BIOS 4545 Syllabus

Human Genetics, Section A, 3 credits

Fall 2026

Instructor Information

Instructor: **Professor Greg Gibson**

Email: **greg.gibson@biology.gatech.edu**

General Course Information

Description

This course provides an introduction to contemporary human genetics, focused on complex traits and disease. It is largely lecture-based, supplemented with in depth discussion of current research papers. The first half of the course focuses on providing the tools of the field, namely the theory of quantitative and evolutionary genetics, whole genome sequence analysis, genome-wide association studies, polygenic scores, integrative genomics, and microbiome analysis. The second half then explores how these methods are being used to gain basic understanding of genetic architecture in the major domains of human disease: inflammation, immunity, cancer, metabolic, cardiovascular, psychiatric and neurological. Principles of personalized genomic medicine are also introduced, as well as consideration of the role of AI in research and translation.

Course Learning Outcomes

Be able to explain concepts of heritability and behavioral genetics to non-experts

Know how to use the basic tools of human genome analysis

Understand the etiology of all major common complex diseases

Have formulated a personal opinion about personalized genomic medicine

Be confident about reading contemporary literature using advanced statistics

Required Course Materials

"A Primer of Human Genetics", by Greg Gibson (Oxford University Press)

Will be provided free in pdf form on Dropbox

Contemporary research (6 papers) will be chosen from 2026 literature at the beginning of the semester and made available on Canvas.

Grading Policy:

- 2 Literature reviews at student discretion (20%)
- Term paper (20%)
- Final Exam (30%)
- Class Attendance and Participation (30%)

Description of Graded Components

Each item is described in course materials. Grade equivalents are provided as assignments are completed.

Course Policies

Attendance and/or Participation

Attendance at lectures is at student's discretion, but since 30% of the grade is participation it is advised. Attendance at the 6 class presentations is mandatory. Advisement of expected absence (eg due to athletic or family commitments, or interviews) is appreciated and ensures it does not count against participation.

Academic Integrity

Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor. Students are expected to act according to the highest ethical standards. Review Georgia Tech's Honor Code and the student Code of Conduct.

Any student suspected of cheating or plagiarism on a quiz, exam, or assignment will be reported to the Office of Student Integrity, who will investigate the incident and identify the appropriate penalty for violations.

Use of AI to assist in research is encouraged and expected in the literature reviews and term paper, but must be documented with prompts and responses. Documents suspected of having been generated by AI will however be rejected for credit and the student must explain the circumstances.

Core IMPACTS

Core IMPACTS is the University System of Georgia's General Education curriculum. If you are teaching a course that counts towards Core IMPACTS, you should include a syllabus statement about the Core area and associated career competencies. This resource developed by the Center for Excellence in Teaching and Learning and Online Education at Georgia State University includes template syllabus statements for each of the Core IMPACTS areas that you may adapt for your course.

Accommodations for Students with Disabilities

If you are a student with learning needs that require special accommodation, contact the Office of Disability Services (404-894-2563) as soon as possible to make an appointment to discuss your special needs and to obtain an accommodations letter. Please also e-mail me as soon as possible in order to set up a time to discuss your learning needs.

Student-Faculty Expectations Agreement

At Georgia Tech, we believe that it is important to strive for an atmosphere of mutual respect, acknowledgement, and responsibility between faculty members and the student body. The Student-Faculty Expectations articulate some basic expectations that you can have of me and that I have of you. In the end, simple respect for knowledge, hard work, and cordial interactions will help build the environment we seek. Therefore, I encourage you to remain committed to the ideals of Georgia Tech while in this class.