

Laboratory in Genetics

(By E. Jane Hubbard at the New York University)

This is a project-based stand-alone laboratory course that was designed and initially offered by Dr. E. Jane Hubbard at New York University. Equipment for the course was obtained with a combination of institutional and NSF funding. Like the course offered by Dr. Leilani Miller (who provided valuable advice in its initial stages), it aims to introduce students to research by means of a discovery experience.

The course consists of two projects, one “forward genetics” project and one “functional genomics” project, the exact nature of which varies from year to year. Students work in teams of 3-4 students for each project. Students begin by carrying out and analyzing a set of “known” crosses designed to demonstrate recessive/dominant traits, independent segregation, linkage and X-chromosome linkage. Each team then screens for and isolates a number of mutants from a mutagenesis and maps one or more of these mutants. Both genetic and molecular markers are used in mapping experiments that proceed from linkage to 3-factor mapping to additional analysis such as dosage analysis. The second project uses RNAi feeding in a modifier screen context, to test for genetic interactions. This project provides the opportunity to use public databases and the primary research literature. Teams report their findings in individually-prepared research paper-style written reports as well as team-prepared oral presentations to the class. Opportunity is provided for written reports to be re-written after comments. Weekly “lab-lectures” provide additional background and structure.

Students synthesize and apply information and concepts from their previous courses while learning how to collect, analyze and report new data resulting from their experiments.