BIMM134 – The Biology of Cancer
Winter 2020

Lectures:
Fred Kavli Auditorium Tata Hall 3201
Tuesdays/Thursdays; 8:00-9:20AM
January 6 – March 13

Instructor: Eric Bennett, Ph.D.
email - e1bennett@ucsd.edu
Office Hour: Thursday 12-1 pm,
Natural Sciences Building, Room 6105

Discussion Sections:
Wednesday – 11-12 – SEQUO 148
Wednesday – 12-1 – SEQUO 148
Friday – 8-9 – SEQUO 148
Friday – 9-10 – SEQUO 148
Friday – 10-11 – SEQUO 148

Attendance at the discussion sections is optional. However, attendance is strongly recommended. The instructional assistants will be available to review material during these sections and discussion sections are great places to get questions answered. There will also be four ungraded problem sets assigned during the course that will ONLY be reviewed during the discussion sections.

Course website:
All course information will be available from the course website (canvas.ucsd.edu). Grades will also be posted to the course website.

Optional Textbook:
The Biology of Cancer – 2nd Edition
Robert A. Weinberg – Purchase of the book is not required for the course. All exams will only cover material that is presented in class. The textbook can be helpful in providing additional material that supplements and complements the material discussed in class.

Other reading assignments:
Supplemental reading assignments will be posted on the course website. These readings are not required reading and are meant to enhance the course lectures. These readings are either review articles or primary research articles and form the basis of some the material presented in class.

Exams:
Midterm I: January 30, in-class
Midterm II: February 27, in-class

Final: March 19 8:00-11:0AM, comprehensive

Final grade breakdown
Midterm I – 30%
Midterm II – 30%
Final – 35%
In class participation – 5%

The final grade distribution will be based on a curve. The median cumulative score (summation of all graded components) for the class will be set as the points required to earn a B in this class. All subsequent grades will be based on this curve as set after the final by the instructor. Academic dishonesty will result in an automatic F in the course and will be reported to the Office of the Dean of Students.

Exam policy:
Exams must be taken at the indicated times. If an emergency (a real emergency!) arises, you must let me know as early as possible before the actual exam. Emergencies that prevent students from taking the midterm or final exams will be handled with an alternative exam. Students with learning disabilities recognized by the university should contact the Office for Students with Disabilities (https://osd.ucsd.edu/) to initiate possible alternative exam arrangements.

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.

Instructional Assistants: (Discussion sessions to be held in Weeks 2 thru 10)

Name	Email Address	Sessions
Yan Liang	yal069@ucsd.edu	Friday 8-9; 9-10
Xinyu (Mabel) Chen	xic240@ucsd.edu	Wednesday 11-12
Nathan Kamer	nkamer@ucsd.edu	Friday 10-11
Samuel Reyes	sgr005@ucsd.edu	Wednesday 12-1

Email policy:
Use the instructional assistants 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 the 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 Expectations:

What I expect of you	What you can expect of me
Be informed. Read this syllabus carefully and completely so you understand the course structure and expectations.	**Enthusiasm.** To be prepared for each class and to bring my enthusiasm for teaching to each lecture.
Be prepared. Keep up with readings and lecture materials. Each lecture will build on material from the previous lecture. Staying current with the lectures will greatly aid your learning experience.	**Responsiveness.** To respond to emails within 24 hours. Emails received on weekends or while I'm traveling may take longer.
Act ethically. Have a good attitude and maintenance of honest and ethical principles towards me, your classmates, and the execution of the course. See the UCSD principles of community section of this syllabus for more information.	**Timely feedback.** To make every effort to return graded exams within one week. I will respond to student feedback with regards to parts of the lecture material that need additional clarification or course elements that need adjusting.
Have integrity. Please make an honest, fair, responsible, respectful, trustworthy, and courageous effort on all academic work in this course.	**Integrity.** To uphold integrity standards and create an atmosphere that fosters active learning, creativity, critical thinking, and honest collaboration.
Be flexible. Sometimes my schedule gets affected by unavoidable work travel, necessitating some office hour rescheduling at the last minute.	**Reasonable** accommodation and understanding for student situations that arise; however, I will not make exceptions for one person that are not available to every other person in the course.
Get involved. The more questions you ask during class and the more you participate in the active learning segments the more fun the course is for me and you.	**Thoughtful discussion** of all questions. I want to empower you to get involved into the course discussion as your questions are insightful and helpful to other students.

Diversity and Inclusion Statement:
In an ideal world, science would be objective. However, much of science is subjective and is historically built on a small subset of privileged voices. I acknowledge that it is possible that there may be both overt and covert biases in the material due to the lens with which it was written, even though the material is primarily of a scientific nature. Integrating a diverse set of experiences is important for a more comprehensive understanding of science.

Please contact me (in person or electronically) or submit anonymous feedback if you have any suggestions to improve the quality of the course materials.

Furthermore, I would like to create a learning environment for my students that supports a diversity of thoughts, perspectives and experiences, and honors your identities (including race, gender, class, sexuality, religion, ability, etc.)

To help accomplish this:

If you have a name and/or set of pronouns that differ from those that appear in your UCSD profile, please let me know.

I (like many people) am still in the process of learning about diverse perspectives and identities. If something was said in class (by anyone) that made you feel uncomfortable, please talk to me about it. (Again, anonymous feedback is always an option.)

As a participant in course discussions, you should also strive to honor the diversity of your classmates.

Cancer Research Seminar Extra Credit:

There will be 3-4 cancer research seminars at various times throughout the quarter. These seminars will take place outside of class time and are a great opportunity to learn about some current cancer research topics. Attendance at these seminars will constitute extra credit opportunities for the class. Seminars available for extra credit will be announced during class and posted to the course website.

To earn the extra credit you must check in with an Instructional Assistant before or after the seminar.

You also must submit a half-page synopsis of the research seminar within 48 hours of attending the seminar (trust me, you will want to write it while the seminar is fresh in your mind). See “Outline for writing cancer biology research seminar synopses” document for guidelines in constructing your written synopses.

Submission of the research synopses will be through the course website. Synopses emailed to either me or the IAs will not be accepted.

The first seminar that you attend will count for the entirety of your participation score for the class (5% of the total)

Each subsequent seminar you attend and write a synopsis for, you will receive 10 bonus points to be applied to any exam (basically two free questions) up to a maximum of 20 points (i.e. once you attend three seminars there will be no more extra credit).

Course Learning Objectives:

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
January 7 - Introduction to Cancer	Chapter 2 – tBoC Pgs 31-44;59-69
January 9 – Genetic variability and heterogeneity in Cancer	pdf on course website Chapter 11 – tBoC Pgs 439-474
January 14 – Tumor Viruses	Chapter 3 - tBoC
January 16 – Human Cellular Oncogenes	Chapter 4 - tBoC
January 21– Tumor Suppressors	Chapter 7 – tBoc
January 23 – Loss of proliferation control I RTKs – Ras	Chapter 5 – tBoC Chapter 6 - tBoC Pgs 175-193
January 28 - Loss of proliferation control II – Cell cycle	Chapter 8 – tBoC Pgs 231-254
January 30 – Midterm - I	
February 4 – Loss of feedback inhibition –	Chapter 6 – tBoC Pgs 193-202 pdf on course website
February 6 – Avoiding cell growth suppressive signals – Senescence	Chapter 10 – tBoC pdf on course website
February 11 – Avoiding cell growth suppressive signals – p53	Chapter 9 - tBoC Pgs 331-378
February 13 - Avoiding cell growth suppressive signals – Apoptosis I	Chapter 9 - tBoC pdf on course website
February 18 - Avoiding cell growth suppressive signals – Apoptosis II	Chapter 9 - tBoC pdf on course website

February 20- Genomic instability and DNA damage I .	Chapter 12 – tBoC
February 25 - Genomic instability and DNA damage II	Chapter 12 – tBoC
February 27 – Midterm 2	
March 3 - The Cancer Microenvironment and Angiogenesis	Chapter 13 – tBoC
March 5 – Metastasis Guest Lecture – Jay Desgrosellier, Ph.D.	Chapter 14 – tBoC Pgs 641-694
March 10 – Cancer Metabolism	pdf on course website
March 12 – Cancer Immunology	Chapter 15 - tBoC
March 19 – Final Exam 8AM	

UCSD Principles of Community
The University of California, San Diego is dedicated to learning, teaching, and serving society through education, research, and public service. Our international reputation for excellence is due in large part to the cooperative and entrepreneurial nature of the UC San Diego community. UC San Diego faculty, staff, and students are encouraged to be creative and are rewarded for individual as well as collaborative achievements.

To foster the best possible working and learning environment, UC San Diego strives to maintain a climate of fairness, cooperation, and professionalism. These principles of community are vital to the success of the University and the well-being of its constituents. UC San Diego faculty, staff, and students are expected to practice these basic principles as individuals and in groups.

Click here for the complete UC San Diego Principles of Community in English and Spanish.

Student Resources for Support and Learning

ACADEMIC SUPPORT

Geisel Library	Research tools and eReserves
Content Tutoring with the Teaching + Learning Commons	Drop-in and online tutoring through the Academic Achievement Hub
Supplemental Instruction with the Teaching + Learning Commons	Peer-assisted study sessions through the Academic Achievement Hub to improve success in historically challenging courses
Writing Hub Services in the Teaching + Learning Commons	Improve writing skills and connect with a peer writing mentor
Learning Strategies Tutoring	Address learning challenges with a metacognitive approach
OASIS	Intellectual and personal development support
Student Success Coaching Program	Peer mentor program that provides students with information, resources, and support in meeting their goals
Academic Integrity	Policy on Academic Integrity of Scholarship and strategies to excel with integrity
Technical Support	Assistance with accounts, network, and technical issues

STUDENT RESOURCES

Basic Needs	Provides access to food, housing, and financial resources
Counseling and Psychological Services (CAPS)	Provides services like confidential counseling and consultations for psychiatric services and mental health programming
Community Centers	As part of the Office of Equity, Diversity, and Inclusion the campus community centers provide programs and resources for students and contribute toward the

	evolution of a socially just campus
Counseling and Psychological Services	Individual, group, couples, and family psychotherapy services for registered undergraduate and graduate students
Office for Students with Disabilities	Documents students disabilities, provides accessibility resources, and reasonable accommodations
Triton Concern Line	Report students of concern at (858) 246-1111