SYLLABUS FOR *GENES, EVOLUTION, AND DEVELOPMENT* (BIO 125)

About office hours: We have distributed our office hours throughout the week to be as available as possible. If your schedule conflicts with our office hours, we can also meet with you by arrangement. Interactions with the problem solving and laboratory teaching assistants are intended to complement, but not replace, interactions with the professors. Stop by our offices early in the term, even if it is just to introduce yourself. Students are more successful if they ask questions early in the term rather than waiting until the end to sort out points of confusion.

Studying, exams, and grading:

Learning biology is a process, not just memorizing a body of knowledge. We've designed both class meeting times and the lab portions of the course to reflect this. Our goals for the course are to have you learn fundamental concepts of biology as well as gain critical skills. Biology changes rapidly and we will present some information in lecture that either updates or expands the text. It is also important to note that each section of the course builds on previously covered concepts. We encourage you to make use of all available resources, including our office hours listed above, our problem solving TA, and the lab TAs. You'll find that problem solving both in class and on exams is designed to help you to integrate and apply what you are learning about biology. Your class notes and solved problems will be the most useful guides when studying for the exams. Lab is an integral part of your learning in the course and it will make up 30% of your final grade.

Research in the field of learning supports the idea that working in groups enhances learning. Throughout the term you will be asked to work in groups both in class and in the lab. It is your responsibility to actively participate in your group and it is also your responsibility to let one of the instructors know if your group is not functioning effectively. We will work with you and your group to come to a productive solution.

We encourage anyone requesting testing accommodations to talk to us either after the first class period or during office hours.

Texts and Web site:

Losos, Mason, and Singer. 2008. Biology (8/e). McGraw-Hill.
Deel, S. 2007. Lab Report Guide
Course Information on Moodle

March 30-April 3

DNA is an information **molecule**.
The information stored in DNA can be used by an organism in the form of **proteins** that do the work of the **cell**.
Text: pp 41-53 & 258-262

April 6 - 10

DNA replication: Information that is stored in DNA can be copied into new DNA molecules. Information can be transferred between generations in a process called **mitosis.**
Text: Ch. 14 (262-274), Ch 10 (193-196)

April 13 - 17

The cell converts the information in DNA to RNA and protein through the processes of **transcription** and **translation.** Organisms are able to control both where and when gene expression occurs.
Text: Ch. 15 (279-300)

April 20 – 24 & April 28- May 1

Both the timing and location of **gene expression** in an organism can be controlled by cell communication.
Text: Ch. 16 (303-321)

Cells communicate by sending and receiving information in the form of signals.
Text: Ch. 9 (166-175)

Cell signaling determines when cells divide: the **cell cycle**.
Text: pp 191; 197-202

Gene expression can be artificially controlled through **gene technology**.
Text: Ch. 17 (325-332, 337-346)

May 5 - 8

Offspring are produced using information in the genome: **meiosis** and **Mendelian inheritance**. The information can be modified during meiosis and by mutation.
Text: Ch. 11 (205-216), Ch. 12 (219-230), Ch.13 (238-241, 249-250)

May 11-15

The environment selects useful new information: **natural selection and Hardy Weinberg.** As a result, new species may arise: **speciation.**
Text: Ch. 20 (395-405, 407), Ch. 21(415-425), Ch. 22 (433-447)

May 18 - 22

Genomes contain all of the information within a species. Genomes can be compared both within a species (**SNPs**) and between organisms (**genome evolution** and **comparative genomics**).
Text: Ch. 13 (244-247), Ch. 17 (332-337), Ch. 18 (350-362), Ch. 24 (479-484)

May 25 – June 3

A complex multicellular organism **develops** from a single cell.
How did diverse body plans evolve? (**Evolution of development**)
How do genes, evolution, and development tie together?
Text: Ch. 19 (371-376, 385-387), Ch. 25 (489-500)