California State University, Hayward   Department of Statistics

STAT 6031   Introduction to Statistics for Bioinformatics   Shagufta Aslam
Office SC N243
Winter 2003   January 06, 2003

Course   Information
Class Meeting: MW 6:00 PM – 7:50 PM SC N206
Office Hours :   MW 4:45 PM – 5:45 PM or by Appointment

Text:
Knudsen, Sten (2002), " *A Biologist's Guide to Analysis of DNA Microaaray Data"* John Willey & Sons.

Recommended Books:
- Weir S. Bruce (1996), " *Genetic Data Analysis II"* Sinauer Associates, Inc,.
- Ewens J. Warren, Grant R. Gregory (2001), *" Statistical Methods in Bioinformatics"* Springer.
- Mount W. David (2001)," *Bioinformatics Sequence and Genome Analysis"* Cold Spring Harbor Laboratory Press.
- Bain Engelhardt (1991), "*Introduction to Probability and Mathematical Statistics".*

Course Grading: Midterm Examination 30%
                             Final Examination   40%
                             Homework   30%

Bioinformatics is the field of study that includes Mathematical, statistical and computing methods that aim to solve biological problems using DNA and amino acid sequence and related problems. Following is the list of topics we will learn:

1.   Mendel's Theory and Hardy Weinberg Equilibrium.
2.   Basic Sequence data questions.
3.   Random sequence, Permutations and combinations.
4.   Basic Probability, Conditional Probability, Bayes Theorem and Independence.
5.   Some Discrete and Continuous Probability Distributions.
6.   Alignment problems and Blast.
7.   Information Theory (deals with transmission of message).
8.   Basic Microarray data.
9.   Normalization.
10.   Two components Model for expression arrays.

11.	Cluster Analysis.
12.	Analysis of Variance for Microarray Data
13.	Design of Experiment.
14.	Markov Chain.

Note: No Make-Up allowed for Midterm and Final Examinations.