Cancer Biology and Biotechnology (Biol 4015, 8803 & ISyE 8813A) Fall, 2008

Course description: The purpose of this course is to introduce students (graduate and upper level undergraduate), faculty, post-doctoral fellows and others to the major concepts of cancer biology as well as to state-of-the-art technologies that are being applied to the understanding of cancer and cancer risk, the early detection of tumors, cancer treatment, and monitoring of treatment efficacy (and recurrence). Although these topics will be covered in depth, the lectures will be geared to a multidisciplinary audience encompassing both basic scientists and engineers.

Instructor(s): Al Merrill, School of Biology (al.merrill@biology.gatech.edu)
with faculty from the Colleges of Sciences and Engineering at Georgia Tech as well as special invited lecturers.
Teaching assistant: Chenyi Pan, cypan@gatech.edu

Time and location: Thursdays, 5:05 –6:55 pm; room L1205 ES&T

Optional textbook: No textbook covers all the information in this course, but if you want a general overview of cancer biology, two relatively recent (and good) books on cancer biology are: *Principles of Cancer Biology* by Lewis J. Kleinsmith, Pearson/Benjamin Cummings Pub. (2005) and *Biology of Cancer* by Robert A. Weinberg, Garland Science (2006). These are on reserve in the library.

All of the information that you will be required to know will be presented in class or assigned research papers

Grading: For registered attendees, the grade will be based on in-class participation, reports, and a final examination according the this proportion:

Critiques of research papers	20%
Team research project	30%
Mid-term exam	25%
Final examination	25%

Final grades will be assigned using the following scale:

90% and greater	A
80-89%	B
70-79%	C
60-69%	D
Less than 60%	F

Course format: Each class will be comprised of introductory lecture(s) followed by discussion of relevant research papers (presented by faculty and students) or the reports from the team projects.

Tentative Course Schedule

Date (lect #)	Topic	Instructor(s) (Affiliation)
	Cancer biology	
Aug. 21 (1)	Overview of cancer and carcinogenesis (Chap 1,2 & 4-6)*	A. Merrill (GT Biol)
Aug. 28 (2)	Cancer cell growth, death and metastasis (Chap. 2-6)	"
Sept. 4 (3)	Cancer genetics and epigenetics (Chap. 9 & 10)	P. Vertino (EUSM)
Sept. 11 (4)	Genomic instability (Chap. 8 &10)	W. Zhou (EUSM)
	Research paper analysis	A. Merrill (GT Biol)
Sept. 18 (5)	Viral mechanisms of human carcinogenesis (Chap. 7) and an overview of the American Cancer Society	M. K. Offerman (ACS)
Sept. 25 (6)	Basic and clinical aspects of a prototypic cancer:	
	Prostate cancer (Chap. 11)	J. Petros (EUSM)
	Other cancers (Survey; appendix A)	A. Merrill (GT Biol)
Oct. 2 (7)	**Mid-term exam (Lectures 1-6)**	
	Cancer technologies	
Oct. 9 (8)	Computational methods in cancer informatics, early intervention, diagnosis, and treatment	E. K. Lee (GT ISyE)
	Research paper discussion	E. K. Lee (GT ISyE)
Oct. 10	**Last day to drop a course with a "W" grade**	
Oct. 16 (9)	Gene expression technologies	G. Bao (GT/EU
	Research paper discussion	A. Merrill (GT Biol)
Oct. 23 (10)	Tissue imaging methods	A. Merrill (GT Biol)
	Research paper discussion	
Oct. 30 (11)	Mass spectrometry for biomarker analysis and imaging	M. C. Sullards (GT Chem)
	Student presentations	Groups 1 & 2
Nov. 6 (12)	Biosensors	W. D. Hunt (GT ECE)
	Student presentations	Groups 3 & 4
Nov. 13 (13)	Nanotechnologies	S. Nie (EU/GT BME)
	Student presentations	Groups 5 & 6
Nov. 20 (14)	Genomics, systems analysis and visualization	M. D. Wang (GT/EU BME)
	Student presentations	Groups 7 & 8
Nov. 27	**Thanksgiving break**	
Dec. 5 (15)	Student presentations	Groups 9-11
	Course wrap-up	A. Merrill (GT Biol)

Dec. 11 (8:00 - 10:50) **Final exam**

*The numbers in parentheses give the related chapters from *Principles of Cancer Biology* by Lewis J. Kleinsmith in case the student feels outside reading is needed.

Additional information (required by Georgia Tech):

All students are required to adhere to the Georgia Tech Academic Honor Code (www.honor.gatech.edu). This includes, but is not limited to, the following issues that pertain to the oral and written critiques, quizes, and exams for this class:

1. Plagiarism is not allowed. Plagiarizing is defined by Webster's as "to steal and pass off (the ideas or words of another) as one's own; use (another's production) without crediting the source."

In simpler terms: When you use any phases, sentences, etc. verbatim from another source, they must be identified by quotation marks and citation of the source. In scientific writing, it is generally preferable to rephrase information from other sources and cite the source rather than use the same text, even when you offset the text with quotation marks. When you show diagrams, models and other materials that are not your own, the sources must also be identified.

These rules apply both to published information and information that you might receive from another student, website, previous class report, etc.

Plagiarization will be dealt with according to the GT Academic Honor Code.

2. Students are encouraged to collaborate in some aspects of the preparation of oral and written critiques, such as the early stages where you are achieving an understanding of the assigned papers; however, the final critiques must be written by each student alone.

For team oral presentations, students may collaborate in all aspects of the work, indeed, it is expected that all will contribute equally to the final product and that they will share the single grade that is awarded for the ppt presentation. Students may use copyrighted figures, etc. from publications in the ppt presentation (if appropriate citations are given) because the ppt will only be posted on the access restricted WebCt website. However, if the team uses multiple copies of any copyrighted items (such as the pdf file of a copyrighted article), each student must download their own copy from the Georgia Tech library website rather than for one student to distribute the pdf.

In the event the assigned paper has been used by a previous class, students are not allowed to use any of the ppt slides in whole or part that were prepared by the other class.

3. Unless specifically identified as group work; quizzes, tests, take–home-tests, homework, etc. are to be completed alone.

4. For Quizzes/Tests: Cheating off of another person's test or quiz is unethical and unacceptable. Cheating off of anyone else's work is a direct violation of the GT Academic Honor Code, and will be dealt with accordingly.

5. Because the exams for this course change every semester, students may use old tests as study tools.

For any questions involving these or any other Academic Honor Code issues, please consult the professors, teaching assistant, or www.honor.gatech.edu.