

Tentative Syllabus
New CPSC 452 Evolutionary Genetics and Genomics
(Currently listed as “Genetics of Higher Organisms”)
Fall 2010

Schedule: T / R 9:30 am – 10.50am, Aug 24 thru Dec 9
Location: Room 30 ACES Library

Instructor: Yoshie Hanzawa
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Office Hours: Please make an appointment preferably by email.

Course Description and Objectives

CPSC 452 Evolutionary Genetics and Genomics aims to provide basic theoretical knowledge of evolutionary genetics to students who are interested in molecular basis of plant diversity and evolution, and crop domestication. This course serves as an introduction to higher level of genetics, genomics, and bioinformatics courses. Basic principles of genetics and genomics will be covered during the course, but it is strongly recommended to take CPSC 352 or IB 204, or a similar course to acquire a basic knowledge of molecular biology prior to this course.

We will learn molecular basis of *genetic variation and phenotypic variation* (Section 1), *factors that affect evolutionary processes and natural selection* (Section 2), and *evolution by human selection* (Section 3). During the course, related topics from recent literatures on molecular evolution and plant improvement will be reviewed, including evo-devo, disease resistance, self-incompatibility, and association study. By the end of this course, students will understand evolutionary processes of key traits for plant improvement promoted by natural and human selection.

Course Materials

Section 1 and 2: Barton, Briggs, Eisen, Goldstein, and Patel (2007) *Evolution*.
Section 3: Suggested literatures.

Course Point Breakdown

	Points	Total
Quizzes	10 pts x 10	100 pts
Assignments	25 pts x 3	75 pts
Project	25 pts	25 pts

200 pts

- Quizzes will be posted on the Compass site (<http://compass.illinois.edu>).
- Assignments and project will be given during the course.
- For project, students will select and research a subject on crop domestication with other students in a group, and present their achievement in the course.
- There is no final exam.

Course Schedule

Week	Date	Topics
		Section 1. Variation
1	8/24	Overview of Species Evolution
	8/26	Molecular Phylogeny
2	8/31	Molecular Phylogeny
	9/2	Origin of Genetic Variation
3	9/7	Origin of Genetic Variation
	9/9	Genetic variation and phenotype
4	9/14	Genetic variation and phenotype
	9/16	Evolution of Complex Traits
5	9/21	Evolution of Complex Traits
	9/23	Assessing genotype-phenotype interactions
6	9/28	Epigenetic Variation
		Section 2. Evolutionary Processes
	9/30	Genetic Drift
7	10/5	Genetic Drift
	10/7	Population Structure
8	10/12	Population Structure
	10/14	Selection
9	10/19	Selection and Other Forces
	10/21	Signature of Selection in Genome
10	10/26	Signature of Selection in Genome
	10/28	Evolution of Genetic Systems
11	11/2	Evolution of Genetic Systems
	11/4	Speciation
12	11/9	Evolution of Novelty
		Section 3. Crop Domestication
	11/11	Genetic Basis of Domestication
13	11/16	Genetic Basis of Domestication
	11/18	Genetic Basis of Domestication
14	11/23	Fall Break
	11/25	Fall Break
15	11/30	Project Discussion
	12/2	Project Discussion
16	12/7	Project Presentations
	12/9	Project Presentations