Course Goals: This course will introduce students to methods for studying biological questions on a genome-wide level. We will examine approaches to measure changes in genomic DNA composition, transcript and protein levels, and molecular interactions as a function of history, genetics, or environment. Analytical methods for interpreting the large bodies of data generated by these methods of experimentation will be discussed. These concepts will be put into practice by a course project and presentation at the end of the term.

Course requirements:
Students are required to attend class, to read the assigned material and to participate in class discussions. Small groups will present recent papers for discussion. In addition each small group will analyze the data from our sequencing project and present their results and analyses. There will be two graded tests.

Readings and Homework
The required readings are the primary literature papers, pdfs of which will be available on the class website, and readings from Genomes, links to which are on the syllabus.

Grading
Tests: 40%
Project: 20%
Homework and Labs: 30%
Class participation: 10%

Class schedule
**Week 1**
March 31
Introduction to genomes – size and complexity, and sequencing technologies

April 2
Introduction to genomes - sequencing

**Week 2**
April 7
Genome sequencing societal impacts
2
April 9
Sequencing computer lab
sequence lab

**Week 3**
April 14
SNP mapping intro
http://www.ncbi.nlm.nih.gov/books/NBK21116/ the whole chapter
3
April 16
SNP computer lab
SNP lab

**Week 4**
April 21
Team presentations: Sequence & SNP papers
4
April 23
Test 1

**Week 5**
April 28
Project set-up
Str 315
5
April 30
Project work
Str 315

**Week 6**
May 5
Project work
Str 315
6
May 7
SAGE & HTS expression intro
http://www.ncbi.nlm.nih.gov/books/NBK21136/ up to 7.3.2. Also, see http://www.ncbi.nlm.nih.gov/books/NBK12777/

**Week 7**
May 12
Team presentations: Gene expression papers
7
May 14
Gene Networks/Function
Epigenetics
**Week 8**
May 19
Network/Functional genomics computer lab

**Network lab**

May 21
Team presentations: Network/Functional genomics papers

**Week 9**
May 26
Project Data Analysis

**Midterm 2 due**

May 28
Project Data Analysis

**Week 10**
June 2
Student presentations

June 4
Student presentations