Biology 309--Principles of Genetics, Spring Semester 2021
LECTURE: M/W/F 10:00-10:50 AM (Zoom meetings, see Blackboard announcements for link)
RECITATIONS:
Section 001—M 1:00-2:30 (Zoom meetings)
Section 002—T 1:00-2:30
Section 003—W 1:00-2:30
Section 004—R 1:00-2:30

Instructor: Dr. Mark Bulmer
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Office hours by appointment (Zoom meetings)

TEXT: Principles of Genetics. Snustad and Simmons, J. Wiley & Sons, 5th, 6th or 7th Edition

Course Objective: This course is designed to expose students to the basic principles of genetics using a problem-solving approach. Students will become familiar with the basic concepts of Mendelian, molecular and population genetics. Topics to be covered include: Mendelian genetics, genetic linkage and mapping, nucleic acid structure, replication, protein synthesis and the genetic code, gene expression and regulation, mutation, repair and recombination, and population genetics.

By the end of this course students should be able to:
- Solve Mendelian inheritance problems and interpret the results.
- Explain the chromosomal basis of Mendelian inheritance.
- Describe the process of DNA replication and gene expression.
- Relate DNA mutation to heritable disease and cancer.
- Describe important recombinant DNA techniques in biotechnology.
- Demonstrate understanding of the heritability of complex traits.
- Solve population and quantitative genetic problems and interpret the results.
- Relate Darwin's theory of evolution to molecular evolution and population genetics.
- Apply genetic concepts to current events and ethical issues such as genetically modifying or cloning organisms.

Prerequisites: BIOL 200/200L, BIOL 202, CHEM 131/131L

Recitation Assignments:
There will be no recitations in the first week of classes. During the recitation period in subsequent weeks, problem sets will be assigned to groups (break out rooms on Zoom). Members of the group should work through the problem sets together and openly discuss the answers to each question. The instructor will periodically check in on the groups to assist in answering the questions. The answers to these problem sets will not be collected and graded. However, there will be recitation examinations with similar questions to the problem set questions (see schedule below for recitation examination dates). Answers to the problem sets will be posted prior to the exams (Friday before the week of the exams) to help you prepare for them.

Rules and Regulations: Lecture attendance (M/W/F 10:00) is important since the class examinations are on the lecture material and instruction on how to answer some of the recitation exam problems are also covered in the lectures. Recordings of the lectures will be provided on request. Recitation attendance is required, and each student is expected to come to the recitation prepared to participate. The participation grade (see below) is based on recitation attendance. If two meetings are missed without strong justification, a failing grade may be given for the course at the discretion of the instructor. The examination dates are given on the lecture schedule. If a student misses an exam, a make-up exam will be given only if justifiable and written documentation of illness or emergency is presented to the instructor within 48 hours following the scheduled exam. All exams (lecture and recitation) are expected to represent your best individual effort, so any attempt to pass off information from another student as your own will result in a grade of F for the exam and the Dean of Students will be notified. A second infraction will result in an F for the course.

Academic Dishonesty: Academic dishonesty is clearly defined in your undergraduate catalog. Anyone who commits any academically dishonest behavior, including cheating or plagiarism, is in violation of the Towson University Code of Conduct

and will have a letter sent to the Director of Judicial Affairs and receive no credit for that assignment. A second infraction will result in the failure of the course.

Diversity Statement. Towson University values diversity and fosters a climate that is grounded in respect and inclusion, enriches the educational experience of students, supports positive classroom and workplace environments, promotes excellence, and cultivates the intellectual and personal growth of the entire university community. Should you feel that you are experiencing a negative environment related to diversity issues or cultural sensitivity, we encourage you to contact the Department's Assistant Chair, [Dr. Colleen Winters cwinters@towson.edu]. For more information go to https://www.towson.edu/fcsm/departments/biology/diversity.html

American Disability Act:
If you are a qualified student with a disability seeking accommodations under the American with Disabilities Act, you are required to self-identify with Disability Student Services in the Administrative Building. Accommodations can not be provided without a letter from Disability Services.

Career Center
The Career Center can help you with your major/career exploration and planning, developing your personal brand documents (resume, cover letter, LinkedIn, etc.) and job/internship resources and connections. You can make a virtual or phone appointment through Handshake at your convenience. For more information visit: https://www.towson.edu/careercenter/

LECTURE SCHEDULE

	Topic	**6th edition chapters**
Jan 25, 27, 29	Course Overview/Genetics Applications Review of Cell Cycle and Mitosis/Meiosis Mendel's Experiments--Classical Genetics	Chapters 1 and 2 Chapter 3
Feb 1, 3	Beyond Mendel Chromosomal Basis of Mendelism	Chapter 4 Chapter 5
Feb 5, 8, 10	Variation in Chromosome Number/Structure Linkage/Crossing Over/Mapping	Chapter 6 Chapter 7
Feb 12	DNA structure	Chapter 9
Feb 15	**EXAM I (Chapters 1-6)**	
Feb 17, 19	DNA Replication	Chapter 9 Chapters 10
Feb 22, 24, 26 Mar 1	DNA Transcription/Translation	Chapters 11 Chapters 12
Mar 3, 5, 8	Mutation and Repair Definitions of a Gene	Chapter 13
Mar 10	Regulation in Prokaryotic Gene Expression	Chapter 18
Mar 12	**EXAM II (Chapters 7, 9-12)**	
Mar 15, 17, 19	**Spring Break**	
Mar 22, 24	Regulation in Prokaryotic Gene Expression Regulation in Eukaryotic Gene Expression	Chapter 18 Chapter 19
Mar 26, 29	Genetics of Cancer	Chapter 21
Mar 31 Apr2	Quantitative genetics	Chapter 22
Apr 5	**EXAM III (Chapters 13, 18-21)**	
Apr 7, 9, 12	Population Genetics	Chapter 23
Apr 14, 16, 19	Biotechnology and Genetics Biotechnology/Genomics	Chapter 14 Chapter 15
Apr 21, 23, 26	Applied Biotechnology	Chapter 16
Apr 28, 30 May 3, 5	Evolutionary Genetics	Chapter 24
May 7	**Take home portion of the Final EXAM DUE**	

Final EXAM May 12 (Wednesday), 2020 8:00-10:00 (emphasis on Chapters 14-16, 22-24).

Recitation Schedule:

Jan/Feb	25/26/27/28	**no recitation**
	1/2/3/4	**Problem Set #1**
	8/9/10/11	**Problem Set #2**
	15/16/17/18	**EXAM I Problems**
Feb/Mar	22/23/24/25	**Problem set #3**
	1/2/3/4	**Problem set #4**
	8/9/10/11	**EXAM II Problems**
	22/23/24/25	**Problem set #5**
Apr/Mar	29/30/31/1	**Problem set #6**
	5/6/7/8	**EXAM III Problems**
	12/13/14/15	**Problem Set #7**
Apr	19/20/21/22	**Problem Set #8**
Apr	25	**Take home exam posted**
May	7	**Take home DUE**

Grading:

EXAM I, II, and III (3@19% each)	57%
Final Exam & Take home exam	35%
Recitation participation	8%
	100%

Grades will be as follows: A 92-100%; A- 89-91.9%; B+ 86-88.9%; B 82-85.9%; B- 79-81.9%; C+ 76-78.9%; C 69-75.9%; D 60-68.9%; F less than 60%