Biology 407 and 5407: Biology of Cancer Syllabus and Schedule Mondays 6:00 – 9:00 PM, Medical Sciences Building 210

Instructor: Elizabeth Brandon, Ph.D. Assistant Professor

Office: 211 Hederman Science Building

601-925-7764 <u>EBrandon@mc.edu</u> http://moodle.mc.edu/ STUDENTS ARE RESPONSIBLE FOR CHECKING THEIR MC EMAIL & MOODLE

Prerequisites: CHE 304, CHE 314, BIO 305, BIO 306

<u>Course description:</u> Building on the student's knowledge of cell physiology and genetics, the discussion in this course will begin with the process of cell transformation, followed by the mechanics of cell growth and division gone awry, and lead up to the interactions between tumors and their host. Signal transduction, the cellular energetics of tumor cells, inflamation, and angiogenesis will be discussed in the context of tumor growth and metastasis.

<u>Course rationale:</u> Biology of Cancer is designed to provide students with detailed instruction in the mechanisms of how cancer begins and the reasons why it can be so difficult to treat successfully. This course is intended for upper level undergraduate and graduate students who are interested in beefing up their education in biomedical topics. An integral part of students' training in this course involves the application of new concepts to the discussion of various cancer topics. Students who are taking this as a graduate level course are required to write a research paper.

<u>Methods of instruction:</u> The course will consist of three hours of lecture per week. There may also be outside assignments involving individual and group research or podcasts. In addition to the reading assignments in the text listed below, there will be supplemental reading material distributed to the students throughout the semester. This is a discussion class and may differ from the format of previous classes that you may have had. **Study tip: draw concept maps for yourself of the class material after class every week.**

Required text: Robert A. Weinberg, 1999. One Renegade Cell: How Cancer Begins. Basic Books. ISBN-13: 978-0-465-07276-7 or ISBN-10: 0-465-07276-3.

***Class notes and reading assignments will be posted on Moodle.

Recommended text: Robert A. Weinberg, 2007. <u>The Biology of Cancer</u>, Garland Science. ISBN 0-8153-4076-1 (softcover).

NOTES: A tuition refund cannot be made on dropped classes *after the first week* of classes. The last day to withdraw from class with a W is **Friday October 25, 2013.**

Course objectives and student outcomes:

- 1. Students will discuss and describe the major breakthroughs in research that have led to our current understanding of cancer.
- 2. Students will describe the groups of genes that regulate the cell cycle, contribute to invasion and metastasis, control cell survival, and carry out DNA repair.
- 3. Students will describe the processes of mutation, transformation, cooperation, and epithelial to mesenchymal transition and mesenchymal to epithelial transition.
- 4. Students will describe the process of angiogenesis and metastasis.
- 5. Students will describe the roles of stromal cells and immune cells to tumor biology.

6. Students will describe the primary approaches used in treating cancer.

<u>Important college dates:</u>

Monday September, 2013: Labor Day. No class.

Tuesday September 3, 2012: Last day to drop the class with 100% tuition refund.

Monday-Tuesday October 7-8, 2013: Fall Break. No class.

Last day to drop a class is October 25, 2013 (zero tuition refund)

Wednesday – Sunday November 27- December 1: Thanksgiving holidays

All classes meet Monday November 25

All day classes meet Tuesday November 26

Night classes do NOT meet Tuesday November 26

Attendance: Your attendance in lectures is welcomed and expected. I will follow the University attendance policy as described in the student handbook, which can be found in The Tomahawk, p.39 – 40. (http://www.mc.edu/publications/handbook/academic.pdf). An important and often overlooked point about attendance is that reduced class attendance can result in a *reduced grade for the course*. *If you miss more than 3 classes* (25%), you will automatically be given an F for the course.

<u>Absence from class</u>: I will allow you to miss one class without making up the missed class work and this will count as your one drop grade. For students with 100% attendance, their lowest weekly grade will be dropped. There are no make-up quizzes.

Absence from an exam: If a student has an excused absence from an exam, the student will make up the missed exam on Monday December 9 at 6:00 PM.

Academic integrity: You are members of an institution that is dedicated to scholarship and spiritual growth. This institution is part of the larger academic community, the foundation of which is based on personal honesty. The success of this community depends on the commitment of both students and faculty to this principle and therefore cheating and plagiarism cannot and will not be tolerated. More importantly, Mississippi College is dedicated to empowering its students to develop the skills necessary for "making responsible, moral choices," and thus, the University will accept nothing less than scrupulous honesty from its students. We will follow the University policy on Academic Honesty (Policy 2.19), which can be found in the student handbook, The Tomahawk, pp. 41 - 43. http://www.mc.edu/publications/handbook/academic.pdf

<u>Class etiquette</u>: This is our class and it belongs to each one of us. Arriving late, texting, receiving cell phone calls or pages, having temper tantrums, and being disruptive robs us of the time that we have to work together. Stealing is wrong. Therefore, arriving late, texting, receiving cell phone calls or pages, having temper tantrums, and being disruptive is wrong. It isn't beautiful logic, but you can catch the drift.

Student evaluation:

- 1. **Quizzes** over the reading material will be given at the beginning of each class. I will take your top 9 quiz grades and calculate your quiz average from these. Quizzes are worth 10% of your final grade.
- 2. Weighted exams:

Midterm exam (undergraduates = 20%; graduates = 16.7%) will be given on **Oct. 14**. Final exam (undergraduates = 40%; graduates = 36.7%) will be given on **Dec. 16**.

- 3. Weekly discussion questions (undergraduates = 30%; graduates = 26.7%)
- 4. For students who are enrolled in BIO 5407, you will read <u>The Emperor of All Maladies: A Biography of Cancer</u> by Siddhartha Mukherjee, M.D. ISBN: 978-1439107959. You'll be given questions to answer on the final exam. This counts for 10% of your final grade.

Grading scale:

- Undergraduates: 90-100% = A, 80-89% = B, 70-79% = C, 60-69% = D, 59% or less = F
- Graduates: 90-100% = A, 85-89% = B+, 80-84% = B, 75-79% = C+, 70-74% = C, 60-69% = D, less than 60% = F

<u>Tutoring:</u> Available for students upon request.

Special accommodations at Student Counseling Services:

In order for a student to receive disability accommodations under Section 504 of the Americans with Disabilities Act, he or she must schedule an individual meeting with the Director of Student Counseling Services **immediately upon recognition of their disability** (if their disability is known they must come in before the semester begins or make an appointment **immediately** upon receipt of their syllabi for the new semester). The student must bring with them written documentation from a medical physician and/or licensed clinician that verifies their disability. If the student has received prior accommodations, they must bring written documentation of those accommodations (example Individualized Education Plan from the school system). Documentation must be current (within 3 years). The student must meet with SCS face-to face and also attend two (2) additional follow up meetings (one mid semester before or after midterm examinations and the last one at the end of the semester). Please note that the student may also schedule additional meetings as needed for support through SCS as they work with their professor throughout the semester. Note: Students must come in each semester to complete their Individualized Accommodation Plan (example: MC student completes fall semester IAP plan and even if student is a continuing student for the spring semester they must come in again to complete their spring semester IAP plan).

Student Counseling Services is located in Alumni Hall Room #4 or they may be contacted via email at : mbryant@mc.edu or rward@mc.edu or by phone at 601-925-7791.

Course Outline and Schedule

Wee	<u>ek Topic</u>	Assigned reading	
8/26	Introduction &	Guide to reading papers, class organization	
		Cancer overview	
9/2	Labor Day Holiday—	Labor Day Holiday—no class, but there is a reading assignment: The Enemy Within: Genes,	
		Cells, and the Nature of Cancer (ch 1), Clues to Cancer's Origins (ch 2)	
		The Elusive Quarry: Hunting the Proto-oncogene (ch 3)	
9/9	Tumor viruses &	Fatal Flaws: Finding Oncogenes in Human Tumors (ch 4)	
	oncogenes	A Book of Many Chapters: Multistep Tumor Development (ch 5),	
0/1/	Т	Finalize the First Consideration that Appell Mutagens (ab. 6) Duelle	
9/16	Tumor suppressors	Fueling the Fire: Carcinogens that Aren't Mutagens (ch 6), Brake	
		Linings: The Discovery of Tumor Suppressor Genes (ch 7)	
9/23	3 Tumorigenesis	Guts: A Case Study in Cancer Development (ch 8),	
)1 <u>2</u> .	1 umorigenesis	Defenders of the Text: DNA Repair & Its Breakdown (ch 9),	
		Detended of the Text. Diffitepul & its bleakdown (th)),	
9/30	Cell cycle	Guide Proteins of the Cell: The Machinery that Controls Growth (ch 10)	
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10/14 Midterm exam

12/16	******Final exam 6 PM ***********		
12/9	Targeted Rx, & vaccines		
12/2	Tumor metabolism and tumor stem cells		
11/25	Metastasis		
11/18	Tumor/Immune system interaction	An End to the Scourge: Using the Knowledge of Cancer's Causes to Develop New Cures (ch 16)	
11/11	Adaptation	Many Obstacles in the Road: The Evolution of a Tumor (ch 15) MicroRNA	
11/4	Apoptosis	Assisted Suicide: Apoptosis and the Death Program (ch 13), A Clock Without Hands: The Cell Cycle Clock Apparatus (ch 14)	
10/28	Telomeres	Immortality: Avoidance of Almost Certain Death (ch 12)	
10/21	Cell cycle	A Breakdown of Order: Subverting Normal Growth Control (ch 11)	