

Course Announcement-Fall 2006
MWF 10:20 a.m. —11:10 a.m., Room 127A ZACH
ELEN 669-600 - Engineering Applications in Genomics

INSTRUCTOR: Dr. A. Datta **Tel #:** (979)-845-5917 **Office:** 216N ZEC
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DESCRIPTION

This course will provide a tutorial introduction to the current engineering research in genomics. The necessary Molecular Biology background will be presented and techniques from signal processing and control will be used to (i) unearth intergene relationships, (ii) carry out gene-based classification of disease, (iii) model genetic regulatory networks and (iv) alter their dynamic behavior. The idea is that having taken this course, any engineering graduate student should be able to come up to speed in this emerging area and hopefully even initiate some research in it. Among other things, we will discuss recent genomics related research carried out by the instructor and his co-workers at Texas A&M University, the National Human Genome Research Institute, the National Cancer Institute, the M.D. Anderson Cancer Center and the Translational Genomics Research Institute.

PREREQUISITES

None as far as molecular biology is concerned.

SYLLABUS

- *1. Review of Organic Chemistry: Sugars, Fatty Acids, Amino Acids and Nucleotides (3 hours)*
- *2. Basics of Molecular Cell Biology: Procaryotes, Eucaryotes, Eucaryotic Cell Structure, Compartmentalization, Mitosis, Meiosis, Apoptosis, Cell Cycle, Cancer as the breakdown of Cell Cycle control (9 hours)*
- *3. DNA, RNA and Proteins: Transcription, Translation, the Genetic Code, Chromosomes and Gene Regulation (6 hours)*
- *4. Unearthing Genomic Relationships using the Coefficient of Determination (9 hours)*
- *5. Probabilistic Boolean Network Models (9 hours)*
- *6. Intervention and Control in Genetic Regulatory Networks (9 hours)*

STUDENT EVALUATION

- There will be one in-class exam and a paper presentation. The exam will count towards 50 percent of the final grade and the paper presentation will count towards the remaining 50 percent.

For more information contact the instructor.