Instructor: Michael Gotesman, PhD

Course Website: http://libguides.brooklyn.cuny.edu/genetics/home

Suggested Text Book: Hartwell, Genetics: From Genes To Genomes 5th Edition

Grading Policy:
- Exam 1: 20 points
- Exam 2: 30 points
- Exam 3 (Final): 40 points
- LRNR Assignment: 10 points

LRNR Link:
https://enroll.lrn.us/product/biology-for-majors/?section=IHGTDKYI72DI

LRNR Class Code: IHGTDKYI72DI

Class Decorum Points:
- Gained by: Appropriate questions in class, blackboard.
  Answering questions on blackboard.
- Lost by: Using private email addresses (BC, all CUNY, or any .edu are acceptable).
  Inappropriate emails and questions on blackboard.
  Asking questions in email that were previously answered on blackboard or trying to negotiate grades.

Important Dates:

<table>
<thead>
<tr>
<th>Date</th>
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<tr>
<td>July 16</td>
<td>Tuesday</td>
<td>Classes begin, first meeting, 9:55 AM 113 NE</td>
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<tr>
<td>July 22</td>
<td>Monday</td>
<td>Last day to drop with WD</td>
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<td>July 25</td>
<td>Thursday</td>
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<td>August 1</td>
<td>Thursday</td>
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<td>August 5</td>
<td>Monday</td>
<td>Last day to drop a course with a grade of &quot;W&quot;</td>
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<td>August 15</td>
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<td>Last day of class</td>
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<tr>
<td>August 20</td>
<td>Tuesday</td>
<td>Final (Lectures 11–15)</td>
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Bio 3011 Schedule: Readings are listed for the suggested text book

Prior Knowledge:
Chapter 1: Genetics: The study of Biological Information

**Part 1: Basic Mendelian Genetics**

**Unit 1: Cellular Replication** –
Chapter 4 (4.1 – 4.5): Chromosomal Theory of Inheritance

Lecture 1a –
Introduction – Syllabus (connect assignments and videos), Class Rules, Grading policy
Review of Cell theory, Genetic Information, Mitosis

Lecture 1b –
Review of Meiosis, crossing over, independent assortment.

**Expected Outcomes – you should...**
1. Demonstrate knowledge and understanding, conceptually and pictorially, the process of mitosis and meiosis.
2. Demonstrate knowledge of the differences and similarities between mitosis and meiosis.
3. Demonstrate knowledge and understanding of the connections between mitosis and meiosis and Mendelian principles.
4. Demonstrate ability to draw and label the processes of mitosis and meiosis with cells having different diploid numbers.

**Unit 2: Mendelian Heredity** –

Chapter 2 (2.1-2.2): Mendel’s Principals of Heredity
Chapter 5.4: The Chi-Square Test and Linkage Analysis

Lecture 2a –
DNA Variability: Independent Assortment, Crossing over, Mutations
Mendel’s Work, Punnett Square, dihybrid crosses

Lecture 2b–
Review of dihybrid cross, trihybrid cross (branched method – videos), Chi-square (Chapter 5.4)

**Expected Outcomes – you should...**
1. Demonstrate understanding of basic Mendelian principles.
2. Demonstrate knowledge of definitions of commonly used genetic terms.
3. Demonstrate understand and use of the basic principles of probability.
4. Demonstrate knowledge of the use of probability in genetic analysis and the use of probability to compute genetic ratios.
5. Demonstrate ability to use the Punnett square and the branching methods of computing genotypic and phenotypic ratios.
6. Know the principle of the Chi square test and be able to use it to test data.
Unit 3: Mendelian Heredity in Humans -
Chapter 2.3: Mendelian Inheritance in Humans
Chapter 4 (4.6 - 4.7): Validation of the Chromosome Theory, Sex Linked and Sexually Dimorphic Traits in Humans

Lecture 3a –
Review trihybrid cross, Chi Square, Chromosome validation, sex-linked traits, introduction of pedigree analysis

Lecture 4 –
Rules for pedigree analysis, Chromosomal Aneuploidy

Videos:

III. Sex-chromosome linkage
A. The origins of the discovery of sex-chromosome linkage.
B. The implications of sex-chromosome differences.
C. Recognize, from the results of genetic crosses when sex-chromosome linkage is indicated and when it is not.
D. The meiotic basis of nondisjunction.
E. Helpful videos

Expected Outcomes – you should...
1. Demonstrate understanding of the different inheritance patterns of autosomal linked genes and sex-chromosome linked genes
2. Demonstrate understanding of the importance of chromosome balance and X-chromosome inactivation
3. Demonstrate understanding of the relationship between meiosis and primary and secondary nondisjunction

IV. Pedigree analysis
A. When is pedigree analysis used?
B. The limits and uses of pedigree analysis
C. Using pedigree analysis to understand different modes of gene transmission
D. Helpful videos

Expected Outcomes – you should...
1. Demonstrate understanding of when pedigrees are consistent or inconsistent with different modes of inheritance (autosomal vs sex- chromosome linked; recessive vs dominant)
2. Demonstrate understanding of how pedigree analysis is useful in the physical mapping of genes
3. Demonstrate understanding of how pedigrees are made

Unit 4: Extension of Mendelian Heredity –

Chapter 3: Extensions to Mendel’s law
Lecture 5a –
Terminology, Single gene extension

Lecture 5b –
Multifactorial and multiple gene extension, metabolic pathways.

Expected Outcomes – you should…
1. Demonstrate understanding of the connection between phenotype and genotype, and how these relationships can give rise to altered Mendelian ratios
2. Demonstrate understanding of the assumptions underlying basic Mendelian genetics
3. Demonstrate understanding of the genetic consequences of modifying these assumptions
4. Demonstrate understanding of the concept of biochemical pathways and the genetic analysis of pathways

Lecture 9– EXAM 1 (Lectures 1-5, Chapters 1-4, 5.4)

Part 2: Chromosome Analysis

Unit 5: Chromosome Mapping –

Chapter 5 (excluding section 5.4): Linkage Recombination, and the Mapping of Genes on Chromosomes (excluding Chi Square)

Lecture 6 –
Gene Linkage and Recombination for chromosome mapping

VI. Linkage analysis
A. Distinguish the inheritance patterns of linked and unlinked genes
B. Understand the relationship between linkage and recombination
C. Use recombination frequencies to make genetic maps
D. Understand and use three point test crosses
E. Distinguish between mapping functions used in random meiotic product mapping and tetrad mapping.
F. Mapping vs sequencing.
G. Articles on mapping

Expected Outcomes – you should…
1. Understand the difference in inheritance patterns between independently assorting genes and linked genes
2. Understand the assumptions that are used to develop mapping functions
3. Understand there is a relationship between genetic distance between genes and physical distance
4. Understand the assumptions used in the analysis of three-gene test crosses and compute the outcomes of three-point test crosses by solving word problems
5. Understand that the biology of an organism must be understood in order to map genes on a chromosome
Lecture 7 —
Tetrad Analysis, Mitotic Recombination and Genetic Mosaics.

**Unit 6: DNA Replication—**

Chapter 6: DNA Structure, Replication and Recombination

Lecture 8a —
DNA Structure, Replication

Lecture 8b—
DNA Replication Continued, DNA Recombination

Chapter 7: Anatomy and function of a Gene: Dissection through Mutations

**Unit 7: DNA Mutation Analysis —**

Lecture 9a—
Mechanism of mutation, complementation analysis

Lecture 9b –
Impact of DNA Mutations

**Unit 8: Central Dogma of Molecular Biology —**

Chapter 8: Gene Expression: The flow of Information from DNA to RNA to Proteins

Lecture 10 –
Transcription

**Lecture 11 –Exam 2 (Lectures 6-10, Chapters 5-8, excluding chapter 5.4)**

**Part 3: Understanding the Impact of Genomes**

**Unit 9: Analysis of Genomes —**

Chapter 9: Digital Analysis of Genomes

Lecture 11 –
Sequencing DNA and Genomes

Lecture 12 –
Analyzing DNA sequences
Unit 10: Physical Basis of Chromosomal Inheritance –

Chapter 11 (11.1 -11.3): The Eukaryotic Chromosome: 11.1 Chromosome DNA and Proteins, 11.2 Chromosome Structure and Compaction, 11.3 Chromosomal Packaging and Gene Expression

Chapter 12: Chromosomal Rearrangement and changes in Chromosome Number

Lecture 13a –
Chromosome compaction, PCR, Chromosomal Rearrangement

Lecture 13b –
Transposable Elements

Unit 11: Gene Regulation in Prokaryotes —
Chapter 15: Gene Regulation in Prokaryotes

Lecture 14

Unit 13: Population Genetics –
Chapter 20: Variation and Selection in Populations

Lecture 15a—
Hardy-Weinberg Principal

Lecture 15b –
Breeder’s Equation

Final –Exam 3 (Lectures 11-15, Chapters 9, 11, 12, 15, 20)
CLASS RULES AND REGULATIONS

**Unconscious Bias**

To prevent unconscious discrimination, the instructor asks that instead of your name, you use your CUNY ID number on tests and assignments.

**Class Preparation**

It is expected that students prepare themselves **before** they come to class. This includes, for example, **solving** assigned problems and **reading and understanding** assigned material and previous lecture before coming to the class. **Attendance for this course is mandatory.** Students are responsible of knowing everything taught in class even if it is not in the textbook. Essential information not covered in the text is included in the lectures, and thus it is important that you attend all lectures. If you miss a lecture you are responsible for the material covered.

**Note:** Course materials and assignments will be posted on Blackboard. There will be assignments on connect on a weekly basis. Students are responsible for checking and doing the assignments/readings on the Blackboard course Webpage and Connect on a regular and timely basis.

**Office hours**

Michael Gotesman: **By Appointment Only**, Biology Office.

**University's Policy on Academic Integrity**

The faculty and administration of Brooklyn College support an environment free from cheating and plagiarism. Each student is responsible for being aware of what constitutes cheating and plagiarism and for avoiding both. An example would be to use exact words or figures from a source without attributing those words to the author or the source. The complete text of the CUNY Academic Integrity Policy and the Brooklyn College procedure for implementing that policy can be found at this site: [http://www.brooklyn.cuny.edu/bc/policies](http://www.brooklyn.cuny.edu/bc/policies). If a faculty member suspects a violation of academic integrity and upon investigation, confirms that violation, or if the student admits the violation, the faculty member MUST report the violation.

**Student Disability Services**

In order to receive disability-related academic accommodations students must first be registered with the Center for Student Disability Services. Students who have a documented disability or suspect they may have a disability are invited to set up an appointment with the Director of the Center for Student Disability Services, Ms. Valerie Stewart-Lovell at 718-951-5538. If you have already registered with the Center for Student Disability Services please provide your professor with the course accommodation form and discuss your specific accommodation with him/her.

**Non-attendance due to religious beliefs**

The state law regarding non-attendance because of religious beliefs is found on p. 53 in the Bulletin.

**Cell phones**

NO cellular phones, computers, PDAs, watches or other devices are allowed during tests/exams. No texting or messaging and no phone ringing or annoying vibrating noise from your cell phone, PDA or other device during class. You are allowed to use computers, PDAs and other devices to take notes in class.

**Magner Career Center, Learning Center, CAASS and other student advisement/support offices**

It's never too early to start preparing for your career. Do you need help preparing a resume, finding an
Helpful Videos and Expected Outcomes

Part 1: Basic Mendelian Genetics
Chapter 4 (4.1 – 4.5): Chromosomal Theory of Inheritance

Unit 1: Cellular Replication –
Videos:

I. The physical basis of Mendelian principles
A. Chromosomes and ploidy
B. Mitosis
C. Meiosis
D. Helpful videos

Chromosomes
1. http://www.youtube.com/watch?v=VXhRL9VsKCo&list=PLgh8WcYegg4oownMBBHKTjvxvf-Z5fc8&index=6 (useful genetics - chromosome structure) 15’
2. http://www.youtube.com/watch?v=T5v-Rq5C3K8 (central dogma-nice video, but chromosomes are always present) 8’
3. http://www.youtube.com/watch?v=27TxKoFU2Nw (DNA structure and replication animation) 6’
4. http://www.youtube.com/watch?v=8kK2zwjRV0M (crashcourse-DNA structure and replication-too cute but useful) 12’

Mitosis
1. http://www.youtube.com/watch?v=JcZQkmooyPk (animation- cell cycle and mitosis) 6’
2. http://www.youtube.com/watch?v=LRPMKZPFEOl (useful genetics-mitosis) 20’
3. http://www.youtube.com/watch?v=L0k-enzeoOM (crash course) 11’
4. https://www.youtube.com/watch?v=2aVnN4RePyl (bozemanscience-overview of cell cycle, mitosis, meiosis) 13’
5. https://www.youtube.com/watch?v=1cVZBV9tD-A (bozemanscience-poloidy and mitosis) 14’
6. https://www.youtube.com/watch?v=mxVoTj6zwg (bozemanscience – phases of mitosis) 11’

Meiosis
1. http://www.youtube.com/watch?v=vA8aMpHwYh0 (animation) 3’
2. http://www.youtube.com/watch?v=rqPMp0U0HOA (animation) 6’
3. https://www.youtube.com/watch?v=kGJGivS64A (Chromosome dynamics during meiosis) 1’
4. http://www.youtube.com/watch?v=qCLmR9-YY7o (crash course) 12’
5. http://www.youtube.com/watch?v=1x4Lb0pEao0 (useful genetics - life cycles) 12’
6. http://www.youtube.com/watch?v=SWpZSVRkTUo (useful genetics-sex chromosome disjunction) 12’
7. https://www.youtube.com/watch?v=zcPhlHPv93A&list=PLgh8WcYegg4oownMBBHKTjvxvf-Z5fc8&index=15 (useful genetics -crossing over) 21’
8. http://www.youtube.com/watch?v=gsEXGE6J0Q (useful genetics -crossing over) 21’

Expected Outcomes – you should...
1. Demonstrate knowledge and understanding, conceptually and pictorially, the process of mitosis and meiosis.
2. Demonstrate knowledge of the differences and similarities between mitosis and meiosis.
3. Demonstrate knowledge and understanding of the connections between mitosis and meiosis and Mendelian principles.
4. Demonstrate ability to draw and label the processes of mitosis and meiosis with cells having different diploid numbers.
Unit 2: Mendelian Heredity –
Chapter 2 (2.1-2.2): Mendel’s Principals of Heredity
Chapter 5.4: The Chi-Square Test and Linkage Analysis

Videos:

Mendelian Genetics
1. http://www.youtube.com/watch?v=oor1eloe5hA&list=PLgh8WcYegg44v3l2j1l0cAoYhem_eqeEo (useful genetic introduction to genetic analysis) 5'
2. http://www.youtube.com/watch?v=lxacLICBH9o (useful genetics - genetic nomenclature, how genes are named) 20'
3. http://www.youtube.com/watch?v=JSh_KeAHRvg (useful genetics – Mendelian genetics) ~20'
4. http://www.youtube.com/watch?v=mS637Rn1tKM&list=PLgh8WcYegg44v3l2j1l0cAoYhem_eqeEo&index=4 (useful genetics – how to do genetic analysis) 30'

Branching Method
5. https://www.youtube.com/watch?v=Qcmdb25Rnyo&list=PLHqvmhxpssqySQQ2GqQrUIzfFCM-Mj&index=9 (Punnett square and method of branching) 14'
6. http://www.youtube.com/watch?v=Y1PCwxUDT18 (bozeman science - Punnett square) 12'
7. https://www.youtube.com/watch?v=CBezq1FUEA (crash course - amusing but useful for very basic definitions can be distracting) 10'
8. http://www.youtube.com/watch?v=y4Ne9DXk_Jc (probability - Some things are not correct! Ignore siblings part) 10'
9. http://www.youtube.com/watch?v=7gJsS7Lu8wc (method of branching) 12'
10. http://www.youtube.com/watch?v=nBTr2h2GYYw (branching method - turn off the sound) 2'

Chi Square
11. http://www.youtube.com/watch?v=WXPBoFDqNVk (bozeman science – chi square test)
12. http://www.youtube.com/watch?v=nlY8P_U8eLY&list=PLgh8WcYegg44v3l2j1l0cAoYhem_eqeEo&index=x=10 (useful genetics – chi square test – YOU WILL HAVE TO DO A CHI SQUARE TEST)
13. http://www.youtube.com/watch?v=b3o_hjWkgQw (chi square test - nongenetic example)
14. http://www.youtube.com/watch?v=LE3AlY_c8 (chi square test - nongenetic example)

Expected Outcomes – you should...
1. Demonstrate understanding of basic Mendelian principles.
2. Demonstrate knowledge of definitions of commonly used genetic terms.
3. Demonstrate understand and use of the basic principles of probability.
4. Demonstrate knowledge of the use of probability in genetic analysis and the use of probability to compute genetic ratios.
5. Demonstrate ability to use the Punnett square and the branching methods of computing genotypic and phenotypic ratios.
6. Know the principle of the Chi square test and be able to use it to test data.

Unit 3: Mendelian Heredity in Humans -
Chapter 2.3: Mendelian Inheritance in Humans
Chapter 4 (4.6-4.7): Validation of the Chromosome Theory, Sex Linked and Sexually Dimorphic Traits in Humans

Videos:

III. Sex-chromosome linkage
A. The origins of the discovery of sex-chromosome linkage.
B. The implications of sex-chromosome differences.
C. Recognize, from the results of genetic crosses when sex-chromosome linkage is indicated and when it is not.
D. The meiotic basis of nondisjunction.
E. Helpful videos
Sex chromosome linkage
1. http://www.youtube.com/watch?v=mk1X52grkOc (useful genetics – sex chromosome linkage) 20’
2. http://www.youtube.com/watch?v=NYe_kSspcUE (useful genetics - sex determination) 10’
3. http://www.youtube.com/watch?v=SWEPzZSRKtUo (useful genetics - X-Y chromosome pairing) 12’
4. http://www.youtube.com/watch?v=hrfSjDN5xDS&index=26&list=PLXwnjgs_UWPjLSTTBHTbJvZgRIY S5kF1 (animation of X-chromosome inactivation) 1.47
5. http://www.youtube.com/watch?v=un6x2fHrc10 (useful genetics - X linked genes in females- X inactivation) 15’
6. http://www.youtube.com/watch?v=FJOKk9aQy-E (useful genetics - X linked genes in males) 12’
7. https://www.youtube.com/watch?v=0XF4D9cCJOA (Lecture on aneuploidy-especially awesome if you are thinking of going to med school) 32’
8. https://www.youtube.com/watch?v=2yAJrSealJo (useful genetics - nondisjunction of sex chromosomes) 20’
9. https://www.youtube.com/watch?v=HG94fHCTuY (useful genetics - nondisjunction and aneuploidy-errors in meiosis=nondisjunction) 20’

Expected Outcomes – you should…
1. Demonstrate understanding of the different inheritance patterns of autosomal linked genes and sex-chromosome linked genes
2. Demonstrate understanding of the importance of chromosome balance and X-chromosome inactivation
3. Demonstrate understanding of the relationship between meiosis and primary and secondary nondisjunction

IV. Pedigree analysis
A. When is pedigree analysis used?
B. The limits and uses of pedigree analysis
C. Using pedigree analysis to understand different modes of gene transmission
D. Helpful videos

Pedigree analysis
1. https://www.youtube.com/watch?v=iBEQqFxCS5Y (karyotyping) 10’
2. https://www.youtube.com/watch?v=ixCIJFVv2Vk (analyzing a pedigree – an approach but not entirely correct!! especially for dominant pattern- for clarification contact instructor) 15’
3. https://www.youtube.com/watch?v=0cwhooDZ0M (pedigree analysis) 9’
4. https://www.youtube.com/watch?v=BFIVwLW9_s (pedigree analysis) 8’
5. https://www.youtube.com/watch?v=yd5BEbGkTU (pedigree analysis) 8’
6. https://www.youtube.com/watch?v=JIBcv3VMA0 (pedigree analysis) 11’

Expected Outcomes – you should…
1. Demonstrate understanding of when pedigrees are consistent or inconsistent with different modes of inheritance (autosomal vs sex-chromosome linked; recessive vs dominant)
2. Demonstrate understanding of how pedigree analysis is useful in the physical mapping of genes
3. Demonstrate understanding of how pedigrees are made

Unit 4: Extension of Mendelian Heredity –
Chapter 3: Extensions to Mendel’s law
Videos:

V. Extensions of Mendelian genetics – genetic interactions
A. Multiple alleles
B. Complex dominance relationships
C. Epistasis and an introduction to biochemical-genetic analysis of pathways
D. Helpful videos
1. http://www.youtube.com/watch?v=rIe7mPXkYhs (bosemanscience-called nonmedelian genetics but really extensions) 15'
2. http://www.youtube.com/watch?v=1uUIBfT79YM (useful genetics -problem solving examples -a little confusing) 23'
3. http://www.youtube.com/watch?v=oQCAzk1FpL0 (useful genetics- dominance and extension of genetic analysis) 17'

1. http://www.youtube.com/watch?v=QJzAvTAL9WI (animation of biochemical pathway) 2'
2. http://www.youtube.com/watch?v=ONHX_Ohc4s8 (biochemical pathway-different types of pathways) 8'
3. http://m.youtube.com/watch?v=7QkQg9Gyw0U (useful genetics – biochemical pathways and genetic analysis of pathways) 14'

Expected Outcomes – you should…
1. Demonstrate understanding of the connection between phenotype and genotype, and how these relationships can give rise to altered Mendelian ratios
2. Demonstrate understanding of the assumptions underlying basic Mendelian genetics
3. Demonstrate understanding of the genetic consequences of modifying these assumptions
4. Demonstrate understanding of the concept of biochemical pathways and the genetic analysis of pathways

Wednesday, July 24, 2019 -- Exam 1 (Lectures 1-5, Chapters 1-4, 5.4)

OUTCOMES ASSESSMENT {Test #1}. (20% of final grade)
A. Demonstrate an understanding of genetic terms by recognizing appropriate definitions or contextual use.
B. Demonstrate an understanding of basic Mendelian genetics by solving of word problems.
C. Demonstrate an understanding of probabilities as they apply to Mendelian principle by solving problems by using probabilities.
D. Demonstrate an understanding of mitosis and meiosis by recognizing pictorial depictions of the processes as related to ploidy and chromatid constitution.
E. Demonstrate an understanding of pedigree analysis by analyzing unfamiliar pedigrees.
F. Demonstrate an understanding of sex-chromosome linkage inheritance patterns and be able to distinguish that from autosomal inheritance patterns by solving word problems having both types of patterns
G. Demonstrate the connection between basic Mendelian inheritance patterns from more complex variations involving multiple alleles, incomplete dominance and epistatic interactions and biochemical genetic pathways by the solution of word problems involving these types of interactions.

Part 2: Chromosome Analysis

Unit 5: Chromosome Mapping –
Chapter 5 (excluding section 5.4): Linkage Recombination, and the Mapping of Genes on Chromosomes (excluding Chi Square)

VI. Linkage analysis
A. Distinguish the inheritance patterns of linked and unlinked genes
B. Understand the relationship between linkage and recombination
C. Use recombination frequencies to make genetic maps
D. Understand and use three point test crosses
E. Distinguish between mapping functions used in random meiotic product mapping and tetrad mapping.
F. Mapping vs sequencing.
G. Articles on mapping

Helpful videos
6. http://www.youtube.com/watch?v=dKukCMXUBIE (solving three point test cross-ok but not great) 13'
3. https://www.youtube.com/watch?v=uZ6idUYtv8 (found by student)
   https://www.youtube.com/watch?v=TU44tRohJ8A

Expected Outcomes – you should…
1. Understand the difference in inheritance patterns between independently assorting genes and linked genes
2. Understand the assumptions that are used to develop mapping functions
3. Understand there is a relationship between genetic distance between genes and physical distance
4. Understand the assumptions used in the analysis of three-gene test crosses and compute the outcomes of three-point test crosses by solving word problems
5. Understand that the biology of an organism must be understood in order to map genes on a chromosome

Videos:
https://www.youtube.com/watch?v=sHes1MoISsA
https://www.youtube.com/watch?v=GlCFgz3wuxk

Unit 6: DNA Replication–

Chapter 6: DNA Structure, Replication and Recombination

DNA Structure, Replication Videos:
https://www.youtube.com/watch?v=2rEf1S-z234

Unit 7: DNA Mutation Analysis –

Chapter 7: Anatomy and function of a Gene: Dissection through Mutations

IX. Gene function
A. Biochemical-genetics analysis of pathways
B. Complementation analysis
C. Helpful videos

https://www.youtube.com/watch?v=0_FYiYzIChY

1. http://www.youtube.com/watch?v=A7eWMjgOTWs (useful genetics -complementation test)
2. http://www.youtube.com/watch?v=uERjKWXO4NQ (complementation test)
3. http://www.youtube.com/watch?v=LVbAVW84nE (complementation review)
4. http://www.youtube.com/watch?v=oor1elo5hA&list=PLgh8WcYegg44v3l2j110cAoYhem_eqeEo
5. http://www.youtube.com/watch?v=x_vlxGFrZLY (transcription translation review)
Expected Outcomes - you should...
1. Demonstrate ability to analyze data presented in tabular and graphic format
2. Demonstrate ability to order biochemical intermediates into a biochemical pathway and determine the effect of mutations on the progression of the pathway
3. Demonstrate ability to determine how many genes are involved in a pathway
4. Demonstrate understanding of the concept of complementation analysis and solve complementation problems

Unit 8: Central Dogma of Molecular Biology –

Chapter 8: Gene Expression: The flow of Information from DNA to RNA to Proteins

Videos:
2. http://www.youtube.com/watch?v=TSv-Rq5C3K8 (central dogma-nice video, but chromosomes are always present) 8'
3. http://www.youtube.com/watch?v=27TxKoFU2Nw (DNA structure and replication animation) 6'
4. http://www.youtube.com/watch?v=8kK2zwjRV0M (crashcourse-DNA structure and replication-too cute but useful) 12'

Thursday, August 1, 2019 -- Exam 2 (Lectures 6-10, Chapters 5-8, excluding chapter 5.4 )
Monday, August 5, 2019 -- Last day to drop a course with a grade of "W"

OUTCOMES ASSESSMENT {test #2}. (30% of final grade)
A. Demonstrate an understanding of the mechanisms by which different mutagenic agents cause mutations
B. Demonstrate an understanding of transcription, translation and the genetic code by being able to analyze a DNA sequence, find and translate a putative mRNA and predict what effect different mutagenic agents would have on protein function.
C. Demonstrate a working knowledge of complementation testing
D. Distinguish between genetic mapping and complementation testing
E. Be able to deduce a biochemical pathway and to determine where in the pathway various mutations would alter the pathway.

Part 3: Understanding the Impact of Genomes

Unit 9: Analysis of Genomes –
Chapter 9: Digital Analysis of Genomes

Videos:
DNA Sequencing
https://www.youtube.com/watch?v=diq-ggs-D1U&list=PLgh8WcYegg4oownMBBHKTjvxf-Z5fc8&index=12
Unit 10: Physical Basis of Chromosomal Inheritance —
Chapter 11 (11.1 -11.3): The Eukaryotic Chromosome: 11.1 Chromosome DNA and Proteins, 11.2 Chromosome Structure and Compaction, 11.3 Chromosomal Packaging and Gene Expression

Chapter 12: Chromosomal Rearrangement and changes in Chromosome Number

Videos:
DNA Compaction:
https://www.youtube.com/watch?v=Z4VbSP4QPFA

Chromosomal rearrangement:
https://www.youtube.com/watch?v=jfN1Naa3in0

Transposable elements:
https://www.youtube.com/watch?v=CroyUMRpbxg

PCR:
https://www.youtube.com/watch?v=vi7MeqD2_FY

Unit 11: Gene Regulation in Prokaryotes —
Chapter 15: Gene Regulation in Prokaryotes

Unit 12: Gene Regulation in Eukaryotes —
Chapter 16: Gene Regulation in Eukaryotes

Unit 13: Population Genetics —
Chapter 20: Variation and Selection in Populations

Videos:
Breeders Equation:
https://www.youtube.com/watch?v=wkAG4ovamoo
https://www.youtube.com/watch?v=JTCb61GkJVs
Tuesday, August 20 -- Exam 3 (Final) (Lectures 11-15, Chapters 9, 11, 12, 15, 20)

OUTCOMES ASSESSMENT {test #3}. (40% of final grade)

A. Demonstrate the ability to analyze a set of gene expression data and formulate hypothesis concerning regulation of gene expression.

B. Demonstrate the ability to use various genetic elements in nontraditional ways.

C. Demonstrate the ability to distinguish genetic from epigenetic phenomena by analyzing data in tabular form.