Course: BIOL 326 Cytogenetics
Spring 2017
Lecture: T, R 9:30-10:52 Biology 324
Course Instructor: Dr. Le Paliulis
Office: Biology 206
Email: le.paliulis@bucknell.edu
Office hours: by appointment (individual and group appointments welcome) or Wednesday 1-2 and Thursday 1-2

Text: Readings will be based on materials available on NCBI National Library of Medicine Books page (URL given with assignment), Nature's Scitable, and on readings in the primary and secondary literature. A reading schedule will be provided on Moodle.

Course Description (from online catalog): Study of chromosome structure, organization, aberrations, and behavior. Multiple eukaryotic systems will be considered with links to human disease.

Specific Course Objectives: By the end of this course you should be able to (numbers in parentheses refer to Bucknell University Biology Department learning goals):

Explain how the behavior of chromosomes during cell division determines heredity (Ia, Ic).
Describe how chromosome behavior is controlled by chromosome structure (Ia, Ic).
Assess how changes in chromosome structure, both on the molecular and microscopic level affect chromosome behavior (Ic, Id).
Examine how errors in chromosome distribution lead to human disease (Ia, Ic).
Describe how chromosome manipulation can lead to massive changes in the organism and can be exploited in agriculture and plant breeding (Ia, Ic).
Evaluate and critique primary literature on cytogenetics topics in oral presentations (Ia, IIb).
Synthesize multiple different types of resources on chromosome-based diseases to write papers aimed at many different audiences (Ic, IIb).
Synthesize multiple different types of resources on chromosome behaviors or key experiments in cytogenetics to create a narrated animation on the topic chosen (Ic, IIb).

To achieve these objectives, you must do all assigned reading, attend all course meetings and do all assigned work. You are expected to have completed assigned reading before coming to lecture.

Evaluation and grading: Your final grade will be determined from the total points earned in the assignments described below.

Exam: There will be one exam which will be given in class on March 2. There is no final exam. Your in-class exam must be taken on the scheduled date. If you know that you will be absent on the day of the exam, you must notify me IN ADVANCE. Permission to take the exam on an alternate date will not be automatically granted but will be considered on a case-by-case basis. If you miss your exam for any unforeseen reason, proper documentation must be provided to make up the missed exam. The make-up exam will be different from the original exam and will only be given to students who have obtained permission to take it. An exam missed without

permission will result in a zero for that exam. All exam grades are final. If you have any questions regarding credit for an exam questions, please make an appointment to see me or send a message by email within 24 hours of the exam's return. Be prepared to provide documentation for any questions that you wish to discuss.

Writing assignments: A series of six connected writing assignments based on cytogenetics and human health will be due during the semester. These writing assignments will culminate in a final piece of writing aimed at a popular audience. Your writing will go through multiple drafts. Sample articles from magazines will be provided, as well as detailed feedback.

Flipbook video assignment: Students will create a flipbook illustrating chromosome movements in mitosis. Final flipbooks will be graded. Assignment will be given in class.

Video assignment: Students will create a narrated video that animates a chromosome process, structure, or seminal experiment in cytogenetics. The video should be at least 2 minutes long, and must be based on at least 3 references from the literature. Grades will be based on correctness of material shown in the video, as well as style and clarity of message of the video. The point total will be distributed as follows: worksheets prior to preparing script=5 points each; final, edited script=25 points; storyboard=40 points; final; edited video=75 points. Students will work in groups of 3, with each member of the group contributing equally to the total work.

Minipresentations: A large component of this class will be a survey of recent and past cytogenetics research. This will require that we evaluate primary literature, and review literature. Minipresentations will be assigned on the dates when original or review articles are presented. Each student will be responsible for presenting a portion of the paper, and their presentations will be approximately five to ten minutes long. Another student will be assigned the role of discussant, and will be required to ask at least one question about the presenter's presentation. Each presentation/discussant day will be graded on the basis of 5 points/presentation or discussion, and the minipresentation grade and discussion grade will each be 100 points of the total grade. Detailed instructions for minipresentations/discussions and assignments for each will be provided prior to the first minipresentation day.

Grades are calculated by adding the total points you earn from all the work described and dividing by total possible points. There is no curve. The scale below will be used for evaluation.

Exam	100 points	100
Writing assignment 1	20 points	20
Writing assignment 2	30 points	30
Writing assignment 3	50 points	50
Writing assignment 4	50 points	50
Writing assignment 5	50 points	50
Writing assignment 6	150 points	150
Minipresentations	100 points	100
Flipbook video assignment	25 points	25
Semester Video Assignment	150 points	150
Miniquiz	5 points	5
	Total	**730**

Grading Scale

A ≥ 94% A- = 93.9% to 89.9% B+ = 89.8% to 87% B = 86.9% to 82%
B- = 81.9% to 79.9% C+ = 79.8% to 77% C = 76.9% to 72%
C- = 71.9% to 69.9% D = 69.8% to 60% F ≤ 59.9%

Academic Responsibility and Honesty

Please refer to the academic responsibility and honesty codes in your student handbook. All cases of cheating and plagiarism will be dealt with through the Dean's office.

BUCKNELL UNIVERSITY HONOR CODE

As a student and citizen of the Bucknell University community:

1. I will not lie, cheat or steal in my academic endeavors.

2. I will forthrightly oppose each and every instance of academic dishonesty.

3. I will communicate directly and promptly with any person or persons I believe to have been dishonest in academic work.

4. I will let my conscience guide my decision on reporting breaches of academic integrity to the appropriate faculty or deans.

Course schedule

1/17 first day of class Case study Reading: http://www.nature.com/scitable/topicpage/Human-Chromosome-Number-294 http://www.nature.com/scitable/topicpage/Karyotyping-for-Chromosomal-Abnormalities-298	1/19 Flipbook video of mitosis
1/24 mitosis and meiosis Reading: http://www.nature.com/scitable/topicpage/Chromosome-Segregation-in-Mitosis-The-Role-of-242 http://www.nature.com/scitable/topicpage/Mitosis-and-Cell-Division-205 http://www.nature.com/scitable/topicpage/Developing-the-Chromosome-Theory-164 http://www.nature.com/scitable/topicpage/Meiosis-Genetic-Recombination-and-Sexual-Reproduction-210	1/26 mitosis and meiosis chromosome behavior
1/31 mitosis	2/2 cell cycle
2/7 Meet in Library Lab (BERT025)	2/9 mitosis/meiosis Discuss how to write a review Video assignment treatment, to do in class and turn in.

2/14 Mitosis/meiosis Writing assignment 2 due	2/16 DNA structure and chromosome structure http://www.nature.com/scitable/topicpage/Chromosome-Territories-The-Arrangement-of-Chromosomes-in-3025
2/21 sex determination http://www.nature.com/scitable/topicpage/Genetic-Mechanisms-of-Sex-Determination-314 http://www.nature.com/scitable/topicpage/Sex-determination-in-honeybees-2591764 http://www.nature.com/scitable/topicpage/Sex-Chromosomes-and-Sex-Determination-44565	2/23 sex determination Script due Discussion of Storyboarding
2/28 Dosage compensation and Imprinting Writing assignment 3 due	3/2 Dosage compensation and Imprinting Storyboard due
3/7 sex determination in duckbill platypus Writing assignment 4 due	3/9 exam
3/14 spring break	3/16 spring break
3/21 Workshop on using audio booth Discussion of expectations for Writing assignment 5	3/23 cytogenetics and agriculture
3/28 cytogenetics and agriculture Audio due, for peer review	3/30 cytogenetics and agriculture Final audio due
4/4 cytogenetics and human health Check out laptops for preparing videos. Discuss use of iStop motion (maybe in video lab) Writing assignment 5 due	4/6 cytogenetics and human health
4/11 cytogenetics and human health	4/13 Editing in FinalCutPro
4/18 cytogenetics and human health Peer review of videos meet in Video Editing Lab	4/20 cytogenetics and human health, discussion of/workshop on writing assignment 5, preparation for writing assignment 6
4/25 cytogenetics and human health Videos due, meet in Video Editing Lab	4/27 last day of class miniquiz Writing assignment 6 due

Course schedule is subject to change!

Any student who may need an accommodation based on the impact of a disability should contact me privately to discuss the specific needs. Please contact Heather Fowler, Director of the Office of Accessibility Resources at 570-577-1188 orhf007@bucknell.edu who will help coordinate reasonable accommodations for those students with documented disabilities.