

Quantitative Genomics - Spring 2023 Final Version, April 21

Date	Topic / Assignments	Lecture	Week
Jan 24	INTRODUCTION	<i>Logistics / Intro. to Quant Gen</i>	1
Jan 26	PROBABILITY AND STATISTICS	<i>Intro. to probability</i>	
Jan 31		<i>Intro. to conditional probability</i>	2
Feb. 2	HW #1 – Assigned	<i>Intro. to random variables and random vectors</i>	
Feb. 7		<i>Expectations, variances, covariances, and probability models</i>	3
Feb. 9	HW #1 – Due HW #2 – Assigned	<i>Introduction to inference</i>	
Feb 14		<i>Introduction to estimation</i>	4
Feb 16	HW #2 – Due	<i>Maximum likelihood estimators</i>	
Feb 21		<i>Introduction to hypothesis testing I</i>	5
Feb 23	HW #3 – Assigned	<i>Introduction to hypothesis testing II</i>	

Feb 28		<i>No Class!!</i>	6
March 2	QUANTITATIVE GENOMICS	<i>Introduction to hypothesis testing III</i>	
March 7	HW #3 - Due	<i>Introduction to genetic modeling</i>	7
March 9		<i>Introduction to genetic inference I: genetic linear regression model</i>	
March 14	HW #4 - Assigned	<i>Introduction to genetic inference II: MLE</i>	8
March 16		<i>Introduction to genetic inference III: calculating p-values</i>	
March 21	MAPPING: GWAS	<i>Genome-Wide Association Studies (GWAS) I: Introduction</i>	9
March 23	HW #4 - Due	<i>Genome-Wide Association Studies (GWAS) II: Linkage Disequilibrium</i>	
March 28	Midterm Assigned (March 29)	<i>Genome-Wide Association Studies (GWAS) III: statistical and experimental issues</i>	10
March 30	Midterm Due (March 31)	<i>Genome-Wide Association Studies (GWAS) VII: Covariates and QQ plots</i>	
April 5		<i>No Class!!</i>	11

April 7		<i>No Class!!</i>	
April 11	Project Assigned	<i>Genome-Wide Association Studies (GWAS) VI: Minimum GWAS analysis and PCA</i>	12
April 18		<i>Genome-Wide Association Studies (GWAS): logistic regression I</i>	
April 20		<i>Genome-Wide Association Studies (GWAS): logistic regression II</i>	13
April 25		<i>Genome-Wide Association Studies (GWAS): logistic regression III (IRLS algorithm)</i>	
April 27		<i>Mixed Models</i>	14
May 2	BAYESIAN STATISTICS	<i>Bayesian inference I: introduction & inference basics and linear models</i>	
May 4		<i>Bayesian inference II: MCMC algorithms</i>	15
May 9	PEDIGREE AND INBRED LINE DESIGNS	<i>Basics of linkage analysis & Inbred line analysis</i>	
May 10	CLASSIC QUANTITATIVE GENOMICS Project Due	<i>Additive genetic variance and heritability</i>	16