

## **Cancer Biology and Biotechnology (Biol 4802, 8802 & ISyE 8813A) Fall, 2006**

**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](mailto:al.merrill@biology.gatech.edu)) with faculty from the Colleges of Sciences and Engineering at Georgia Tech and invited lecturers from Emory University

**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, a recent (and good) book on cancer biology is: *Principles of Cancer Biology* by Lewis J. Kleinsmith, Pearson/Benjamin Cummings Pub. (2005).

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

**Grading:** For registered attendees, the grade will be based on in-class participation (mainly quizzes), reports, and a final examination according to the proportion:

In-class presentations/written critiques of research papers:	30%
In-class quizzes	30%
Final examination:	40%

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).

Date	Topic	Instructor (s) (Affiliation)
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### **Abnormalities of transformed cells and tumors**

Aug. 24	An overview of cancer (Chap 1 & 2)	A. Merrill (GT Biol)
Aug. 31	Cancer cell growth, death and metastasis (Chap. 2 & 3)	“
Sept. 7	Cancer genetics and epigenetics (Chap. 9 & 10)	P. Vertino (EUSM)

### **Mechanisms of carcinogenesis**

Sept. 14	Viral mechanisms of human carcinogenesis (Chap. 7)	M. K. Offerman (EUSM)
Sept. 21	Genomic instability (Chap. 8 & 10)	W. Zhou (EUSM)
Sept. 28	Chemical, physical and dietary agents in carcinogenesis (Chap. 4-6)	A. Merrill (GT Biol)

### **Quiz 1 (Aug. 24-Sept. 21)**

### **Prevalent human cancers**

Oct. 5*	Basic and clinical aspects of a prototypic cancer: Prostate cancer (Chap. 11)	J. Petros (EUSM)
Oct. 12*	Other cancers (Survey; appendix A)	A. Merrill (GT Biol)

**Oct. 13** Last day to drop a course with a “W” grade

### **Application of bioengineering and biotechnology to cancer**

Oct. 18*	Gene expression technologies	G. Bao (GT/EU BME)
Oct. 26*	Nanotechnologies	S. Nie (EU/GT BME)
Nov. 2 *	Computational methods in cancer informatics, early intervention, diagnosis, and treatment	E. Lee (GT ISyE)
Nov. 9	Genomics, proteomics and other omics	M. Wang (GT/EU BME) M. C. Sullards (GT Chem)
Nov. 16	Biosensors	W.Hunt (GT ECE)

### **Quiz 2 (Oct 6-Nov. 10 and research papers #3-5)**

Nov. 23	Thanksgiving break	
Nov. 30	Tumor imaging	X. Hu (EU/GT BME)
Dec. 7	Wrap up (Cancer prevention, Chap. 12)	A. Merrill (GT Biol)

Dec. 14 (5:05-6:55 pm) **Final exam**

**\*Dates when critiques of research papers will be presented by students.**

Additional information (required by Georgia Tech):

All students are required to adhere to the Georgia Tech Academic Honor Code ([www.honor.gatech.edu](http://www.honor.gatech.edu)). This includes, but is not limited to, the following issues that pertain to the oral and written critiques, quizzes, 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 phrases, 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](http://www.honor.gatech.edu).**