Human Genetics/Genetic Epidemiology – MHS, ScM, PhD, and ScD
Department of Epidemiology

1. Obtain a solid background in human genetics and a comprehensive introduction to the statistical and analytical approaches of genetic epidemiology in both population and family-based studies to identify genes that control risk

Specific Competencies	Learning Opportunities		Evaluation Opportunities: Course Work/Exam	Written Comps	Department Preliminary Orals	School Preliminary Orals	Thesis	Final Defense	Public Thesis Presentation	Non-Thesis Research
Explain the basic human genetic concepts (Mendelian principles, chromosomes, genes, DNA, mutations, twin studies, human genetic diseases) in research studies	340.630	Population Genetics and Genetic Epidemiology	X	X	X	X				
	340.631	Methods for Association Analysis in Genetic Epidemiology								
	340.632	Methods for Linkage Association in Genetic Epidemiology								
	340.664	Introduction to Genetic Epidemiology								
	340.840	Special Studies - Biweekly Classic Reading Course for >1st Year Students								
	Monthly Seminar Series									
	Weekly Journal Clubs									
	JHMI Genetic Epidemiology Journal Club									
Understand the molecular underpinnings of genetics	120.602	Introduction to Molecular Biology	X	X	X	X				
	120.603	Molecular Biology of Disease								
Utilize concepts in designing population-based genetic epidemiologic studies	340.630	Population Genetics and Genetic Epidemiology	X	X	X	X	X	X	X	
	340.631-2	Methods for Association Analysis in Genetic Epidemiology								
	340.664	Introduction to Genetic Epidemiology								
	340.820	Thesis Research Epidemiology								
	340.840	Special Studies - Biweekly Classic Reading Course for >1st Year Students								
	Monthly Seminar Series									
	Weekly Journal Clubs									
	JHMI Genetic Epidemiology Journal Club									

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Specific Competencies	Learning Opportunities		Evaluation Opportunities: Course Work/Exam	Written Comps	Department Preliminary Orals	School Preliminary Orals	Thesis	Final Defense	Public Thesis Presentation	Non-Thesis Research
Utilize concepts in designing family-based genetic epidemiologic studies	340.630	Population Genetics and Genetic Epidemiology	X	X	X	X	X	X	X	
	340.631	Methods for Association Analysis in Genetic Epidemiology								
	340.632	Methods for Linkage Association in Genetic Epidemiology								
	340.664	Introduction to Genetic Epidemiology								
	340.820	Thesis Research Epidemiology								
	340.840	Special Studies - Biweekly Classic Reading Course for >1st Year Students								
	Monthly Seminar Series									
	Weekly Journal Clubs									
Discuss issues in genetic analysis of complex chronic diseases (penetrance, genetic heterogeneity, gene-environment interactions)	340.607	Epidemiologic and Preventive Aspects of Cardiovascular Diseases	X	X	X	X	X	X	X	
	340.624-5	Etiology, Prevention, and Control of Cancer I-II								
	340.630	Population Genetics and Genetic Epidemiology								
	340.631-2	Methods for Association Analysis in Genetic Epidemiology								
	340.664	Introduction to Genetic Epidemiology								
	340.840	Special Studies - Biweekly Classic Reading Course for >1st Year Students								
	Monthly Seminar Series									
	Weekly Journal Clubs									
Know and be able to communicate principles of segregation analysis of simple and complex traits	340.630	Population Genetics and Genetic Epidemiology	X	X	X	X	X	X		X
	340.631-2	Methods for Association Analysis in Genetic Epidemiology								
	340.664	Introduction to Genetic Epidemiology								
	340.840	Special Studies - Biweekly Classic Reading Course for >1st Year Students								

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Specific Competencies	Learning Opportunities		Evaluation Opportunities: Course Work/Exam	Written Comps	Department Preliminary Orals	School Preliminary Orals	Thesis	Final Defense	Public Thesis Presentation	Non-Thesis Research
Know and be able to communicate principles of linkage analysis (including parametric and non-parametric approaches, and concepts of multipoint methods	340.630	Population Genetics and Genetic Epidemiology	X	X	X	X	X	X		X
	340.631	Methods for Association Analysis in Genetic Epidemiology								
	340.632	Methods for Linkage Association in Genetic Epidemiology								
	340.664	Introduction to Genetic Epidemiology								
	340.840	Special Studies - Biweekly Classic Reading Course for >1st Year Students								
	Monthly Seminar Series									
	Weekly Journal Clubs									
Know and be able to communicate principles of population genetics (including Hardy-Weinberg equilibrium, linkage equilibrium, haplotype structure and genetic variation across populations)	340.630	Population Genetics and Genetic Epidemiology	X	X	X	X	X	X	X	X
	340.631	Methods for Association Analysis in Genetic Epidemiology								
	340.632	Methods for Linkage Association in Genetic Epidemiology								
	340.664	Introduction to Genetic Epidemiology								
	340.840	Special Studies - Biweekly Classic Reading Course for >1st Year Students								
	Monthly Seminar Series									
	Weekly Journal Clubs									
Read and interpret published papers in journals such as *Genetic Epidemiology*	340.630	Population Genetics and Genetic Epidemiology		X						
	340.631	Methods for Association Analysis in Genetic Epidemiology								
	340.632	Methods for Linkage Association in Genetic Epidemiology								
	340.664	Introduction to Genetic Epidemiology								
	340.820	Thesis Research Epidemiology								
	340.840	Special Studies - Biweekly Classic Reading Course for >1st Year Students								
	Monthly Seminar Series									
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Specific Competencies	Learning Opportunities	Evaluation Opportunities							
		Course Work/Exam	Written Comps	Department Preliminary Orals	School Preliminary Orals	Thesis	Final Defense	Public Thesis Presentation	Non-Thesis Research
Describe different genotyping technologies and discuss the pros/cons of each technology in the context of particular study designs	340.630 Population Genetics and Genetic Epidemiology 340.631 Methods for Association Analysis in Genetic Epidemiology 340.632 Methods for Linkage Association in Genetic Epidemiology 340.664 Introduction to Genetic Epidemiology Monthly Seminar Series Weekly Journal Clubs	X	X	X	X		X	X	
Understand the role of genetics in public health context, including policy implications, genetic screening implications, genetic testing implications	340.630 Population Genetics and Genetic Epidemiology 340.631 Methods for Association Analysis in Genetic Epidemiology 340.632 Methods for Linkage Association in Genetic Epidemiology 340.664 Introduction to Genetic Epidemiology 340.820 Thesis Research Epidemiology Weekly Journal Clubs Genetic Epidemiology Journal Clubs			X	X	X	X	X	
Understand and apply human subjects and informed consent issues in human genetic research	306.665 Research Ethics and Integrity 340.820 Thesis Research Epidemiology 550.860 Research Ethics Committee on Human Research (IRB) Modules	X	X	X	X	X	X	X	X