Biology for Citizens of the World (Honors 290, Section 08)
Spring 2014
UMass Boston Honors College

Course Meeting Time & Location:

- The course meets MWF from 2pm-2:50pm
- Our classroom is Wheatley 1st floor Room W01-0040

Instructor:

- Megan Rokop PhD, Associate Director of the UMass Boston Honors College
- Email: <Megan.Rokop@umb.edu>
- Office location: Campus Center 2nd floor Room 2003 (in the Honors area)
- Office Hours: MWF 3:30-4:30pm, or by appointment

Course Website:

- http://honors290-s14-rokop.wikispaces.umb.edu/home
- All readings are posted on the course website and are to be completed in advance of that class period

Assigned Texts:
There are no assigned texts for this class; the assigned readings are short articles linked to the course website.

Course Summary:

What do we all need to know about biology, to be informed citizens, regardless of our career choices? The goal of this course is to teach biology that will be directly relevant to everyone's lives because they are related to human health, or actions we are all asked to perform as citizens (such as paying taxes, voting, or sitting on juries). The units we will cover are as follows:

Weeks 1-5, Bioethics & biology-related controversies

- DNA Testing
- Genetic Engineering & Gene Therapy
- Drug Development & Drug Trials
- Informed consent

Week 6, Types of Diseases: Cancer
Week 7, Types of Diseases: Infectious Diseases
Weeks 8-11, Types of Diseases: Common complex diseases

- Immune disorders
- Neurological & psychiatric disorders
- Metabolic disorders

Weeks 12-13, Scientific Writing
Weeks 14-15, Statistics & The Scientific Process

The course will focus on the molecular biology concepts behind the topics at hand, and also how we came to have this knowledge. We will incorporate discussions of both the people behind the science, and the process of science itself. We will emphasize the skills that are central to every aspect of science and scientists, including: asking questions, questioning assumptions, problem solving, critical thinking, experimental design, proper controls, data analysis, and communicating science.

The course will include several short writing assignments, and two longer writing assignments. In the bioethics unit, each student will write a paper on his/her stance on a bioethical issue discussed in class. In the science communication section, students will learn the practice of writing all of the standard sections of a scientific paper: Title, Abstract, Introduction, Materials & Methods, Results, and Conclusions. Students will also learn how the key concepts of statistics (both descriptive statistics, and hypothesis testing) are used as a common language among scientists. Each student will practice these skills by writing a paper on a semester-long project engaging in a scientific study of a topic of his/her choice.

Expectations of students:

- Attendance is expected at all course meetings, with the exception of circumstances such as illness or family emergency. If you must miss a class, I ask that you contact me beforehand via email. It is your responsibility to make up any missed work.
- All assignments are expected to be on time, with the exception of circumstances such as illness or family emergency. Assignments can be turned in either via email or at the beginning of class.
- Class will begin promptly at the start time.
- Use of cellphones, pagers, and other similar devices are absolutely prohibited.
- I ask that you refrain from using laptops during this class. If this policy presents a hardship or problem for you, please speak with me about it.
- Students are to be respectful during class discussions. This includes listening to others, not interrupting, and not speaking while others are talking.
- You should come prepared to every class by having critically read the assigned reading. Reading closely and critically means re-reading, taking notes, writing on the page, stopping to reflect and writing down your reflections. I recommend that you bring your print-copy of the assigned reading with you to class.

Grade Breakdown:

Your grade in this course will be an average of 5 equally weighted grades:

1. Attendance
2. The average of your grades on the short writing assignments SW #1-5
3. The average of your grades on the short writing assignments SW #6-11
4. Your grade on the bioethics paper
5. Your grade on the scientific paper on your semester-long project

Calculating course grades:
These 5 grades will be averaged using the same point system used to calculate GPAs at UMass Boston (e.g. "A" counts as 4.0, "A-" counts as 3.7, etc) as outlined on this website: http://www.umb.edu/registrar/grades_transcripts/grading_system

Class participation will then be used to determine your final grade. This is because your averaged scores will lead to a final score that will lie in between two letter grades. Then, your class participation will be used to select which of the two grades is your final grade for the course.

Your grade for attendance will be determined using the following guidelines:

- A = you attended every class (barring illness or emergency)
- A– = 1 unexcused absence
- B+ = 2 unexcused absences
- B = 3 unexcused absences
- B– = 4 unexcused absences
- C = 5 unexcused absences
- C– = 6 unexcused absences
- D = 7 unexcused absences
- F = 8+ unexcused absences

Example grade calculation:

For example, say your grades were as follows:

Assignment	Your performance	Your score
Attendance	2 unexcused absences	3.30
SW #1-5	A, B, A–, B–, A	Ave of (4.0, 3.0, 3.7, 2.7, 4.0) = 3.48
SW #6-11	B+, C, A, A, B+, B	Ave of (3.3, 2.0, 4.0, 4.0, 3.3, 3.0) = 3.27
Bioethics paper	B	3.00
Scientific paper	A	4.00

Then your final score would be the average of these six scores = 17.05/5 = 3.41

This means your final grade would either be an A– (which is a 3.7) or a B+ (which is a 3.3).

Impressive class participation would lead to selection of a final grade of A–, whereas dissatisfactory class participation would lead to selection of a final grade of B+.

Course Policies:

Accommodations:
Section 504 and the Americans with Disabilities Act of 1990 offer guidelines for curriculum modifications and adaptations for students with documented disabilities. If applicable, students may obtain adaptation recommendations from The Ross Center for Disability Services at UMass Boston. The Ross Center can be contacted in person at the Campus Center Upper Level Room 211, or by phone at (617) 287-7430. A student will need to provide documentation of disability to this center in order to receive official university services and accommodations. The student must present and discuss these accommodations to each professor within a reasonable period, preferably by the end of the Add/Drop period.

Academic Honesty and Student Conduct:
Students are required to adhere to university policies on academic honesty and student conduct. The current Code of Student Conduct, including information about academic dishonesty is available online at:
http://www.umb.edu/academics/undergraduate/office/students/CodeofStudentConduct.html
Violations of this policy are subject to a range of consequences, from failure on the assignment to expulsion from the university. The penalties, and the procedures to be taken by the instructor, the student, and the university in a case of suspected plagiarism or other dishonesty are spelled out in the above document.

Honors 200 courses and General Education Requirements:
All Honors 200 courses can be assigned either to the Intermediate Seminar requirement, or to a Distribution category (e.g. AR, HU, SB, NS, WC) – in the case of this course the designation "NS" is applicable. Please be sure to discuss the assignment of this Honors 200 course with your Honors advisor.

Honors Grades and the Pass/Fail Option:
Only those Honors courses in which the student earns a grade of B or better can count toward the Honors requirements (although an Honors course for which a grade lower than a B is obtained may still be used to fulfill a Gen Ed requirement). Honors students may elect the Pass/Fail option for an Honors course, but then that course will not count toward Honors requirements.

Syllabus with Written Assignments

Week	Class Topics	Assignment due Monday that week
1	• Mon 1/27: Introduction • Wed 1/29: Doing science • Fri 1/31: Genes & Genomes	• None
2	• Mon 2/3: DNA Testing 1 • Wed 2/5: DNA Testing 2 • Fri 2/7: Regulation of 23andMe	• SW#1 (Project ideas)
3	• Mon 2/10: DNA crime banks • Wed 2/12: Pre-natal screening • Fri 2/14: Genetic engineering 1	• SW#2
4	• Wed 2/19: Genetic engineering 2 • Fri 2/21: Gene therapy	• SW#3 • **Due Tues b/c Mon is a holiday**
5	• Mon 2/24: Diseases & treatments • Wed 2/26: The FDA & clinical trials • Fri 2/28: Informed consent 1	• SW #4
6	• Mon 3/3: Informed consent 2 • Wed 3/5: Cancer basics • Fri 3/7: Cancer treatments & resistance	• SW#5
7	• Mon 3/10: Tuberculosis • Wed 3/12: Malaria 1 • Fri 3/14: Malaria 2	• Bioethics paper
SP BK	**(no class)**	**(no class)**
8	• Mon 3/24: HIV • Wed 3/26: Immune system & disorders • Fri 3/28: Allergies & asthma	• SW#6
9	• Mon 3/31: Transfusions & transplants • Wed 4/2: Kidney transplants & dialysis • Fri 4/4: Vaccines & autism	• Bioethics paper revision
10	• Mon 4/7: Neurodegenerative diseases • Wed 4/9: Depression & anxiety • Fri 4/11: Bipolar & schizophrenia	• SW#7
11	• Mon 4/14: Stem Cells • Wed 4/16: Diabetes • Fri 4/18: Heart disease & cholesterol	• SW#8
12	• Wed 4/23: Science Writing 1 • Fri 4/25: Science Writing 2	• SW#9 • **Due Tues b/c Mon is a holiday**
13	• Mon 4/28: Science Writing 3 • Wed 4/30: Science Writing 4 • Fri 5/2: Science Writing 5	• SW#10 (Review of journal article)
14	• Mon 5/5: Statistics 1 • Wed 5/7: Statistics 2 • Fri 5/9: Statistics 3	• Scientific paper
15	• Mon 5/12: Statistics 4 • Wed 5/14: Statistics 5	• SW#11 (Peer review of science paper)
FINALS	**(no class)**	• Mon 5/19: Scientific paper revision

Reading list (all articles are available on the course website)

Date	Readings due at 9am that day
Mon 1/27	• None
Wed 1/29	• Twenty Tips for Interpreting Scientific Claims
Fri 1/31	• None
Mon 2/3	• Inside 23andMe founder Anne Wojcicki's $99 DNA revolution • Facing Life with a lethal gene
Wed 2/5	• I had my DNA picture taken with varying results • GINA Act • Who's your daddy • What would you do
Fri 2/7	• Why we have a right to consumer genetics • The FDA vs 23andMe • 23andMe is terrifying, but not for the reasons the FDA thinks • 23andMe and the FDA are both wrong
Mon 2/10	• The Government wants your DNA • Defense lawyers fight DNA samples gained on the sly • Can this DNA sleuth help catch criminals • pp.218-223 from The Strongest Boy in the World
Wed 2/12	• Prenatal test puts Downs in hard focus • Prenatal DNA Sequencing • pp.240-246 from The Strongest Boy in the World
Fri 2/14	• A race to save the orange • GMOs may feed the world
Wed 2/19	• Animal, vegetable, controversy • A New Breed • Are engineered foods evil
Fri 2/21	• Gene therapy coming of age • Gene therapy emerges from disgrace • pp.122-131 from The Strongest Boy in the World
Mon 2/24	• None
Wed 2/26	• A History of the FDA • Informed Consent for Genomics • NIH clinical trials and you • FDA 101
Fri 2/28	• A Broken Contract • First, Do Harm

	• DNA returned to the tribe, raising questions about consent
Mon 3/3	• Afterword from The Immortal Life of Henrietta Lacks • Deal done over HeLa cell line • HeLa timeline • The Miracle Woman
Wed 3/5	• Understanding Cancer Diversity • Mapping the Cancer Genome
Fri 3/7	• A Triumph in the War Against Cancer • The Treatment
Mon 3/10	• A Plague Reborn • TB's Revenge
Wed 3/12	• An evolving foe • A race against resistance
Fri 3/14	• Rachel Carson's birthday bashing • The Mosquito Killer
Mon 3/24	• Secrets of the HIV controllers • The Social Epidemic
Wed 3/26	• Replacing an Immune System gone haywire • What is the immune system?
Fri 3/28	• Bring on the peanuts • Asthma and the Inner City • Bacteria and Asthma: Untangling the links
Mon 3/31	• Replacement parts • How to build a heart
Wed 4/2	• Supply, Demand, and Kidney Transplants • How the Kidney works
Fri 4/4	• Autism linked to 100s of spontaneous genetic mutations • Straight Talk about Vaccination • A voice for science
Mon 4/7	• Forestalling the Darkness • Stopping Alzheimer’s before it starts
Wed 4/9	• Lifting the Black Cloud • Personalized Psychiatry in the Genomic Era
Fri 4/11	• Schizophrenia fact sheet • The Psychiatrist's Jigsaw
Mon 4/14	• Diseases in a dish • Stem Cell Basics
Wed 4/16	• Decoding Diabetes • Prosperity's Plague

Fri 4/18	• Cholesterol veers off script • A cardiac conundrum • Statins: From fungus to Pharma
Wed 4/23	• TBA • pp. 312-313 and 327-328 from Scientific Writing and Communication
Fri 4/25	• pp. 187-191 and 265-272 from Scientific Writing and Communication
Mon 4/28	• pp. 289-299 from Scientific Writing and Communication
Wed 4/30	• pp. 223-229 from Scientific Writing and Communication
Fri 5/2	• pp. 247-253 from Scientific Writing and Communication
Mon 5/5	• pp. 196-199 from Scientific Writing and Communication • Big Picture: Averages • Field Studies: Standard Deviation
Wed 5/7	• Field Studies: Hypothesis testing • Big Picture: Different Statistical tests • pp. 57-59 & 62 from What is a p-value anyway?
Fri 5/9	• Big Picture: Chi-Squared Worked example
Mon 5/12	• Field Studies: T-test • pp. 64-68 from What is a p-value anyway?
Wed 5/14	• Trials and Errors • Spearman's Rank Correlation Coefficient