

Martin T. Ferris  
5081 GMB  
Office hours: By Appt

[mtferris@email.unc.edu](mailto:mtferris@email.unc.edu)  
919-966-5881 (office)

### Course Description:

This course is a graduate level course which will cover the following topics: 1) the mathematical and theoretical underpinnings of quantitative genetic modeling and analysis, 2) the determination and quantification of genetic components to phenotypes, 3) the role of genetic architecture in trait selection and evolution, 4) principles, applications and interpretations of genetic mapping.

At the conclusion of this module, individuals should have an appreciation for the impact that quantitative genetic control of traits has on biomedical, agricultural and evolutionary sciences. Individuals will hopefully also be comfortable applying quantitative genetics framework in their research careers.

### Course Expectations & Policies:

As this course is a graduate level course, prior familiarity with principles of genetics is expected. Similarly some familiarity with algebraic and statistical basics is highly encouraged.

Course materials will be presented in lecture format, and class participation is expected during lecture periods. Lecture slides will be available on Sakai after presentation in class. Recitation will be used mainly for clarification of materials, as well as working on problem sets/writing assignment.

Due to the short nature of the module, work will not be accepted late without compelling reasons. As this is a graduate level course (pass/fail), results will be based on an strict numerical outcome (laid out below). Undergraduates who take the course will operate on a similar strict numerical outcome.

### Assessment

Grade will be based as follows:

Class Participation: 15%

Problem Set 1: 15%

Problem Set 2: 15%

Writing Assignment: 25%

Final Exam: 30%

### Tentative Schedule:

Date	Session	Notes
Jan 10	Introduction to Quant Gen and Mendelian behavior	

Jan 11	Recitation	Writing assignment explanation
Jan 15	Single-locus Genetic variance	
Jan 17	Multi-locus Genetic variance	
Jan 18	Recitation	Assignment of Problem Set 1
Jan 22	Co-ancestry & Relatedness	
Jan 24	Heritability	
Jan 25	Recitation	Problem Set 1 due
Jan 29	Selection of Quantitative Traits	
Jan 31	Principles of Genetic Mapping	
Feb 1	Recitation	Assignment of Problem Set 2
Feb 5	Analysis of genetic crosses	
Feb 7	Systems Genetics I: GxE, Multi-level phenotypes	
Feb 8	Systems Genetics II: Case/Control; Causal Inference	Problem Set 2 due
Feb 12	FINAL EXAM (distributed 24 hrs beforehand; in-class work time)	Writing Assignment due