

University of Florida
College of Public Health & Health Professions Syllabus
PHC 7594 – GENETIC EPIDEMIOLOGY (3 CREDIT HOURS)

Spring: 2026

Course Logistics

Meeting days/time: Monday: 12:50pm – 3:50pm

Delivery format: On-Campus

Course Website or E-Learning: <https://ufl.instructure.com>

Instructor: Jinling Liu, PhD, MS.

Class Room: Department of Epidemiology, CTB Room 4240C

Phone: (352) 294-8576

Email: jinling.liu@ufl.edu

Office hours: By appointment

Preferred course communications: email

Prerequisites: PHC 6000 (Epi Methods I), PHC 6011 (Epi Methods II, can be taken concurrently), and PHC 6050c (Biostat Methods I). Talk to the instructor for a prerequisite waiver or further information. Course is designed for master level (MS/MPH) or PhD students.

Audience for this Course

- Students who are interested in genetic epidemiology of human disease
- Students who will be working with genetic data
- Students who are interested in statistical analysis of genetic data
- Students who are interested in learning research methods in genetics, and those who want to expand their knowledge in genetics and statistical genetics.

Purpose and Outcome

Course Overview

This course covers fundamental concepts, terminologies and principles in genetic epidemiology. At the completion of this course, students should be able to critically review and discuss genetic epidemiologic literatures, provide input on the design of genetic epidemiologic studies, identify and apply appropriate tests for genetic analysis, and interpret results of genetic linkage and

association analysis. This course is one of the available advanced epidemiology methods courses for the PhD program.

Relation to Program Outcomes

The main purposes of this 3-credit hour course are to introduce and consolidate: (1) basic concepts, terminologies, and theories in human population genetics and genetic epidemiology; (2) study design of genetic epidemiological research; (3) necessary analytical skills in genetic epidemiology and precision health. This course will also teach students how to design an efficient genome-wide linkage and association studies and how to interpret research findings of genetic epidemiological studies in large-scale human populations.

Course Objectives and/or Goals

- Describe basic concepts and terminologies in human population genetics
- Explain fundamental principles and theories in genetic epidemiology
- Describe various genetic markers commonly used in genetic epidemiology studies
- Conduct Hardy-Weinberg Equilibrium (HWE) test and calculate allele and genotype frequencies
- Compare and contrast genetic linkage and association analysis
- Compare and contrast family-based and population-based studies
- Interpret results of genetic linkage and association analyses, including genome-wide linkage and genome-wide association studies (GWAS)
- Describe HapMap and explain tagging SNPs
- Discuss issues related to human genetic studies, such as genetic heterogeneity, population admixture and multiple comparisons

Instructional Methods

- Didactic lectures: The course will consist of lectures to introduce fundamental concepts, terminologies, and principles in the areas of human population genetics and genetic epidemiology.
- Homework: Students will be responsible for completing the assigned homework and handing in their homework on time.
- Assigned readings: Students are responsible for completing the assigned readings and should be prepared to discuss each reading assignment in class.
- In-class exercises: The course will include in-class exercises to help students understand the key concepts and theories discussed in class.
- Examination: There will be one closed book in-class final exam at the end of this course.
- Oral presentation: Students are required to orally present a chosen topic in the area of genetic epidemiology. Students will work as groups (3–4 students in each group, 15–20 minutes for each group) to present their work in PowerPoint slides. Journal articles for presentation can be selected based on the students' interests, but prior approval from the course instructor is required in order to avoid repeating of the same or similar topic.

Description of Course Content

Course Schedule: This represents a schedule for Spring 2026. Schedule changes will be announced in advance.

Date	Class	Topic	HW	HW due	Readings
1/12/26	Lecture 1	<ul style="list-style-type: none"> • Course introduction • Introduction to genetic epidemiology • Key concepts in human genetics 	HW1: Basic concepts in hum genet		Reading 1: Introduction to genet epi
1/19/26	Martin Luther King Day	No class			
1/26/26	Lecture 2	<ul style="list-style-type: none"> • HWE and its applications 	HW 2: HWE		
2/2/26	Lecture 3	<ul style="list-style-type: none"> • Linkage disequilibrium (LD) • Principles of Mendelian inheritance 	HW 3: Genotype and allele frequency	HW 1 due	
2/9/26	Lecture 4	<ul style="list-style-type: none"> • Familial aggregation • Heritability analysis • Segregation analysis 	HW 4: pedigree, concordance/discordance	HW 2 due	Reading 2: Familial aggregation and heritability of pyloric stenosis Reading 3: Segregation for early onset major depression
2/16/26	Lecture 5	<ul style="list-style-type: none"> • Genetic markers • TagSNPs & Haplotype blocks 	HW 5: genetic marker, heterozygosity	HW 3 due	Reading 4: Genetic markers Reading 5: TagSNPs & haplotype block
2/23/26	Lecture 6	<ul style="list-style-type: none"> • Parametric linkage • 		HW 4 due	Reading 6: Linkage for prostate

		Nonparametric linkage			cancer Reading 7: Linkage for essential hypertension
3/2/26	Lecture 7	<ul style="list-style-type: none"> • Family-based association studies • Case-control association studies • GWAS and issues related to genetic associated studies 		HW 5 due	Reading 8: Family-based GWAS Reading 9: GWAS for lung cancer
3/9/26		<ul style="list-style-type: none"> • Course summary and review 			
3/16/26	Spring Break	No class			
3/23/26		<ul style="list-style-type: none"> • Students oral presentation 			
3/30/26		<ul style="list-style-type: none"> • Prepare for final 			
4/6/26		<ul style="list-style-type: none"> • Final exam (closed book, in-class exam) 			

Course Textbook (Recommended but Not Required)

- Statistical Methods in Genetic Epidemiology by Duncan Thomas. Publisher: Oxford University Press. ISBN: 978-0195159394

Useful reference books:

- Principles of Population Genetics, 4rd Edition, Daniel Hartl & Andrew Clark, 2007, ISBN 978 0 87893 308 2
- An Introduction to Genetic Epidemiology. Edited by Lyle J. Palmer, Paul R. Burton and George D. Smith. The Policy Press 2011. ISBN 978 1 86134 897 5
- Genetics in Medicine, Nussbaum Robert L, et al. ISBN: 978 1 41603 080 5
- Specific readings related to each topic will change from year to year based on the latest publications.

Technical Support

For technical support for this class, please contact the UF Help Desk:

- helpdesk@ufl.edu
- (352) 392-HELP - select option 2
- <https://helpdesk.ufl.edu/>

Additional Academic Resources

- Career Connections Center: Reitz Union Suite 1300, 352-392-1601. Career assistance and counseling services.
- Library Support: Various ways to receive assistance with respect to using the libraries or finding resources.
- Teaching Center: Broward Hall, 352-392-2010 or to make an appointment 352-392-6420. General study skills and tutoring.
- Writing Studio: 2215 Turlington Hall, 352-846-1138. Help brainstorming, formatting, and writing papers.
- Student Complaints On-Campus: Visit the Student Honor Code and Student Conduct Code webpage for more information.
- On-Line Students Complaints: View the Distance Learning Student Complaint Process.

Course Requirements

- Attend the class and participate in group discussions
- Complete and return the assigned homework
- Complete the assigned reading and be prepared to discuss in class
- Complete one in-class written exam

Academic Requirements and Grading

Assignments

- There will be 5 homework assignments for this class. The homework will be due one week after the assignment is released. You can hand in a hard copy or email your homework to the TA before deadline. Late homework will not be accepted except for emergencies.
- There will also be 9 assigned readings of literature articles relevant to the topics in genetic epidemiology. Students are required to read the articles and be prepared to discuss them in class.

Grading Components

- Homework (50%): You will have 5 assignments, each worth 10 points. Each assignment will be graded based on whether the calculation is correct or not. Data interpretation will also count towards to the score of each assignment.
- Class participation (10%): Students are required to attend all class sessions and to actively participate in classroom discussions on the assigned reading or other related topics. If a student is more than 20 minutes late to the class, the student will be treated as not present.
- Oral presentation (20%): Students are required to orally present a topic related to genetic epidemiology. The oral presentation will be graded based on several factors including how well the student understands the chosen topic, interpretation of the results, answers to questions, etc. The topic can be chosen by students, but prior approval is required from the instructor to avoid repeating of the same or similar topics.
- Final exam (20%): There will be one in-class, closed book exam. Any topic covered in the class will possibly be included in the exam (unless specifically stated by the instructor).

Point System (Letter Grades)

Points earned	Letter Grade
93–100	A
90–92	A-
87–89	B+
83–86	B
80–82	B-
77–79	C+
73–76	C
70–72	C-
67–69	D+
63–66	D
60–62	D-
<60	E

Please be aware that a C- is not an acceptable grade for graduate students. The GPA for graduate students must be 3.0 based on 5000 level courses and above to graduate.

Letter Grade Points

Letter Grade	Grade Points
A	4.0
A-	3.67
B+	3.33
B	3.0
B-	2.67
C+	2.33
C	2.0
C-	1.67
D+	1.33
D	1.0

D-	0.67
E	0.0
WF	0.0
I	0.0
NG	0.0
S-U	0.0

More information on UF grading policy may be found at:

<http://gradcatalog.ufl.edu/content.php?catoid=10&navoid=2020#grades>

Exam Policy

If you cannot submit an assignment on time, it is your responsibility to communicate that information ahead of time to the instructor. Late work will be accepted on a case-by-case basis.

Policy Related to Make-up Exams or Other Work

Any requests for make-ups due to technical issues MUST be accompanied by the ticket number received from LSS when the problem was reported. You MUST e-mail the instructor within 24 hours of the technical difficulty if you wish to request a make-up.

Policy Related to Required Class Attendance

Students are expected to attend all class sessions and participate in classroom discussions. If a student is more than 20 minutes late to the class, the student will be treated as not present, and will not receive any points toward their class participation grade for that day. Students who cannot attend a class should inform the instructor via email prior to the date of the class, or on the day of the absence for illness or emergency. Excused absences must be consistent with university policies.

Student Expectations, Roles, and Opportunities for Input

Expectations Regarding Course Behavior

- Attend the class and participate in group discussions
- Complete and return the assigned homework
- Complete the assigned reading and be prepared to discuss in class
- Complete one in-class written final exam. No internet and electronics (laptops, phones, recording devices, etc.) are allowed during the exam.
- Complete an oral presentation with your group

Communication Guidelines

Email correspondence and all interactions on e-Learning should follow the etiquette of business emails (see UF's Netiquette Guide for Online Courses at <http://teach.ufl.edu/wp-content/uploads/2012/08/NetiquetteGuideforOnlineCourses.pdf>).

Academic Integrity

Students are expected to act in accordance with the University of Florida policy on academic integrity and uphold the Honor Code pledge. Violations of the Honor Code will not be tolerated and will be reported to the Dean of Students Office for consideration of disciplinary action.

Please remember cheating, lying, misrepresentation, or plagiarism in any form is unacceptable and inexcusable behavior.

Recording Within the Course

Students are allowed to record video or audio of class lectures for limited purposes (personal educational use, university complaint process, or legal proceedings). Publication or sharing of recordings without written consent of the instructor is prohibited.

Policy Related to Guests Attending Class

Only registered students are permitted to attend class. By exception, a department chair or designee may grant a student permission to bring a guest(s) for a total of two class sessions per semester (two sessions total across all courses). No further extensions will be granted.

Online Faculty Course Evaluation Process

Students are expected to provide professional and respectful feedback on the quality of instruction via GatorEvals. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>.

Support Services

Accommodations for Students with Disabilities

If you require classroom accommodation because of a disability, it is strongly recommended you register with the Dean of Students Office within the first week of class or as soon as you believe you might be eligible. Provide documentation of accommodations to the instructor as soon as possible after receiving the letter.

Counseling and Student Health

Students sometimes experience stress from academic expectations and/or personal and interpersonal issues that may interfere with academic performance. University resources include:

- The Counseling and Wellness Center: 352-392-1575; <http://www.counseling.ufl.edu>

- U Matter We Care: <http://www.umatter.ufl.edu/>
- Student Health Care Center at Shands: 392-0627; <https://shcc.ufl.edu/>
- Alachua County Crisis Center (24/7): (352) 264-6789
- University Police Department: 352-392-1111 (or 9-1-1 for emergencies)
- UF Health Shands Emergency Room / Trauma Center: 352-733-0111; 1515 SW Archer Road, Gainesville, FL 32608

Do not wait until you reach a crisis to come in and talk with us. You are not alone so do not be afraid to ask for assistance.

Inclusive Learning Environment

Public health and health professions are based on the belief in human dignity and on respect for the individual. We value and respect diversity of background, experience, and opinion, and promote openness and tolerance of differences. We embrace the University of Florida's Non-Discrimination Policy.