

BIOLOGY 352 GENETICS
FACE-to-FACE CLASS**INSTRUCTORS:** Dr. Michael Nelson**EMAIL:** michael.nelson@njit.edu**OFFICE:** CKB 339-A**OFFICE HOURS:** Monday 2:30 – 3:30

Tuesday 12:00 – 12:50

COURSE SCHEDULE: CKB G-08

Wed-Fri 1:00am -2:20pm

COURSE WEBSITE:<https://njit.instructure.com/courses/42425>**ATTENDANCE**

Attendance is mandatory for this class and will be monitored through short in-class quizzes online.

Attendance of 85% of lectures earns full attendance credit for the course. You will need to have a computer or a cell phone in order to complete these quizzes online. If you expect to miss a class for a valid reason, please email Dr. Nelson and provide documentation (michael.nelson@njit.edu).

COURSE DESCRIPTION: This course surveys the basic concepts of Genetics. We plan to start the course with a detailed examination of classical genetics experiments beginning with those of Mendel, followed by a study of DNA structure and manipulation. Further lectures in the course will focus on some of the details of molecular genetics, developmental genetics, and population genetics.

PREREQUISITES:

Foundations of Biology: Cell and Molecular Bio, BIOL201 and BIOL202 with grade C or better.

OBJECTIVES: To provide the student with: (1) knowledge of terms, concepts and theories of Genetics (2) the ability to integrate the material from multiple sources and research (3) improved critical thinking skills and the opportunity to apply genetic concepts in everyday biology-related applications

INSTRUCTIONAL MATERIALS: Genetics Essentials, Fifth Edition (2021) Benjamin A. Pierce. Students can purchase a 6-month subscription to the E-book, ISBN: 9781319356279 (most affordable option). Below is the link for the different options:

<https://www.macmillanlearning.com/college/us/product/Genetics-Essentials/p/1319244920>

Some additional reading may be occasionally assigned from online resources (free text) such as NCBI

<https://www.ncbi.nlm.nih.gov/guide/literature/>

SUPPLEMENTAL MATERIALS: Any additional materials required for class would either be provided through Canvas (UCID required), or via web link.

CODE OF STUDENT CONDUCT: Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at: <http://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf>.

Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university. If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at dos@njit.edu

REASONABLE ACCOMMODATION: If you have a special need that may require an accommodation or assistance, please inform us of that fact as soon as possible and no later than the end of the second class meeting. Students with disabilities who require accommodations must contact Dr. Phyllis Bolling, Center for Counseling and Psychological Services (C-CAPS), Campbell Hall, (entry level), room 205, (973) 596-3420

GENERATIVE AI: This course expects students to work without artificial intelligence (AI) assistance in order to better develop their skills in this content area. As such, AI usage is not permitted throughout this course under any circumstance.

COURSE EVALUATION PROCEDURES:

GRADING ITEM	WEIGHT
Exam 1	20%
Exam 2	20%
Exam 3 (Final)	25%
Project	10%
Homework	20%
Attendance & Participation	5%
TOTAL	100%

GRADING SCALE	
A	90-100
B+	85-89
B	80-84
C	65-74
D	50-64
F	0-49

The topics to be covered will include:

- Introduction to Molecular Genetics
- DNA Structure and Manipulation
- Mendelian Genetics
- Sex-chromosomes and Sex-linkage
- Genetic Linkage and Chromosome Mapping
- DNA Replication and Recombination
- Molecular Organization of Chromosomes
- Human Karyotypes and Chromosome Behavior
- Microbial Genetics
- Gene Expression
- Regulation of Gene Expression
- Genomics, Proteomics and Transgenics
- Genetic Control of Development
- Mutations and DNA Repair
- Genetics of Cell Cycle and Cancer
- Mitochondrial DNA and Extranuclear Inheritance
- Population Genetics
- Quantitative Genetics

Homework Assignments: There are weekly question sets covering material from the lecture and readings. They will usually be made available on Fridays and you will have one week to complete them.

Late work: Work submitted late will be penalized with a 10% per day reduction. Extensions may be granted under extenuating circumstances on a case-by-case basis. If you are struggling to complete an assignment by the due date, it is essential that you reach out to me before the assignment is due.

Exams: there will be two midterms and one final exam. Exams cover material from lectures, required readings, assignments, and in-class quizzes and activities.

Make-up Exams: Make-up exams are given only under exceptional circumstances such as an excused absence. Arrangements for a make-up exam must be made before the exam date.

COURSE SCHEDULE

Schedule: Dates listed by week; lectures will meet twice every week, unless otherwise noted. Homework assignments will be due on Saturday midnight, on Canvas and review quiz assignments will be due on Sunday midnight. Please note that this is the proposed schedule and is subject to change. A more detailed schedule will be continually updated via the course Canvas site.

Week of	Lecture Topics	Assignments
9/2	Introduction to Genetics / Chromosomes	No HW
9/9	Mendelian Inheritance/ Sexual reproduction	HW1
9/16	Extensions & modifications of Mendelian Genetics / Human Genetics / Pedigree analysis	HW2, Fly Lab
9/23	Genetic testing / Linkage & recombination	HW3
9/30	Mapping / Pedigrees	HW 4
10/7	Exam 1 (10-11) / Bacterial and Viral genetics / Chemical nature of a gene	HW 5
10/14	Chromosome structure / DNA replication / <i>Project released</i>	HW 6
10/21	Central Dogma / Transcription Activity: Genome editing and the environment	HW 7 / <i>Project Assignment 1</i>
10/28	Translation / Genetic code	HW 8
11/4	Bacterial gene regulation	Review Quiz 2
11/11	Eukaryotic gene regulation / Regulatory RNA / Exam 2 (11 – 15)	
11/18	Mutations / Transposable elements	HW 9 / <i>Project Assignment 2</i>
11/25	Genetic techniques / Fri No Class (Thanksgiving)	HW10
12/2	Epigenetics / Cancer genetics	Review Quiz 3
12/9	Model organism genetics / The-omics era	<i>Project due</i>
12/15	Exam 3 (Final) Date TBD	Final Exam Schedule will be posted here: http://www5.njit.edu/registrar/exams/