BIOL 101a **Molecular Biotechnology** Dr. Chandler Fulton

Course Description:

The molecular genetics and genomics of DNA structure and replication, gene function (RNA transcription, processing and editing, and protein synthesis), and genome analysis, with emphasis on molecular biology techniques, the recent revolution in our understanding that is being driven by these powerful technologies, and the resulting advances in biotechnology that are changing our lives..

This course is intended for beginning graduate students and advanced upper level undergraduates.

Tentative Syllabus for Summer 2009, second session:

Instructor: Prof. Chandler Fulton, X6-3150, Kalman 129
E-mail: fulton@brandeis.edu

Text: Watson, J.D., et al., 2008, *Molecular Biology of the Gene,* 6th edition. Benjamin Cummings and Cold Spring Harbor Laboratory Press.

(2.5 hr. class, 3 times/wk, M, T, Th, 8:45am-11:15am, 5 wks, total 15 classes)

I plan for each class to be a mixture of lecture and discussion. Active participation is expected, as is reading of the assigned text in advance of each class meeting. I also anticipate some additional homework assignments.

In the first class session, we will re-evaluate this syllabus together and tailor it to the needs of the class participants.

GENOME ELEMENTS

Class 1. July 6 The century of genetics, molecular biology, and genomics

Class 2. July 7 An overview of genetics from Mendel to DNA
Chapters 1 and 2.

Class 3. July 9 The structures of DNA and of genomes
Chapters 6 and 7
Practice Quiz 1

Class 4. July 13 DNA replication
Chapter 8.

Class 5. July 14 DNA mutation
Chapter 9.

EXPRESSION OF GENES

Class 6. July 16 Transcription and splicing of mRNA
Chapter 12-13
Practice quiz 2

Class 7. July 20 Translation of mRNA into protein
Chapter 14
Mid-term Exam (Assigned Chapters 1 through 12, closed-book)

Class 8. July 21 The genetic code
Chapter 15.

REGULATION OF GENE EXPRESSION

Class 9. July 23 Regulation in prokaryotes
Chapter 16

Class 10. July 27 Regulation in eukaryotes
Chapter 17

Class 11. July 28 Regulation by RNAs
Chapter 18
Practice quiz 3

Class 12. July 30 Gene regulation in development
Chapter 19

Class 13. August 3 Genes, genomes and evolution
Chapter 20

CLASS PRESENTATIONS

Class 14. August 4 Class Presentations and review

Class 15. August 6 **Final Exam** (Assigned Chapters 1 through 20, inclusive, closed-book)

Grading system: Quizzes (5%)
Mid-term (20%)
Class participation (25%)
Final (25%)
Class presentation (25%)

Practice Quiz: Three practice 10-minute quizzes will be given in class. After they are collected, answers will be provided. The purpose is to let you, and me, gauge your performance on a regular basis.

Note: If you have a documented disability and wish to request reasonable accommodation, please see me immediately and not later than the beginning of the second week of this course. Thank you.