

# BIMM134 – The Biology of Cancer SPRING 2015

**Lectures:**

CENTR 214

Tuesdays/Thursdays, March 31 – June 4

8:00 – 9:20 AM

**Instructor:** Eric Bennett, Ph.D. – email - e1bennett@ucsd.edu

Office Hours: Tuesday and Thursday 3-4 pm, Natural Sciences Building, Room 5316

**Required Textbook:**

The Biology of Cancer – 2<sup>nd</sup> Edition

Robert A. Weinberg

Copies of the textbook are on reserve at the Biomedical Library

**Exams:**

**Midterm I: April 23**, in-class

**Midterm II: May 19**, in-class

**Final: June 11 – 8AM**, comprehensive

**Final grade breakdown**

Midterm I – 30%

Midterm II – 30%

Final – 35%

In class participation – 5%

**Exam policy:**

There will be **NO** makeup exams.

You are required to take all exams without exception.

Midterm exam re-grade requests will be allowed. Requests will need to be made in writing no later than 1 week prior to date at which graded exams are returned to the class. Re-grade requests must be typed and printed and appended to the original exam. Email requests will not be allowed and all re-grading decisions are final.

**Teaching Assistant:** (Discussion sessions to be held in Weeks 2 to 10)

Name	Email Address	Sessions
Daniel Garcia	dag032@ucsd	Fridays 3-3:50; Center Hall 201 Thursdays 10-11; Leichtag 2A05

**Email policy:**

Use the teaching assistant as your primary contact point for questions - I will attempt to answer short and direct clarification questions as long as you include BIMM134 in subject line of email. Long open-ended emails will likely receive either no response or a short response. I will respond to emails only once a day so if you don't receive an immediate response, wait.

## **Course Learning Goals:**

### **I. Understand the heterogeneity and complexity associated with human cancers.**

#### **Key Concepts**

**What extrinsic and intrinsic factors lead to cancer initiation?**

**What cell types contribute to cancer initiation?**

**How does the surrounding tumor microenvironment as well the interactions between the tumor and other body systems impact cancer formation?**

### **II. Understand the molecular features that drive cancer formation.**

#### **Key Concepts**

**How do cells lose the ability to control their growth?**

**What cellular signaling pathways are commonly perturbed during cancer formation?**

**What defects in cellular and molecular failsafe mechanisms expose vulnerabilities to cancer formation?**

### **III. Understand the genetic basis for cancer formation**

#### **Key Concepts**

**How does cancer result from genetic clonal evolution?**

**What molecular pathways prevent genetic alteration?**

**How does genetic alteration lead to cancer formation and chemoresistance?**

**How is our current genetic understanding of cancer being used to treat specific cancers?**

### **IV. Understand the experimental basis for historical and current discoveries in cancer biology.**

#### **Key Concepts**

**How were/are oncogenes and tumor suppressors discovered?**

**Who were scientists responsible for historically significant discoveries in cancer biology?**

**How are current cancer research efforts reshaping our view of cancer?**

**BIMM134**  
**Biology of Cancer**

Lecture subject	Reading
March 31 - Introduction to Cancer A. Key terminology B. Cancer Stats C. Carcinogens and environmental causes D. Cell Signaling	Chapter 2 – tBoC Pgs 31-44;59-69
April 2 – Principles of cancer initiation and Tumor heterogeneity A. Properties of cancer initiating cells B. Cancer stem cell hypothesis C. Multi-step tumorigenesis	pdf on course website Chapter 11 – tBoC Pgs 439-474
April 7 –Tumor Viruses A. Clonal evolution theory B. Animal Tumor viruses and cellular transformation C. Human Tumor viruses	Chapter 3 - tBoC
April 9 – Human Cellular Oncogenes	Chapter 4 - tBoC
April 14 –Tumor Suppressors	Chapter 7 – tBoc
April 16 – Loss of proliferation control I RTKs – Ras	Chapter 5 – tBoC Chapter 6 - tBoC Pgs 175-193
April 21 - Loss of proliferation control II – Cell cycle	Chapter 8 – tBoC Pgs 231-254
<b>April 23 – Midterm - I</b>	
April 28 – Loss of feedback inhibition – A. Translational control B. nutrient growth control; PI3K – mTOR	Chapter 6 – tBoC Pgs 193-202 pdf on course website
April 30 – Avoiding cell growth suppressive signals – Senescence	Chapter 10 – tBoC pdf on course website

May 5 – Avoiding cell growth suppressive signals – p53

Chapter 9 - tBoC  
Pgs 331-378  
pdf on course website

May 7 - Avoiding cell growth suppressive signals – Apoptosis I

Chapter 9 - tBoC  
pdf on course website

May 12 - Avoiding cell growth suppressive signals – Apoptosis II

Chapter 9 - tBoC  
pdf on course website

May 14 - Genomic instability and DNA damage

Chapter 12 – tBoC

### May 19 – Midterm 2

May 21 –Cancer Metabolism  
Reuben Shaw Guest Lecture

pdf on course website

May 26 – Angiogenesis and the Cancer Microenvironment

Chapter 13 – tBoC

May 28 – Metastasis

Chapter 14 – tBoC  
Pgs 641-694

June 2 – Cancer genomics –  
Rafael Bejar guest lecture

June 4 – Cancer Immunology

Chapter 15 - tBoC

### June 11 – Final Exam 8AM