

EPIDEMIOLOGY 743 • GENETIC EPIDEMIOLOGY • SPRING 2007 SYLLABUS

Course Information

Lead Instructor: Kari North
Office: Suite 306, Bank of America Building
Lecture: 2:00 – 3:15 T, Th. Rosenau 324

Office Hours: By appointment
Phone: 966-2148

Required Text: *A Statistical Approach to Genetic Epidemiology, Andreas Ziegler and Inke Konig, 2006.*

Recommended Text: *Statistical Methods in Genetic Epidemiology, Duncan C. Thomas, 2004.*

Additional Readings: Readings will be made available on Blackboard, <https://blackboard.unc.edu>.

Course Research Assistant: Gray Hagler
Office: Suite 306 Bank of America Building
Office Hours: 8:00 – 5:00 Monday - Friday
Phone: 966-1967

Purpose: The purpose of this course is to examine the concepts and methods of genetic epidemiology relevant to the study of complex human diseases.

Course Description: Genetic Epidemiology is a field of study that deals with the genetic etiology and distribution of diseases in populations. This course will provide students with a focused exposure to two major areas of emphasis, linkage and association analysis. Students will be exposed to the tools needed to critically review the literature in genetic epidemiology and human genetics.

Course Prerequisites: Enrollment is open to all Epidemiology and Biostatistics graduate students that have taken EPI 715 and BIOS 545. For all other cases, permission of the instructor is required.

Requirements: Grades will be based on the following:

<u>Event</u>	<u>Value</u>	<u>Date</u>
Midterm Exam	150 points	02/28/07, 03/07/07
Homework	100 points	ongoing
Final Exam	150 points	04/27/07, 05/05/07

Total Points		400 points

10/4/2007 9:46 AM

Grading: Letter grades are assigned according to the following scale: H (95 – 100%), P (65 – 94%), and L (50 – 64%), calculated from the requirements listed above.

Honor system: The Honor and Campus Codes embody the ideals of academic honesty, integrity and responsible citizenship and have governed the performance of all academic work and student conduct at the University for the past 100 years. Enrollment at this University presupposes a commitment to the principles embodied in these codes and a respect for this tradition.

Note: No make-up examinations will be given unless the instructor is notified before the exam is given. Late projects will not be accepted.

Tests: The test format consists of multiple choice, identification, short-answer essay, and long-answer essay questions. Tests will include questions taken from the lectures and readings.

Homework: There will be 4 homework assignments distributed on 01/24, 02/21, 03/28, and 04/11, which you will have 1 week to complete. Assignments will consist of identification, short-answer essay, and long-answer essay questions. Each homework assignment is worth 25 points.

EPIDEMIOLOGY 743 • GENETIC EPIDEMIOLOGY • SPRING 2007

COURSE SCHEDULE

Lecture Schedule*

Wk	Day	Date	Topic	Presenter	Readings
1	Thur	Jan 11	Lecture 1: Introduction • What is genetic epidemiology?	North	Beaty TH & Khoury MJ, 2000
2	Tues	Jan 16	Lecture 2: Basic Genetics Review	North	Ziegler Chapter 1 Burton PR et al, 2005
	Thur	Jan 18	Lecture 3: Basic Genetics Review	North	Ziegler Chapter 1 Ellsworth DL & Manolio TA, 1999a Dobyns WB et al., 2004
3	Tues	Jan 23	Lecture 4: Laboratory Methods for High-Throughput Genotyping	Bob Millikan	Ziegler Chapter 4 Kristensen VN & Kelefiotis D., 2001 Ellsworth DL & Manolio TA, 1999a
	Thur	Jan 25	Homework 1 Distributed Lecture 5: Mendelian Inheritance, Familial Resemblance	North	Ziegler Chapter 2 Burton PR et al., 2005 Ellsworth DL & Manolio TA, 1999b
4	Tues	Jan 30	Lecture 6: Key Genetic Epidemiology Concepts	North	Ziegler Chapter 3 Burton PR et al., 2005 Ellsworth DL & Manolio TA, 1999b
	Thur	Feb 1	Lecture 7: Linkage Analysis Basics • IBD Sharing	Ethan Lange	Ziegler Chapter 5 Teare MD & Barret JH, 2005 Ellsworth DL & Manolio TA, 1999c Borecki I & Suarez B 2001
5	Tues	Feb 6	Lecture 8: Linkage Analysis Basics • Genetic Model Dependent Linkage Analysis	North	Ziegler Chapter 6 Teare MD & Barrett JH, 2005 Ellsworth DL & Manolio TA, 1999c Borecki I & Suarez B 2001
	Thur	Feb 8	Lecture 9: Finding genes for complex traits	Leslie Lange	TBD
6	Tues	Feb 13	Lecture 10: Linkage Analysis Key Concepts • Model Independent Linkage Analysis • Affected sibling pairs, affected relative pairs	North	Ziegler Chapter 7 Mein CA et al., 1998
	Thur	Feb 15	Homework 2 Distributed Lecture 11: Linkage Analysis Key Concepts	North	Ziegler Chapter 8 Witte JS et al., 2000

			• Haseman-Elston, Variance Components		Kissebah AH et al., 2000
7	Tues	Feb 20	Lecture 12: Linkage Analysis: Advanced Topics • Complexities and Complications	North	Lewis C et al., 2005 North KE et al., 2005
	Thur	Feb 22	Homework 2 Due Lecture 13: Linkage Analysis: Advanced Topics • Where we are now	North	Blangero J 2004 Drayna D 2003 Kim U et al., 2003 Gordon S 2006
8	Tues	Feb 27	Lecture 14: Linkage Analysis / Association Analysis Contrasted	North	Ziegler Chapter 9 Teare MD & Barret JH, 2005 Ellsworth DL & Manolio TA, 1999c Borecki I & Suarez B 2001
			MIDTERM EXAM DISTRIBUTED		
	Thur	Mar 1	Lecture 15: The genetics of complex neurological diseases	Kirk Wilhelmsen	Schuckit MA et al., 2005 Ehlers CL et al., 2004
9	Tues	Mar 6	Lecture 16: Association Analysis Basics • Linkage Disequilibrium • SNP selection • Haplotypes	North	Ziegler Chapter 9 Palmer LJ & Cardon LR, 2005 Gabriel SB et al., 2002 Crawford DC et al., 2004 Conrad DF 2006 Carlson CS 2004 Bhatti 2006
			MIDTERM EXAM DUE		
	Thur	Mar 8	Lecture 17: Genotype by sex interaction	Nora Franceschini	Weiss LA 2006 Franceschini N 2006
10	Tues	Mar 13	No Classes SPRING BREAK		
	Thur	Mar 15	SPRING BREAK- CONTINUED		
11	Tues	Mar 20	Lecture 18: Haplotypes	Ethan Lange	Ziegler Chapter 12 Schaid D, 2004 Niu T, 2004
	Thur	Mar 22	Lecture 19: Association Analysis Basics Continued • Measures of Association	North	Ziegler Chapter 10 Cordell HJ + Clayton DG 2005 Zondervan KT et al., 2004 Hattersley AT & McCarthy MI, 2005 Balding DJ 2006
12	Tues	Mar 27	Lecture 20: Association Analysis: Advanced Topics	North	Cardon LR & Palmer LJ., 2003 Freedman ML et al., 2004

			• Population Stratification		Marchini J et al., 2004 Helgason A et al., 2005 Tsai H 2005 Price AL 2006
			Homework 3 Distributed		
	Thur	Mar 29	Lecture 21: Gene – Environment Interaction and Cancer	Andrew Olshan	Botto LJ & Khoury MJ, 2001 Garcia-Closas M et al., 2005 Thomas DC, 2005 Wang X et al., 2002
13	Tues	Apr 3	Lecture 22: Gene - Environment Interaction and Atherosclerosis	Christy Avery	Hung R 2004 Greenland S 2000
			Homework 3 Due		
	Thur	Apr 5	Lecture 23: Association Analysis: Advanced Topics • Methodological Concerns	North	Colhoun et al., 2003 Ioannidis J et al., 2001 Ioannidis J et al., 2003
14	Tues	Apr 10	Lecture 24: Genome-wide Association Analysis • Panel Coverage	Jeannette Bensen	Pe'er I et al., 2006 Barrett JC & Cardon LR, 2006 Carlson CS 2006
			Homework 4 Distributed		
	Thur	Apr 12	Lecture 25: The Genetic Epidemiology of Schizophrenia	Patrick Sullivan	Sullivan PF 2005 TBD
15	Tues	Apr 17	Lecture 26: Genome-wide Association studies	North	Hirschhorn JN & MJ Daly, 2005 Wang WYS et al 2005 Klein RJ 2005
			Homework 4 Due		
	Thur	Apr 19	Lecture 27: Genome-wide Association studies	North	Duerr RH 2006 Herbert A 2006 Smyth DJ 2006
16	Tue	Apr 24	Lecture 28: Genome-wide Association Studies : A Practical Example	Karen Mohlke	TBD
	Thur	Apr 26	Lecture 29: Course Summary • The current practice of genetic epidemiology • What have we learned?	North	Smith GD et al., 2005
			FINAL EXAM DISTRIBUTED		

FINAL EXAM: Take Home Exam Due Friday May 4th

* Schedule of topics and readings are subject to change.

10/4/2007 9:46 AM