**BIOL 220 (TOPICS IN GENETICS AND EVOLUTION) COURSE SYLLABUS**
**SUMMER 2021**

## Course information

Instructor: Mateusz Urbanski (mmurbanski@genectr.hunter.cuny.edu)

Class Times: Tuesday and Thursday 11:40 AM – 2:00 PM (online lecture, attendance required)

Office hours: Tuesday 9:30 AM to 10:30 AM (please email ahead of time to schedule an appointment)

Important Dates: The session begins on 05/27/2021 and ends on 07/26/2021. The last day to withdraw with a "W" grade is 07/20/21. The (preliminary) class schedule is located on the last page of this document.

## Course outline

This course will provide an overview of genetics. The first half of course will cover the processes of mitosis and meiosis, chromosome structure and classical gene inheritance. The second half will course will focus on the use of model genetic organisms (including yeast, fruit fly and mouse) in gene discovery. Human genetics and genetics of human disease will also be covered, and current research articles and experimental techniques will be discussed to support the lectures.

## Course format

All course materials will be distributed through the Blackboard course site. This will include the lecture slides, as well as supplementary materials and research articles.

The final grade will be based on:

1. Midterm online exam covering topics from lectures 1-6. (30%)
2. Final exam covering the topics from lectures 9-14. (30%)
3. Two timed quizzes. (20%)
4. Homework assignments and participation. (20%)

Make-ups for exams or quizzes will only be allowed in cases of serious, documented emergency, and the student must make a reasonable effort to provide notification ahead of time if possible.

**Prerequisites**

BIOL100 or equivalent. Students should have a basic knowledge of gene expression, mitosis, meiosis and chromosome transmission. It is recommended that you review the relevant subjects in a basic college biology text. (For example, Campbell's "Biology" 12th Edition, Chapters 12-21.)

**Learning outcomes**

By the end of the course, a successful student should be able to:

1. Demonstrate an understanding of key principles such as: Genome organization, cell cycle, gene expression and regulation thereof, mutations and chromosomal aberration, inheritance, basic evolutionary theories, genome evolution and gene editing.
2. Appreciate the specific contributions and uses of model genetic systems such as *S. cerevisiae*, *D. melanogaster*, *C. elegans* and *M. musculus* to the biomedical research.
3. Understand the how genetic screening contributes to the study of fundamental biological processes.

**How to succeed**

Review the material distributed via Blackboard ahead of time. This will include, but will not be limited to, the slides for the upcoming lecture.

This should allow you to come to class prepared, with a preliminary idea of the topics which will be covered, as well as specific questions and comments.

The slides are meant as visual aids to discussion rather than complete subject summaries, so note-taking is strongly encouraged.

The class and tests focus on understanding and logic, rather than pure memorization. The homework assignments and quizzes are meant to prepare you for the sort of thinking which will be required of you during the exams.

**Textbooks**

No textbook is required for this class. It is expected that the materials provided to the students through Blackboard will be sufficient.

**Academic Dishonesty**

Hunter College regards acts of academic dishonesty (e.g., plagiarism, cheating on examinations, obtaining unfair advantage, and falsification of records and official documents) as serious offenses against the values of intellectual honesty. The College is committed to enforcing CUNY Policy on Academic Integrity and will pursue cases of academic dishonesty according to the Hunter College Academic Integrity Procedures.

**Special Accommodations**

In compliance with the American Disability Act of 1990 (ADA), Hunter College is committed to ensuring educational parity and accommodations for all students with documented disabilities and/or medical conditions. It is recommended that all students with documented disabilities (Emotional, Medical, Physical and/ or Learning) consult the Office of AccessABILITY located in Room E1124 to secure necessary academic accommodations. For further information and assistance please call (212- 772- 4857)/TTY (212- 650- 3230). The website for Hunter's AccessABILITY is: http://www.hunter.cuny.edu/studentservices/access/welcome.

**Preliminary Lecture Schedule, Biol 220 Summer 2021**

Major changes in the schedule will be listed in advance on Blackboard.

| Lecture | Date | Homework Due | Topics (subject to change) |
|---|---|---|---|
| 1 | Thursday 5/27 | | Course Introduction, DNA structure |
| 2 | Tuesday 6/1 | 6/2 (Lectures 1 and 2) | DNA Replication, Transcription, Genetic Testing |
| 3 | Thursday 6/3 | | Translation and Gene Regulation / Expression |
| 4 | Tuesday 6/8 | 6/9 (Lectures 3 and 4) | Cell Division and Cell Cycle, Chromosomal Abnormalities, Chromosome Inactivation |
| 5 | Thursday 6/10 | | Mutations, DNA Damage and Repair **QUIZ 1 (Lectures 1-4) 1:30 pm - 2:00 pm** |
| 6 | Tuesday 6/15 | 6/16 (submit questions for review session) | Gene Inheritance and Transmission, Genetic Pedigrees |
| 7 | Thursday 6/17 | | **Review Session** |
| 8 | Tuesday 6/22 | | **MIDTERM EXAM (Lectures 1-6)** |
| 9 | Tuesday 6/29 | | Linkage and Mapping in Eukaryotes |
| 10 | Thursday 7/1 | 7/5 (Lectures 9 and 10) | Forward and Reverse Genetics, Complementation |
| 11 | Tuesday 7/6 | | Forward and Reverse Genetics Continued |
| 12 | Thursday 7/8 | | Fly Genetic Models / Developmental Genetics **QUIZ 2 (Lectures 9-11)** |
| 13 | Tuesday 7/13 | 7/14 (Lectures 12 and 13) | Mouse Genetic Models, RNAi, CRISPR |
| 14 | Thursday 7/15 | 7/19 (submit questions for review session) | Evolution and Phylogeny |
| 15 | Tuesday 7/20 | | **Review Session** |
| 16 | Thursday 7/22 | | **FINAL EXAM (Lectures 9-14)** |