

# Statistical Genomics

Steve Kachman

## 1 Objective

The objective of this course is to develop a better understanding of the statistical methodologies available for the identification and quantification of quantitative trait loci. The focus will be on QTL analysis as it pertains to livestock. However, much of what is covered will pertain also to plants and humans.

## 2 Course Information

- Course:** Biometry 896, Statistical Genomics
- Instructor:** Steve Kachman
- Office:** 104 D Miller Hall
- E-mail:** skachman@unl.edu
- Phone:** 472-2903
- Office Hours:** MWF 2:00-3:00 and by appointment
- Text Book:** *Quantitative Trait Loci Analysis in Animals*, J. I. Weller
- Prerequisites:** Biometry 802  
Basic understanding of genetics  
SAS
- Homework:** Approximately once a week  
20% will be deducted for each day late.
- Exams:** Two exams, will be announced at least one week in advance
- Final Exam:** Thursday, December 19 1:00–3:00 PM  
Revise travel plans accordingly.
- Conflicts:** Expected to take exams at the scheduled time  
If an exam conflicts with an activity vital to your program,  
please have your major adviser contact me well in advance.  
I should be notified as soon as possible of any potential conflicts.
- Grading:** Exams 200 pts  
Final 200 pts  
Homework & Quizzes 100 pts  
Grading will be on a straight 90, 80, 70, 60 percent basis.
- Web Page:** <http://biometry.unl.edu/faculty/steve/896/2002/>

### 3 Topics

Week of	Topic
8/22	Introduction to quantitative trait loci and mapping
9/4	Principles of parameter estimation Method of moments and begin maximum likelihood
9/9	Finish maximum likelihood and start mixed models
9/16	Experimental designs: Inbred Lines
9/23	Experimental designs: Segregating populations
9/30	Estimation Inbred lines Least square based approaches
10/7	Maximum Likelihood based approaches
10/14	Composite Interval Mapping
10/28	QTL as Random Effects
11/11	Statistical Power
11/18	Genome Scans
12/2	Marker Assisted Selection