Hours:**

3.00 - 3.00

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**Course Levels:**

Undergraduate (1000-5000 level)

Graduate (5000-8000 level)

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**Course Components:**

Lecture

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**Course Description:**

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

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**Prerequisites and Co-requisites:**

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

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### **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