

# Biology 328, Fall 2014

## Molecular and Cellular Basis of Human Disease

**Textbooks:** *Essential Cell Biology*, 4<sup>th</sup> edition by Alberts et al.  
*Human Genetics* 2<sup>nd</sup> edition <http://www.ncbi.nlm.nih.gov/books/NBK7580/>

**Blackboard:** The syllabus, assignments and other relevant material will be available on **Blackboard**.

**Required reading:** Students are required to read assigned selections in the textbook and any OTHER assigned readings or literature articles. This course will include numerous assigned readings from other sources in addition to the textbook. This literature may include reviews, journal articles, or material available on the Internet.

Suggestion: Some of the assigned reading will be taken from the primary literature. The textbook should provide you with some background information. If you do not understand the topics being discussed or need more information, you will need to be proactive in finding this information from other **credible** resources to improve your understanding. Do not hesitate to contact one of the instructors for assistance.

**Attendance and participation:** Students are expected to attend class and to participate in class discussions. Interactive discussion will make the class more interesting and greatly enhance the learning process.

**Cell Phones and Electronic Devices:** Please make sure your cell phone ringer is turned off and avoid texting during class.

**Special Accommodations:** Please contact the instructors at the beginning of the semester if you require special needs or accommodations. If you have a disability that needs special accommodations, you should obtain a Student Academic Accommodations Request (SAAR) from the Disabilities Resource (DR) office.

**Assignments:** There will be at least 24 assignments given but only the scores for the top 20 assignments will count towards your grade for this section of the course. Note: both out-of-class and in-class assignments will be given. These will include but are not limited to homework, class discussions and participation, quizzes, evaluations etc. The instructors will inform you as to what is considered an assignment.

### Grading:

Assignments: (20 out of 24 assignments)	25%
Paper: (1 paper – see below)	25%
Exams: 2 exams, a midterm and a final	50%

The final exam will **NOT** be cumulative.

Grading will be done on a straight grading scale. However, based on class averages (which we would put at around 75%) we reserve the right to adjust the scale. You may be scored up but NEVER down.

**Learning goals and objectives:** There are four principal objectives for the student in this course.

1. Students will learn how to locate and utilize different types of scientific resources.
2. Students will learn how to analyze and critically assess current scientific literature.
3. Students will learn to communicate what they have learned from their scientific readings to their peers and to the professors.
4. Students will learn the molecular and cellular aspects of the human diseases discussed in this course. Some foundational concepts include:
  - the molecular mechanisms and control of gene expression and protein synthesis e.g. at the level of genome organization, DNA, RNA transcription, translation, degradation, secretion etc.

- extracellular and intercellular components of the cell and their functions
- mechanisms of cell signaling
- the processes of cell division (meiosis and mitosis) and Mendelian inheritance patterns
- based on the understanding of basic components of the cell and genetic inheritance patterns students will make predictions about how defects in these molecular components could lead to changes in mechanism.
- molecular and cellular mechanisms that control human diseases.
- learning about important scientific advances that aid in identifying genetic links to human disease.
- learning about current gene therapy techniques, the challenges they face and be able to make predictions about their suitability for particular disease therapies

**Paper:** This part of your assessment will give you the opportunity to use your library research skills and practice your critical reading and written communication skills. As a part of the course grade (25%), you will write a paper based on a recent news story that is relevant to a particular disease. This paper will have a 5 page, double-spaced limit using 11 point Times font (references can be on a separate page). The paper assignment will include the following:

1. Choose a news story from the internet that is focused on a new/improved method of treatment/diagnosis for a particular disease (this can be any disease, even those covered in class).
  - a. The story must be from an internet source (news website, blog, disease foundation). This needs to be a news story and NOT a primary scientific paper on PUBMED. It can be that there is a paper on PUBMED, but you must choose a news story that describes the findings as the springboard for your paper.
  - b. The story must be from the last 6 months.
  - c. Examples:
2. Paper Outline:
  - a. Describe the major results of the news story (1 paragraph).
  - b. Describe the basic genetics and cell biology of the disease (1-2 pages).
  - c. Describe the current state of disease diagnosis and treatment (1-2 pages).
  - d. Describe how the result from the news story affects part c. Provide your opinion about whether the results described in the story will dramatically change the state of disease treatment or if you are skeptical about its impact (~1 page).

### 3. Paper grading:

The grades for the paper will be based upon several factors.

a. **The news story for your paper must be preapproved by the instructor.** This topic must be submitted by September 30<sup>th</sup>, 2014. If the topic is late you will lose 5 points off your final paper grade for each day it is late.

b. The paper will require at least five scientific citations in addition to your news story. You are encouraged to use the Internet, but your citations must be from original scientific or medical sources, NOT Wikipedia. A preliminary outline and bibliography for your paper is due on October 21<sup>st</sup>, 2014. You will again lose 5 points from your final paper for each day that your outline is late.

c. Your paper is due on November 11<sup>th</sup>, 2014. Papers must be submitted through Safe Assign on Blackboard by **5PM** on the day they are due. Late papers will incur a 5 point deduction for every day they are late. Additionally, the first day's deduction begins immediately after the due date expires. For example, if the paper is 30 minutes late it will receive a 5 point deduction.

d. Each paper will be reviewed by the instructor and by one of your peers in class. This review will be performed anonymously. Neither the author nor the reviewer will know whose paper they are reviewing. Your grade will be based both on the instructors review and the peer review. You will also be graded by how thoroughly you peer review the other person's paper. All reviews must be completed by December 4<sup>th</sup>, 2014.

e. At this point you may simply stay with the grade you have received on this draft of the paper. If you are not satisfied with the grade, however, you may revise the paper based upon the comments from the instructor and the reviewer. This revised paper is due on December 19<sup>th</sup>, 2014. This due date is without exception and late revisions will not be accepted. From these revisions students may raise their grades as much as one whole grade.

**Exams:** The exams will be designed to test your understanding of: basic cell biology, genetics and molecular biology; your knowledge of the mechanistic basis of diseases presented in this course; and your ability to apply general concepts to other disease models. The format may be a combination of short answer and short essay, short paragraph-type questions. These two exams will also be submitted using SafeAssign.

**Academic honesty, integrity and plagiarism:** The policy and for academic honesty and integrity is outline in the University Catalog. For more information refer to

<http://www.public.iastate.edu/~catalog/2007-2009/geninfo/dishonesty.html>

and <http://www.dso.iastate.edu/ja/academic/students.html>

It is important that you understand that academic dishonesty is not acceptable. To plagiarize is: “to commit literary theft: present as new and original an idea or product derived from an existing source” (Merriam-Webster’s Collegiate Dictionary, 11<sup>th</sup> Edition, 2003 Merriam-Webster) Copy-pasting is plagiarism. In addition to receiving zero points for an assignment presentation or exam, students caught plagiarizing may be subject to university discipline. More info on plagiarism can be found at:

<http://www.bioethics.iastate.edu/classroom/plagiarism.html>

By taking this course, you agree that your papers and other written assignments may be subject to evaluation for originality and intellectual integrity (i.e. plagiarism) by use of Blackboard SafeAssign. All papers submitted for review will be included as source documents in Iowa State University’s Institutional SafeAssign database.

# Biology 328, Fall 2014

## Class Schedule

Date	Topic	Instructor	Deadlines
8 / 26	Human genome and genetics	Kuhlman	
8 / 28	Genetics and Cell Biology Review	Kuhlman	
9 / 2	Chromosome aneuploid disorders	Kuhlman	
9 / 4	DNA repair disorders	Kuhlman	
9 / 9	Connective Tissue disorders	Kuhlman	
9 / 11	Metabolic Disorders	Ellinwood	
9 / 16	Finding Resources	<b>Bobb</b>	
9 / 18	Cytoskeletal Disorders	Kuhlman	
9 / 23	Cytoskeletal Disorders Literature discussion	Kuhlman	
9 / 25	Muscular Dystrophy	Selsby	
9 / 30	Skeletal Disorders	Kuhlman	<b>Paper topic due</b>
10 / 2	Cystic Fibrosis	Kuhlman	
10 / 7	Epigenetics, Non-Classical Inheritance	Kuhlman	
10 / 9	<b>Midterm</b>		
10 / 14	Sickle Cell Anemia & Literature discussion	Kuhlman	
10 / 16	Neurodegenerative diseases: Prions	Trimarchi	

10/21	Neurodegenerative diseases: Alzheimer's disease	Trimarchi	<b>Paper outline and bibliography due</b>
10/23	Neurodegenerative diseases: Parkinson's disease	Trimarchi	
10/28	Neurodegenerative diseases: Huntington's disease	Trimarchi	
10/30	Neurological disorders: Schizophrenia	Trimarchi	
11/4	Introduction to immunology	Trimarchi	
11/6	Autoimmune diseases	Trimarchi	
11/11	Infectious diseases/bacteria	Trimarchi	<b>PAPER DUE- 5PM</b>
11/13	Infectious diseases/viruses	Trimarchi	
11/18	HIV/AIDS	Trimarchi	
11/20	Infectious diseases - paper	Trimarchi	
11/24-28	THANKSGIVING BREAK		
12/2	Cancer I: Tumor suppressors and oncogenes	Trimarchi	
12/4	Cancer II: Hereditary vs. sporadic cancers	Trimarchi	<b>Peer review due</b>
12/9	Cancer III: Current experimental strategies and treatments	Trimarchi	
12/11	Type II diabetes/obesity	Trimarchi	
12/?	Finals week	Trimarchi	<b>Final exam</b>
12/19		Trimarchi	<b>Paper Revisions due (optional)</b>