THE UNIVERSITY OF TEXAS AT EL PASO
COLLEGE OF SCIENCE
Bioinformatics Program

Course #:	BINF 5113
Course Title:	Mathematics Seminar for Bioinformatics
Credit Hrs:	1
Term:	Fall 2009
Course Meetings & Location:	T 9:00 - 11:20am, R 9:00am - 12:20pm Bell Hall 130A
Prerequisite Courses:	STAT 5380, STAT 5385 or Instructor approval
Instructors:	Naijun Sha and Ming-Ying Leung
Office Location:	Bell Hall 203 (Sha) and 225 (Leung)
Contact Info:	Phone # 747-6844 (Sha) and 747-6836 (Leung) E-mail nsha@utep.edu; mleung@utep.edu Fax # 747-6502
Office Hrs:	MW: 1:00-2:00pm (Sha) or by appointment. Dr. Leung will post her office hours for each week outside her office.
Textbook(s), Materials:	Required: Applied Multivariate Statistical Analysis, 6th edition by R. A. Johnson and D. W. Wichern. Suggested: Biological Sequence Analysis: Probabilistic Models of Proteins and Nucleic Acids by R. Durbin, S. Eddy, A. Krogh and G. Mitchison.
Course Objectives (Learning Outcomes):	Students will learn to apply appropriate probabilistic models and statistical techniques to address bioinformatics problems such as biomolecular sequence and microarray data analyses. Through assigned projects, class discussions, hands-on labs, as well as oral presentations in the seminar, students will also acquire skills to identify bioinformatics problems that require advanced mathematical and statistical knowledge, and to describe and discuss these issues with individuals with suitable expertise.
Course Activities/Assignments:	Attendance at lectures, labs, and seminars are required, and active participation in class discussions is highly encouraged. Homework and data analysis projects will be assigned throughout the semester. You may work on the exercises with your fellow students, but each student must answer the questions individually. ZERO grades will be obtained for those whose solutions are the exact copies of someone else's. NO LATE HOMEWORK WILL BE ACCEPTED
Assessment of Course Objectives:	BINF/STAT 5354: Homework, exam, project BINF 5113: Presentation

Course Schedule: This course and seminar focus on statistical methods and probability models for analyzing post-genomics data. It consists of two modules:

1. 8/25 – 10/15. Statistical analysis of a multivariate response. Topics covered: Descriptive multivariate statistics, multivariate normal distribution, principal component analysis, classification and clustering analysis. Applications with the use of statistical packages will be considered. Prerequisite: STAT 5380, STAT 5385 or equivalent, or consent of instructor.
2. 10/20 – 12/3. Probabilistic modeling for nucleic and amino acid sequences. Topics covered: Markov chains and Hidden Markov Models (HMM). Probabilistic approaches to sequence alignment, phylogeny, and RNA structure analysis. Prerequisite: Instructor approval.

Grading Policy: BINF/STAT 5354:

Homework 30%
Midterm Exam 30%
Final Exam 40%

The final grade is based on a scale of 90-100 = A, 80-89 = B, 70-79 = C, 60-69 = D, below 60 = F. Attendance and class participation will be used to help decide borderline grades.

BINF 5113:

Grades are based on quality of student's assigned presentation and his/her participation in discussions at the seminars presented by others.

Make-up Policy: IF you notify the instructor BEFORE the exam AND have a university excuse for missing the exam, you may take the make-up exam arranged by the instructor.

Attendance Policy: Class attendance is required.

Academic Integrity Policy: Reference UTEP's policy cited in http://academics.utep.edu/Default.aspx?tabid=23785

Civility Statement: Please turn off cell phones during classes.

Disability Statement: If a student has or suspects she/he has a disability and needs an accommodation, he/she should contact the Disabled Student Services Office (DSSO) at 747-5148 or at <dss@utep.edu> or go to Room 106 Union East Building. The student is responsible for presenting to the instructor any DSS accommodation letters and instructions.

Military Statement: If you are a military student with the potential of being called to military service and/or training during the course of the semester, you are encouraged to contact as soon as possible.