Stony Brook University
Department: Biochemistry & Cell Biology

BIO 314 Cancer Biology(Online)
Syllabus and Course Schedule Summer 2 Extended
June 24th-August 17th, 2019

This is an 8-week asynchronous online course except for three live, proctored exams that can be taken on our West Campus, Manhattan location or at previously approved NTCA remote test centers.

*BIO 314 in the Summer Session 2 extended term is administered entirely online except for:

Three required in-person exam sessions consisting of:
Exam 1 (Thursday, July 11th from 6:30 to 8:15 PM)
Exam 2 (Thursday, July 25th from 6:30 to 8:15 PM)
Exam 3 (Thursday, August 15th from 6:30 to 9:00 PM)

Exams are given on our West Campus at 100 Nichols Road, Stony Brook, New York
(Register for Section 30)
Or at our Manhattan location at the SUNY School of Optometry at 33 West 42nd Street, NY, NY
( Register for Section 60)
OR
Throughout the United States via approved Remote Test Center Sites
(Register for Section 30).

Anyone wishing to schedule a remote test center exam should contact Prof. Souza for approval of the site prior to July 1st.
See [http://www.ncta-testing.org/find-a-cctc-participant](http://www.ncta-testing.org/find-a-cctc-participant) for potential sites near you.
Fees for remote test centers are the responsibility of the student and are paid to the test center directly.

Part 1: Course Information

Instructor Information

Course Content Instructor: Susan Erster, PhD
Office: Life Science Building, Room 316
Office Hours: By Appt. E-mail to schedule: Phone appt. or Adobe Connect access through Blackboard or Skype (headsets recommended)
Office Telephone: 631-632-8562
E-mail: Susan.Erster@stonybrook.edu

Online Course Faculty Administrator: Joanne Souza, PhD
Office: Life Science Building, Room 378
Office Hours: By Appt. Email to schedule: Phone appt.
Office Telephone: 631-632-8548
Email: Joanne.Souza@stonybrook.edu

Course Description

We will examine the biology of cancer. Emphasis is on molecular and cellular events, such as regulation of gene expression, genome maintenance, cell growth and death, differentiation, cell-cell recognition, signaling, and homeostasis, that are frequently disrupted in cancer. Recent advances in diagnosis and therapy will also be discussed.

Prerequisite
C or higher in BIO 202 (Fundamentals of Molecular and Cellular Biology) or equivalent

Textbook & Course Materials

Required Text

Course Technical Requirements

- Internet connection (DSL, LAN, or cable connection desirable)
- Access to Blackboard
  - Browsers by Operating System
    - Windows 8, Windows 10
      - Internet Explorer 11
      - Firefox 31+
      - Chrome 36+
    - Windows 7, Vista
      - Internet Explorer 11
      - Firefox 31+
      - Chrome 36+
    - Mac OS X 10.7, 10.8, 10.9, 10.10, 10.11& 10.12
      - Safari 6+
      - Firefox 31+
      - Chrome 36+
- Adobe Acrobat Reader and Quicktime and/or Windows media
- Java: Update to newest version, if prompted
Course Structure

This course, except for three live, proctored exams is delivered entirely online, asynchronously, through the Blackboard course management system.

- Go to [http://blackboard.stonybrook.edu](http://blackboard.stonybrook.edu)
- Sign in with your Stony Brook University NET ID and Password.

In Blackboard, you will have access to the following:

- Course and lectures learning objectives
- Video lecture sub-modules and animated movies (45 hours total).
- Various primary source academic journal articles in reference to cancer biology.
- Online quizzes- designed to assist you in gaining higher levels of content mastery.

Asynchronous discussion resources:

- Discussion board submissions consist of student collaborative brainstorming sessions.
- You will discuss strategy together about how to approach and potentially solve more difficult, complex questions. Some of these questions, currently, may not necessarily have answers.
- Students will be mentored in course content and critical thought techniques by the teaching assistants and faculty within the discussion board format.
- You will be expected to:
  - COLLABORATIVELY discuss strategies, needed relevant concepts, and potential solutions
  - Attempt to scientifically falsify potential solutions and choose the best possible solution with known information.
- Some assigned problem areas within the understanding and treatment of cancer may not have yet been solved; therefore, critical and innovative thought will be expected.
- Some discussions will be based on journal articles, some
on short videos, etc.

- At the beginning of each week:
  - You will access the lecture folders assigned for the week under your assignments tab on Blackboard. They will include:
    - lecture videos separated into video sub-modules (usually A, B, C, D, etc.)
    - textbook readings & movie/animation assets
    - lecture PowerPoints,
    - **graded assignment due dates for the week.**
  - BY each due date (2 per week), you will:
    - Read the assigned textbook/journal article reading
    - Watch each assigned lecture module
    - Complete the assigned graded learning asset Equiz on Blackboard for each module.
      - Each has between 5 and 9 questions of varying levels of difficulty beginning at the foundational conceptual/definitional level, then adding detail of understanding and complexity, and lastly applications of content.
      - These quizzes are designed to assist you in learning content while building your skill and critical thought level in answering more complex questions per module of the course.
      - Each correct answer will earn one point toward your learning asset grade. See detailed directions on Blackboard.
  - Each week, several times during the week, you will be expected to contribute to a discussion brain storming session directed toward the solving of a more complex/novel problem via discussion board work/debate. See grading rubric on Blackboard for more information. You are expected to only work on one question of 2-3 questions available but to post continually (more than once) during the week, collaborating with your colleagues and brainstorming until the due date on
Sunday.

- These quizzes and discussion sessions are designed to:
  - assist in your learning and retention of) the material in the course
  - Solve more complex problems such as those on the exams and later standardized preparatory exams (MCAT, DAT, etc)
  - Develop collaborative, critical, and innovative thinking skills directed toward unanswered questions in research and medical applications.

- A general discussion board that is ungraded is available where students can ask questions of the faculty and the teaching assistants in any area of the course.

- There are three in-person, proctored exams, each covering approximately one third of the content, given at either Stony Brook University West Campus, Stony Brook University’s Manhattan location at SUNY Optometry or at other approved remote testing facilities in the United States (contact Prof. Joanne Souza for more information).

**Estimated Weekly Time Budget:**

Video lecture hours: approx. 6 most weeks

- Textbook : 2
- Quiz hours : 2
- Discussion hours : 2

If you need technical assistance at any time during the course or to report a problem with Blackboard you can:

- Visit the Stony Brook University [Student Help Desk Page](mailto:helpme@stonybrook.edu)
- Phone: (631) 632-9602
- E-Mail: helpme@stonybrook.edu
- Live Chat: [Chat Live with the TLT Student Help Desk!](mailto:helpme@stonybrook.edu)

**Contact the University Service Desk at (631) 632-9602**

**Important Note:** This syllabus, along with course assignments and due dates, are subject to change. It is the student’s responsibility to check Blackboard for corrections or updates to the syllabus. Any changes will be clearly noted in course announcement and/or through Blackboard email.
Part 2: Course Learning Objectives

The course is designed to introduce students with a strong background and interest in biology to the current understanding of the molecular basis of cancer. Emphasis will be placed on the methodologies and approaches of ongoing research efforts, so that students will be more prepared to read research papers published in scientific journals.

**The Nature of Cancer:** Be able to define cancer and describe the ways in which cancer has been classified by the scientific community. Recognize the cells they originate from, and identify the gradations between normal and cancer cells.

**Tumor Viruses:** Recognize and be able to describe and discuss the mechanisms of transforming viruses.

**Cellular Oncogenes:** Explain how cellular oncogenes were identified, and indicate how the structural and regulatory alterations of cellular genes can contribute to cancer.

**Signal Transduction:** Recall the evolution and necessity of cell-cell communication, the mechanisms of G protein and receptor tyrosine kinase signaling. Describe how defects in these proliferative signaling pathways explain the uncontrolled growth seen in cancer cells.

**Tumor Suppressor Genes:** Define and explain the phenomenon of gene "loss" in cancer, and the mechanism of action of tumor suppressor genes NF-1, APC, and VHL.

**Cell growth:** Indicate how progression through the proliferative cycle of DNA replication and cell division is regulated in normal cells. Illustrate how the loss of tumor suppressor protein pRb contributes to tumorigenesis.

**Cell death:** Indicate how the tumor suppressor protein p53 preserves genome integrity by promoting cell cycle arrest, DNA repair, and programmed cell death in cells that have sustained genome damage. Determine the consequences of p53 "loss" in cancer cells.

**Cell Immortalization:** Distinguish the mechanisms that cause normal cells to eventually stop dividing, and examine how cancer cells evade these mechanisms to become "immortal".

**Multi-step Tumorigenesis:** Define and describe the six hallmarks of cancer cells, the minimal set of genetic modifications that are required to transform normal cells, and the initiator/promoter model of tumorigenesis.

**Maintenance of Genomic Integrity:** Identify and describe the mechanisms that can introduce mistakes into DNA, the repair pathways that deal with the damage, and the consequences if they are not repaired.

**Heterotypic Interactions:** Describe and examine the interactions between cancer cells and normal cells that enable angiogenesis, invasion and metastasis, and the suppression of the anti-tumor immune response.

**The Rational Treatment of Cancer, special topics in cancer research:** Be able to define and describe the conventional therapies: surgery, radiation, and the classes of chemotherapy, and the mechanisms that result in resistance. Evaluate the dietary and lifestyle choices that are believed to promote cancer, and those that are believed to prevent cancer. Describe and
be able to discuss the process of drug discovery, and evaluate and appraise some of the promising novel targeted therapies. Hypothesize and argue present evidence and reasoning.

You will meet the objectives and learning outcomes listed above through a combination of the following activities in this course:

- Watch assigned lecture module videos and movie assets
- Review the comparable content in the textbook or journal articles assigned.
- Complete graded learning assets quizzes per module
- Participate in all the discussion board sessions per module
- Complete the three live, proctored exams.

**Part 3: Grading Policy**

**Graded Course Activities**

Visit the **Assignments** link in Blackboard for details about each weekly assignment and the due dates.

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<tr>
<th>Percent of Final Grade</th>
<th>Description</th>
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<tr>
<td>25 %</td>
<td>Approx. 69 content quizzes &amp; 8 extensive and comprehensive discussion assignment due Quiz 0 (exam location quiz = 4 bonus quiz points)</td>
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<td>25 %</td>
<td>Exam 1</td>
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**Late Work Policy**

Pay close attention to deadlines—there will be no make-up quizzes, discussions, or exams accepted without documentation of serious and compelling issues submitted within ONE WEEK OF THE MISSED ASSIGNMENT or EXAM.

**Viewing Grades in Blackboard**

Points you receive for graded activities will be posted to the Blackboard Grade Book. Click on the My Grades link on the left navigation to view your grades.
We will update the online grades each time a grading session has been complete—typically within 5 days following the completion of an activity. You will see an announcement on Blackboard when grades are available.

**Letter Grade Assignment**

Final letter grades assigned for this course will be based on the percentage of total points earned and may be assigned as follows*:

<table>
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<tr>
<th>Letter Grade</th>
<th>Percentage</th>
<th>Performance</th>
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<tbody>
<tr>
<td>A Range (A- thru A)</td>
<td>88 and up</td>
<td>Nearly Excellent/Excellent Work</td>
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<tr>
<td>B Range (B-, B, B+)</td>
<td>75-87%</td>
<td>Mostly good work/good work/very good work</td>
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<tr>
<td>C Range (C and C+)</td>
<td>58 – 74%</td>
<td>Acceptable Work/marginally good work</td>
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<td>D</td>
<td>50-57%</td>
<td>Poor Work</td>
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<tr>
<td>F</td>
<td>Below 50%</td>
<td>Failing Work</td>
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*NOTE: These letter grades are threshold scores only. Actual final scores needed to earn a certain letter grade may be lowered if warranted based on the difficulty of the exams. In other words, if your final total points in the course equal a 88%, you will not earn less than an A-.

**Part 4: Course Policies**

**Participation**

Students are expected to participate and submit, by the published due dates, all online activities as listed in the weekly assignments. Your participation in the discussions is also required by the due dates noted in the assignments. Faculty will clarify all discussions so as to help you clear up any confusion before exams.

All discussion post submissions are monitored for plagiarism through SafeAssign. All cases of possible plagiarism, including cheating on exams, or other violations of academic integrity will be reported to Academic Judiciary and if found guilty, will result in an F in the course. Please be sure all work is in your own words and properly referenced with internal citations and full references. The discussion board grading rubric showing grading criteria is available on Blackboard.

**Build Rapport**

If you find that you have any trouble keeping up with assignments or other aspects of the course, make sure you let your instructor know as early as possible. Communication channels include:
Email, telephone, and General Discussion Board comments/questions

Building rapport and effective relationships are key to becoming an effective professional. Reach out to “talk science” with your instructors and teaching assistants for better understanding.

Make sure that you are proactive in informing your instructor when difficulties arise during the semester so that we can help you find a solution including potentially dropping the course.

Complete Assignments

All learning assignments for this course will be submitted electronically through Blackboard and dated according to the date/time submitted as shown on Blackboard.

Assignments must be submitted by the given deadline. Extensions will not be given beyond the next assignment except under extreme, documented circumstances.

Understand When You May Drop This Course

It is the student’s responsibility to understand when they need to consider dropping from a course. Students are expected to finalize their class schedules by the end of the “Add/Drop” period on the academic calendar.

The Add/Drop period is shorter during the Summer and Winter Sessions, so always consult the Academic Calendar for the official deadline.

Failure to finalize your course registration by the end of the Add/Drop period may have significant consequences; therefore, you should always consult with your Undergraduate College Advisor prior to the Add/Drop deadline if you are having trouble completing your schedule.

See the Academic Advising website for more information at https://you.stonybrook.edu/firstyear/chapter-ten-academic-advising/

Incomplete Policy

Under emergency, students may petition for an incomplete grade. Circumstances must be documented and significant enough to merit an Incomplete. Inform your instructor of any accommodations needed.

Withdrawals from Classes: The academic calendar, published in the Undergraduate Class Schedule, lists various dates that students must follow. Only the Arts and Sciences Committee on Academic Standing and Appeals or the Engineering and Applied Sciences Committee on Academic Standing may grant permission for a student to withdraw from a course after the deadline. The same is true of withdrawals that will result in an academic under-load. A note from the
instructor is not sufficient to secure a withdrawal from a course in the above circumstances.

**Student Accessibility Support Center/Disability Support Services (DSS/SASC) Statement**

If you have a physical, psychological, medical or learning disability that may impact your course work, please contact Student Accessibility Support Center, ECC (Educational Communications Center) Building, room128, (631) 632-6748. They will determine with you what accommodations, if any, are necessary and appropriate. All information and documentation is confidential. Contact: sasc@stonybrook.edu

**Critical Incident Management**

Stony Brook University expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of Judicial Affairs any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students’ ability to learn. Faculty in the HSC Schools and the School of Medicine are required to follow their school-specific procedures.

**Academic Integrity/Honesty Statement**

Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person’s work as your own is always wrong. Faculty are required to report any suspected instances of academic dishonesty to the Academic Judiciary. Faculty in the Health Sciences Center (School of Health Technology & Management, Nursing, Social Welfare, Dental Medicine) and School of Medicine are required to follow their school-specific procedures. For more comprehensive information on academic integrity, including categories of academic dishonesty, please refer to the academic judiciary website at https://www.stonybrook.edu/commcms/academic_integrity/policies_procedures/index.php

The Biochemistry Department at Stony Brook University takes seriously our responsibility to give students an accurate and fair evaluation of their performance in the course. We therefore have a zero tolerance policy towards cheating. Anyone caught cheating in any way will be reported to the Academic Judiciary Committee and, if found guilty, given an F for the course.

**Blackboard Announcements/Email Policies**

The principal way we will officially communicate with you for this course is through the Blackboard Announcement system and your official Stony Brook email account. It is your responsibility to make sure you receive and read your email in your official University email account. For most students that is Google Apps for Education (http://www.stonybrook.edu/mycloud)
If you need technical assistance please contact Client Support at (631) 632-9800 or supportteam@stonybrook.edu

Course policies are subject to change. It is the student’s responsibility to check Blackboard for corrections or updates to the syllabus. Any changes will be posted in Blackboard.

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<thead>
<tr>
<th>Week #</th>
<th>Lect #</th>
<th>Lecture Name</th>
<th>Text Reading</th>
<th>Lecture Video Modules</th>
<th>Quiz &amp; Discussion</th>
<th>Due Date</th>
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<tbody>
<tr>
<td>Week 1</td>
<td>6/24</td>
<td>Orientation, Academic Integrity, Exam Location</td>
<td>Syllabus &amp; Course Information</td>
<td>Orientation &amp; Academic Integrity Videos</td>
<td>Quiz 0 Disc. Post 1 Introduction</td>
<td>Thurs. June 27th 11:59 PM</td>
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<tr>
<td>1</td>
<td>1</td>
<td>The Nature of Cancer Tumor Viruses 1 &amp; 2</td>
<td>Chapters 2 &amp; 3</td>
<td>Module 1A Module 1B Module 1C</td>
<td>Quiz 1A Quiz 1B/C</td>
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<td>The Nature of Cancer Tumor Viruses 3</td>
<td>Chapters 2 &amp; 3</td>
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<td>Quiz 2A Quiz 2B Quiz 2C</td>
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<td>3</td>
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<td>Cellular Oncogenes</td>
<td>Chapter 4</td>
<td>Module 3A Module 3B Module 3C Module 3D</td>
<td>Quiz 3A Quiz 3B Quiz 3C Quiz 3D Discussion 2: Nature of Cancer/Tumor Viruses</td>
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<td>Week 2</td>
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<td>Growth Factors &amp; Their Receptors</td>
<td>Chapter 5</td>
<td>Module 4A Module 4B Module 4C Module 4D Module 4E Module 4F</td>
<td>Quiz 4A/4B Quiz 4C Quiz 4D/4E Quiz 4F</td>
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<td>5</td>
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<td>Cytoplasmic Signaling</td>
<td>Chapter 6</td>
<td>Module 5A Module 5B Module 5C Module 5D Module 5E Module 5F</td>
<td>Quiz 5A Quiz 5B Quiz 5C Quiz 5D Quiz 5E Quiz 5F Discussion 3 Growth Factors or Cytoplasmic</td>
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<td>Week 3</td>
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<td>Exam 1 Thursday, July 11th</td>
<td>Chapters 2-6 Lectures 1-5</td>
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<td>Tumor Suppressor Genes</td>
<td>Chapter 7</td>
<td>Module 6A Module 6B Module 6C Module 6D Module 6E Module 6F</td>
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<td>pRb &amp; Control of the Cell Cycle</td>
<td>Chapter 8</td>
<td>Module 7A, Module 7B, Module 7C</td>
<td>Quiz 7A, Quiz 7B, Quiz 7C/D</td>
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<td>Module 7D, Module 7E, Module 7F</td>
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<td>p53 &amp; Control of Apoptosis</td>
<td>Chapter 9</td>
<td>Module 8A, Module 8B, Module 8C</td>
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<td>Telomeres &amp; Cell Immortalization</td>
<td>Chapter 10</td>
<td>Module 9A, Module 9B, Module 9C</td>
<td>Quiz 9A, Quiz 9B, Quiz 9C, Quiz 9D/E</td>
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<td>Quiz 10A, Quiz 10B, Quiz 10C</td>
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<td>Tumor Progression 1</td>
<td>Chapter 11</td>
<td>Module 10A, Module 10B, Module 10C</td>
<td>Quiz 11A/B, Quiz 11C/D, Quiz 11E</td>
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<td>Genome Integrity 1</td>
<td>Chapter 12</td>
<td>Module 12A, Module 12B, Module 12C</td>
<td>Quiz 12A, Quiz 12B, Quiz 12C/D</td>
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<td>Module 12D, Module 12E</td>
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<td>Chapter 12</td>
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<td>Angiogenesis, Invasion &amp; Metastasis</td>
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<td>Rational Treatment of Cancer 1</td>
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<td>Module 15D</td>
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<td>Rational Treatment of Cancer 3</td>
<td>Chapter 16</td>
<td>Module 17A</td>
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<td>Guest Lec. Paul M. Bingham, PhD</td>
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<td>Cancer Immunotherapy</td>
<td>Guest Lect. Anthony Antonelli Susan Erster, PhD</td>
<td>Module 19A</td>
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