

# BIO 4311/5311 – CANCER BIOLOGY

## COURSE INFO:

**Time:** Tue, Thurs 2:00-3:20 PM

**Location:** Supple #153

**Recommended Textbook:** THE BIOLOGY OF CANCER  
 by Robert A. Weinberg

**Required book:** The Emperor of All Maladies: A  
 Biography of Cancer by Siddhartha Mukherjee

Academic calendar and important withdraw/drop  
 deadlines available at:

<http://www.registrar.txstate.edu/persistent-links/academic-calendar.html>

## INSTRUCTOR INFO:

**Instructor:** Dr. Shannon E. Weigum

**Email:** [sweigum@txstate.edu](mailto:sweigum@txstate.edu)

**Phone:** (512) 245-1774

**Office:** SUPPLE #142

**Office hours:** Thurs 3:30 – 4:30PM, or by  
 appointment

Appointments must be scheduled and confirmed at  
 least 24 hrs. in advance via email.

## COURSE DESCRIPTION AND OBJECTIVES:

BIO4311/5311 provides upper-division science majors and graduate students with a foundation for understanding the complex molecular, biochemical, and cellular processes associated with cancer development, detection, and therapy. Particular emphasis is placed on student-lead discussions and presentations of current research and primary literature. Topics relating to the role of tumor suppressor genes, oncogenes, DNA repair, apoptosis, ECM organization, cell cycle control, growth factors and their receptors, immune function and tumor viruses will be covered. In addition, existing and emerging diagnostic, as well as therapeutic, strategies will be discussed.

After completion of BIO4311/5311, a student should be able to describe the physiological basis for cancer development and provide a rationale for current diagnostic and therapeutic approaches used to treat cancer patients.

A student successfully completing Biology 4311/5311 is expected to have an improved ability to think critically, communicate scientific ideas, and make informed decisions about scientific issues.

## LECTURE/PRESENTATION DATES:

Week	Date	Lecture/Presentation Topic	Assigned Reading
1	Jan 19	Introduction to the course and cancer statistics	
	Jan 21	<i>Review:</i> Cell and molecular biology	
2	Jan 26	<i>Review:</i> Cell and molecular biology cont'd	
	Jan 28	<i>Lecture:</i> The hallmarks of cancer	<a href="#">Hanahan and Weinberg (2011) Cell 144 (5) p646-674</a>
3	Feb 2	<i>Lecture:</i> EGFR growth factors, receptors, and cell signaling	<a href="#">Yarden and Sliwkowski (2001) Nature Reviews Molecular Cell Biology Vol. 2 p127-137</a>
	Feb 4	<i>Lecture:</i> Rb and cell cycle control	<a href="#">Experimental Biology and Medicine 2006, 231:1271-1281</a>  <a href="#">Current Opinion in Genetics &amp; Development 2004 vol. 14 p527-532</a>
4	Feb 9	<i>Lecture:</i> p53 and apoptosis	<a href="#">Nature 2000 vol.408 p307-310</a>

	Feb 11	Lecture: VEGF and angiogenesis	<a href="#">Trends in Molecular Medicine 2011, 17:(7) p347-362</a>
5	Feb 16	Lecture: Invasion and metastasis	<a href="#">Nature Reviews Cancer 2002 vol.2 p563-572</a>
	<b>Feb 18*</b>	Lecture: Telomerase and cell immortalization	<a href="#">Cell 2013 vol. 152 p390-393</a> <a href="#">Nature Reviews 2001 vol. 1 p203-213</a>
6	Feb 23	Lecture: Tumor microenvironment and cancer stem cells	<a href="#">Nature 2001 vol.414, p105-111</a>
	Feb 25	Lecture: Tumor immunology and immunotherapy	<a href="#">Cold Springs Harbor Perspectives in Biology 2013 vol. 5(3)</a>
7	Mar 1	Lecture: Cancer detection, imaging and diagnostic techniques	<a href="#">Molecular Oncology 2008 vol. 2 p115-152</a>
	Mar 3	Book Discussion: The Emperor of all Maladies	<a href="#">The Emperor of all Maladies: A Biography of Cancer by Siddhartha Mukherjee</a>
8	Mar 8	Lecture: TBD	
	<b>Mar 10</b>	<b>Mid-term Exam</b>	
9	<b>Mar 14-18</b>	<b>SPRING BREAK</b>	
10	Mar 22	Topic: TBD Student Presentation:	
	Mar 24	Topic: TBD Student Presentation:	
11	Mar 29	Topic: TBD Student Presentation:	
	Mar 31	Topic: TBD Student Presentation:	
12	Apr 5	Topic: TBD Student Presentation:	
	Apr 7	Topic: TBD Student Presentation:	
13	Apr 12	Topic: TBD Student Presentation:	
	Apr 14	Topic: TBD Student Presentation:	
14	Apr 19	Topic: TBD Student Presentation:	
	Apr 21	Topic: TBD Student Presentation:	
15	Apr 26	Book Discussion: The Emperor of all Maladies	<a href="#">The Emperor of all Maladies: A Biography of Cancer by Siddhartha Mukherjee</a>
	Apr 28	NO CLASS	
16	<b>May 5</b>	<b>Comprehensive Final Exam 2:00pm</b>	

\* All papers must be selected and approved by Feb 18<sup>th</sup>

## COURSE POLICIES: (PLEASE READ COMPLETELY AND VERY CAREFULLY)

### GRADING:

The course grade will be determined by a variety of assessment approaches, including class participation, at least two random pop quizzes relating to the assigned reading for the day/week, two written exams, and an oral presentation. The exams will be in multiple-choice format, short answer and/or essay format, final is comprehensive.

**There are no make-up exams.** If you have a university excused absence for an exam, please contact Dr. Weigum as soon as possible with the appropriate documentation.

***The final grade will be calculated as follows:***

Participation	10%
Pop Quizzes (assigned reading)	15%
Mid-term Exam	25%
Comprehensive Final Exam	25%
Oral Presentation	25%
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Total:	100%

Grading scale:	90 and above	A
	80 - 89.9	B
	70 - 79.9	C
	60 - 69.9	D
	59.9 and below	F

**ASSIGNED READINGS:**

Readings will be assigned for each class meeting and will consist of primary literature or review papers from established scientific journals (e.g. Cell, Science, Nature, Nature Reviews Cancer etc.). All assigned reading will be posted on the course TRACS site. **Every student is required to read all of the assigned articles...not just the one selected for the formal presentation.** This ensures that students are familiar with the presentation topic and can adequately participate in class discussions.

While there is no required textbook, you are strongly encouraged to seek out relevant texts as needed (i.e. USE THE LIBRARY or e-books). An excellent text is Robert Weinberg’s [The Biology of Cancer](#) as recommended above.

**QUIZZES:**

At least five pop quizzes will be given via TRACS over the assigned readings selected for the student presentations. The quizzes will be posted up to 24 hr. in advance and must be completed by 2:00PM on the due date. There will be no make-up quizzes.

**PRESENTATION:**

Each student will work in a team (maximum of 3 students) to prepare one formal class presentation of a selected research article and lead an in-class discussion regarding the strengths/weaknesses of the published data. Research papers must be selected and approved by Feb 19th. **No review articles...they must be primary literature from a reputable journal!**

***Each member of the team is responsible for contributing significantly toward preparation and presentation – the individual roles should be clearly defined and/or discussed with the instructor.***

Presentations should be approximately 25-30 minutes in length and delivered via PowerPoint® or equivalent. Appropriate introduction/background information should be included in the presentation that ties the article to a topic discussed during the lecture phase of the course, with sufficient explanation of methods/techniques needed to interpret the reported data.

All presentation slides and materials must be sent to Dr. Weigum no later than 10AM on the day of the presentation. Points will be deducted for any late submissions. Grading of the presentations will be done by your peers using a presentation rubric developed by Dr. Weigum.

**GRADUATE STUDENTS (ONLY):**

All students enrolled in BIO5311 will be required to prepare a review manuscript over a selected topic related to your research or future interests. Topics will be selected in consultation with Dr. Weigum, so please be prepared to propose at least three independent topics for discussion. First drafts are due on the day of the mid-term exam and

final drafts are due on the day of the final exam. Format should be double-spaced, Arial 11pt or Times New Roman 10pt, 1 inch margins, with approximately 25-50 references, 12 page limit.

### **ACADEMIC DISHONESTY AND PLAGIARISM:**

University policies regarding academic dishonesty, including definitions and disciplinary actions, can be found at <http://www.txstate.edu/effective/upps/upps-07-10-01.html>. In addition to other possible disciplinary actions, *students caught in an act of academic dishonesty will receive an "F" in the course, regardless of the point value of the assignment.*

### **ATTENDANCE:**

Attending the lectures and presentations is mandatory. Please arrive on time and stay the whole time. Late arrivals and early departures are very disruptive to everybody.

### **EMAIL CORRESPONDENCE:**

You will be required to have, and check your Texas State email regularly for updates and important messages regarding the course. **I will only correspond with students via 'txstate.edu' email address.**

### **DROP/WITHDRAWAL POLICY:**

The University deadline to drop a course with an automatic 'W' grade is **March 29<sup>th</sup> at 5PM**. If you have to withdraw from this class after that day, you will be assigned a 'W' or 'F' grade depending on your status on the day of withdrawal.

## Texas State University-San Marcos Honor Code

As members of a community dedicated to learning, inquiry, and creation, the students, faculty, and administration of our University live by the principles in this Honor Code. These principles require all members of this community to be conscientious, respectful, and honest.

### ***We Are Conscientious:***

We complete our work on time and make every effort to do it right. We come to class and meetings prepared and are willing to demonstrate it. We hold ourselves to doing what is required, embrace rigor, and shun mediocrity special requests, and excuses.

### ***We Are Respectful:***

We act civilly toward one another, and we cooperate with each other. We will strive to create an environment in which people respect and listen to one another, speaking when appropriate, and permitting other people to participate and express their views.

### ***We Are Honest:***

We do our own work and are honest with one another in all matters. We understand how various acts of dishonesty, like plagiarizing, falsifying data, and giving or receiving assistance to which one is not entitled, conflict as much with academic achievement as with the values of honesty and integrity.

### **The Pledge for Students**

Students at our University recognize that, to insure honest conduct, more is needed than an expectation of academic honesty, and we therefore adopt the practice of affixing the following pledge of honesty to the work we submit for evaluation:

*I pledge to uphold the principles of honesty and responsibility at our University.*

### **The Pledge for Faculty and Administration**

Faculty at our University recognize that the students have rights when accused of academic dishonesty and will inform the accused of their rights of appeal laid out in the student handbook and inform them of the process that will take place.

*I recognize students' rights and pledge to uphold the principles of honesty and responsibility at our University.*