ANSCI 492 A

Introduction to Statistical Genomics

Spring 2002 0.5 unit 1st 8 week section

Course Information
Instructor: Dr. Sandra Rodriguez-Zas
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Phone: (217) 333-8810
Classroom Lectures: Monday, Wednesday and Friday, 1:00 pm – 1:50 pm Room 107 ASL
Office hours: Thursdays 2:00-3:00PM Room 306 ASL
Virtual hours: Tuesdays 11:00AM-12:00PM
Computer labs: Friday Jan. 25, Feb. 8 and Mar. 8, 1:00 PM – 1:50 PM
Instructional Lab #2 (030 LIAC)

Course web address: http://webct.cet.uiuc.edu/
Course name: ANSCI 492 A
Web page login: net id or U of I login (preliminary password is equal to the login)
Please, change your password as soon as possible
Web Course Tools (Webct) support: http://webct.cet.uiuc.edu/

Please use the ANSCI 492 A Webct e-board to place questions

Outline
One important area of genomic studies is the identification of significant associations between phenotypic variation and genome location. The detection of quantitative trait loci (QTL) in the genome is essential for the discovery of genes, study of their function and applications. Genome research assists in the diagnosis of human diseases, identification of individuals (fingerprinting), plant and animal genetic improvement, disease management, genetic diversity assessment and variety protection.

Description
Introduction to Statistical Genomics focuses on the analysis of different types of molecular genetic information found in human, plant and animal studies. This capstone course combines concepts in statistics, molecular and quantitative genetics. The theoretical rationale of some statistical and mathematical concepts is complemented or substituted with intuitive explanations when needed.

Objectives
The objectives of Introduction to Statistical Genomics are to:
- present and discuss approaches to analyze molecular genetic data
- reflect on the interpretation of the results of the analyses
- develop critical thinking skills while using relevant computer packages.
- exercise problem solving capabilities and communication skills for effective research
These objectives will be accomplished through lectures, computer labs, homework assignments and course web-page participation.

**Topics**

1) Introduction to genomic and statistical concepts
2) Detection of genes controlling complex traits in line crosses
   - Population designs
   - Analysis of molecular genetic data
   - Computer tools for QTL mapping and analysis
3) Detection of genes controlling complex traits in outbred populations
   - Population designs
   - Analysis of molecular genetic data
   - Computer tools for QTL mapping and analysis
4) Issues in QTL detection
   - False positives and negatives
   - Significance thresholds
   - Power
   - Confidence interval
5) Fine mapping
   - Linkage disequilibrium
   - Transmission disequilibrium test
   - Association studies
6) Microarray studies
   - Description
   - Analysis
   - Designs
References:
Recommended reading material:
Suggested reading materials:

* On reserve at the Biology Library, 101 Burrill Hall. 407 South Goodwin Avenue. Urbana, IL.

Grading
Homework 1 25 points
Homework 2 30 points
Homework 3 30 points
Participation (e-board) 15 points
Total: 100 points

Participation
To foster cooperative learning and reflective thinking students are encouraged to place questions in the electronic board. Students that place insightful questions or answer these questions will receive credit since they are assisting their peers in understanding the course topics and making effective use of the materials in the course’s web page.

Academic Integrity
Rule 33 of the Code on Campus Affairs and Handbook of Policies and Regulations Applying to All Students (http://www.uiuc.edu/admin_manual/code/rule_33.html) gives complete details of rules governing integrity for all students. Students are responsible for knowing and abiding by these rules.

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