Biology 12
Human Reproduction and Development
Spring 2016  1-27-16

Professor Ernst  Barnum 201; 617-627-3541  susan.ernst@tufts.edu
Office hours  Wednesday 4:30 - 5:45 and by appointment
Class time  I+ Monday and Wednesday 3:00-4:15
Required Text  Bioethics and the New Embryology Gilbert, Tyler and Zackin
Teaching Assistant  Clare Parker  clare.parker@tufts.edu
Office: Barnum 216D  Office hours: Monday 10:00-11:00

~ Communications to the class will be sent to students’ Tufts email addresses.
~ PowerPoint slides and other course material will be on Trunk.

~ This course can be used to fulfill one course of the Natural Science Distribution Requirement for LA+J
~ This course does not count towards a major in Biology, Biopsychology or Biochemistry
~ This course can be used for the International Relations Program: T3 Global Health, Nutrition and the Environment as a biology course or a natural science distribution.
~ To receive credit as an elective for the Women’s, Gender, and Sexuality Studies major or minor the focus of papers and projects must address a topic relevant to the study of women, gender, or sexuality studies. You must identify yourself to the instructor in person and by email if you intend to take this course as an elective for the WGSS major or minor.
~ This course does not count for the Natural Sciences Distribution in Engineering

Note: Where indicated material is reference rather than a required reading the material covered in class on this material will be on the exams.

#1  1-25  Introduction

#2  1-27  Fertilization to Birth
DVD  National Geographic  Biology of Prenatal Development
Assignment:
~ Gilbert pages 3-22

#3  2-1  The Answer is DNA
Assignments:
~ Gilbert 179-187
~ http://www.nature.com/scitable/ebooks/essentials-of-genetics-8/contents
   Unit 1: What is DNA and what does DNA do?
Sections 1.1; 1.2; 1.4; 1.5  (Section 1.3 also interesting but not required)
Connection between Hereditary and Development

Assignments:


Unit 1: What is DNA and what does DNA do? Section 1.6

Unit 2: DNA as agent for hereditary and development Sections 2.1; 2.2; 2.3; 2.4

Sexual selection and Mate Choice

Assignments:


Mate Choice


Discussion

Presidents’ Day Observed  No Class

Sexually Transmitted Infections (STIs) and Diseases (STDs)  Bacteria

2014 Sexually Transmitted Diseases Surveillance CDC Sexually Transmitted diseases. This is not an reading assignment, but a link to the CDC - Center for Disease Control, a government health site and a very good resource. Please look it over for classes on 2-17 and 2-18.

[http://www.cdc.gov/std/stats14/default.htm](http://www.cdc.gov/std/stats14/default.htm)

Assignments:

~ Applies to age group of most people in Bio 12


~ Bacteria

[http://micro.magnet.fsu.edu/cells/bacteriacell.html](http://micro.magnet.fsu.edu/cells/bacteriacell.html)

~ Dramatic rise in Syphilis – Clinics closing


Reaction paper #1 Due in Trunk Drop box by noon 2-17
#8 2-18  
(Monday's schedule)  
STIs and STDs  DNA and RNA Viruses

HPV: These are not reading assignments, but a link to the CDC, Center for Disease Control, a government health site and a very good resource.

http://www.cdc.gov/std/hpv/stdfact-hpv.htm

HPV and Cancer (Cervical and Oropharyngeal)

http://www.cdc.gov/std/hpv/stdfact-hpvandoropharyngealcancer.htm
http://www.cancer.gov/cancertopics/factsheet/Risk/HPV

Assignments:
~ HPV cancers on the rise:
~ Screening for cervical cancer in low-resourced countries

HIV/AIDS
Targeting HIV replication; this is not a reading assignment, a link to the CDC - Center for Disease Control, a very good resource.
http://www.cdc.gov/hiv/risk/age/youth/

Assignments
~ How HIV infects people
~ http://www.youtube.com/watch?v=R08MP3wMyqg&feature=player_embedded
~ High risk teens not getting HIV testing
~ HIV prevention pill
Fertilization and Early Development

Assignment:
~Gilbert 52-63

Fertility/Contraception/Birth Control

not a reading assignment, a link to the CDC, a very good resource.


Assignments:
~Gilbert 31-45
~Unintended pregnancies
~http://www.guttmacher.org/pubs/FB-Unintended-Pregnancy-US.html
~Overview Birth Control
~http://www.cdc.gov/reproductivehealth/unintendedpregnancy/contraception.htm

Infertility /Causes/Assisted Reproductive Technologies

Assignment:
Gilbert 64-69; 71-79

Exam 1 classes 1-10

Many faces of ART

~Assignments:

Reaction paper #2 Due in Trunk Drop box by noon 3-7

Class Discussion

Mutations, inheritance

Assignments: Genes and Mutations
~ Unit 2: DNA as agent for hereditary and development
  Section: 2.5
~Unit 3: How Is Genetic Information Passed between Organisms?
  Sections: 3.1; 3.2; 3.3; 3.5
http://www.nature.com/scitable/ebooks/essentials-of-genetics-8/contents
#14 3-14  
Birth Defects – Inherited diseases/Genetic Screening/Genetic Counseling

Assignments:
~ Gilbert 23-26 and 215-225
~ Birth defects: Causes and Statistics  
~ Prenatal Diagnosis  
  http://users.rcn.com/jkimball.ma.ultranet/BiologyPages/P/PrenatalScreening.html

~ Embryo screening and the ethics of human genetic engineering  

#15 3-16  
Birth Defects -- Teratogens -- also epigenetic and later in life ---

Assignment:
~ Birth defect abdominal wall  

#16 3-16  
Environmental influences --- a study of Zika virus

Discussion: add references as semester (and unfortunately) Zika virus increases

Reaction paper #3 Due in Trunk Drop box by noon 3-16

3-21  
Spring Break
3-23  
Spring Break

#17 3-28  
Possible topics: Build a brain – teen age brains: two bodies as one

#18 3-30  
Possible topics: Build a brain – teen age brains: two bodies as one

Assignment:  

#19 4-4  
Stem Cells
#20 4-6 Stem Cells

#21 4-11 Student Presentations

Reaction paper #4 Due in Trunk Drop box by noon 4-11

#22 4-13 Student Presentations

#23 4-18 Student Presentations

4-20 Patriots' Day No Class

#24 4-25 Student Presentations

#25 4-27 Other material

#26 5-2 Exam 2 classes 11-26

GRADING: Reaction papers 3 out of 4 possible 10 points each 30
Projects, class presentation, paper 20 + 10 points 30
(20 group + 10 individual)
2 exams 2 X 20 points 40

Total 100

This course fulfills the following expectations for educational outcomes for Biology and the Natural Sciences Distribution Requirement

1. Core Competencies

Students will learn to:

~ Accurately use and communicate basic scientific vocabulary, terms, and concepts (including relevant quantitative concepts).
~ Gather or synthesize, evaluate, and critically interpret scientific evidence.
~ Evaluate scientific information presented in a variety of media and make decisions about its accuracy, validity, and implications.
2. Knowledge base

Students will gain some:

~ An understanding of the major paradigms in biology, including evolution, cell theory, genetic inheritance, the central dogma
~ An understanding of the relationship between genotype and phenotype
~ An understanding of the information flow between DNA, RNA, and proteins, and a basic knowledge of the processes that govern cellular function and cell division.
~ Familiarity with the processes through which evolution occurs, and an understanding that selection acts on multiple stages in the life cycle.
~ An understanding of the dynamic nature of organismal development from inception through growth and differentiation, aging and death.
~ Recognition that biological processes are based on chemical and physical principles, and that biology informs medicine, community health, food production, and environmental policy.