BSC6883:
Integrated Mathematical Oncology II

CRN#: *****, Section 001, 4 Credit Hours
CAS / Molecular Biosciences

COURSE DESCRIPTION

I. University Course Description

This is a deep focus course on data-driven development of mathematical models of tissue homeostasis, cancer development, and treatment response to answer specific open questions in cancer biological and clinical oncology.

II. Course Purpose

The IMO2 Integrated Mathematical Oncology course is an intense course that focuses on clinical and biological data-driven development of mathematical models. Topics to be covered include modeling for clonal oncogenesis, tumor ecology, metastatization, radiation therapy, chemotherapy, immunotherapy, and cancer screening. Students are expected to have successfully completed the IMO1 course (BSC 6883) prior to enrolling. Individual lectures will provide recent primary research articles, and students are expected to participate in the analysis of these papers as part of their studies.

III. Course Objectives

The primary objective of this course is to provide an understanding of how to develop and test data-driven mathematical models of biological questions relevant to cancer. Students will gain an understanding of how to select the appropriate modeling approach, how to fit mathematical models to data, how to analyze dynamics and make testable predictions. Students will supplement the lecture information and primary research paper reading by implementing appropriate model systems from the primary assigned textbook.

IV. Student Learning Outcomes

Students will demonstrate the ability to build mathematical and computational models purposely for specific research questions utilizing specific biological/clinical data.