Syllabus
BINF 6200 / ITSC 8200: Statistics for Bioinformatics
Fall 2009

Instructor

Xiuxia Du
Xiuxia.Du@uncc.edu
(704) 250-5754

Textbook

No textbook is required

Recommended:

1. Wayne W. Daniel, *Biostatistics,* 9th Edition, Wiley.
2. Bernard Rosner, *Fundamentals of Biostatistics*, 6th Edition, Thomson Brooks/Cole
3. Warren J. Ewens, Gregory R. Grant, *Statistical Methods in Bioinformatics: An Introduction*, 2nd Edition
4. Michael H. Kutner, Christopher J. Nachtsheim, John Neter, William Li, *Applied Linear Statistical Models*, 5th Edition
5. J. S. Milton, Jesse C. Arnold, Introduction to Probability and Statistics, 3rd Edition.
6. W.J. Conover, *Practical Nonparametric Statistics*, 3rd Edition
7. Peter Dalgaard, *Introductory Statistics with R*, 2nd Edition

Course Description

The aim of this 3-credit course is to introduce statistical methods commonly used in bioinformatics. Basic concepts from probability and statistical inference will be introduced and illustrated by examples from bioinformatics. R is introduced as the programming language.

Pre-requisites

Calculus

Objectives

- Lay a solid foundation in probability and random variables for studying statistics
- Understand the concepts underlying statistical analysis
- Design statistics-based algorithms to solve practical bioinformatics problems

Course Content

- Probability
  - Concept of probability
  - Set operations
  - Permutation
  - Combination
  - Conditional probability
  - Independence

    - Bayes's theorem
- Random variables and probability distributions
    - Concept of random variables
    - Discrete random variable
    - Continuous random variable
    - Expectation and variance
    - Distributions: Bernoulli, binomial, geometric, Poisson, exponential, Gaussian, gamma, chi-squared, uniform
- Estimation
- Hypothesis testing
- Analysis of variance
- Regression
- Introductory statistics with R

Grading
Evaluation will be based on understanding of concepts and the ability to apply theory in solving practical problems.

- Homework assignments (biweekly): 60%
- Midterm: 15%
- Final: 20%
- Classroom participation: 5%

Attendance
Attendance at lecture is required, although exceptions will be made for reasons such as illness or family emergency. Excessive absences will result in a reduced classroom participation score at the instructor's discretion, and will negatively impact the overall course grade.

University Integrity
All students are required to read and abide by the Code of Student Academic Integrity. Violations of the Code of Student Academic Integrity, including plagiarism, will result in disciplinary action as provided in the Code. Definitions and examples of plagiarism are set forth in the Code. The Code is available from the Dean of Students Office or online at: http://www.legal.uncc.edu/policies/ps-105.html. A set of links to various resources on plagiarism and how to avoid it is available at the UNCC Library website: http://library.uncc.edu/display/?dept=instruction&format=open&page=920.