**CSB 350H1F – LABORATORY IN MOLECULAR PLANT BIOLOGY**

24L, 36P

**This course has a lab fee of $50.**

**Lab coat and safety glasses are required and the approximate cost is $25. Students are responsible for purchasing these items.**

**Lecturers:**

Prof. D. Christendat dinesh.christendat@utoronto.ca

Prof. E. Nambara eiji.nambara@utoronto.ca

**Prerequisite:** BIO 230H1/(240H1, 241H1)/255H1

**Recommended Preparation:** BIO251H1 or higher level plant biology course; BCH311H1/CSB 349H1/MGY 311Y1 taken concurrently.

**Laboratory methods in plant molecular biology research.** Topics in this course include vector construction, CRISPR-Cas9 mediated mutagenesis, plant transformations, PCR, genetic mapping, and bioinformatics analyses. This course introduces students to current recombinant, molecular and biochemical techniques and covers some of the basic ethical issues in recombinant DNA Technology. The adopted techniques are important for us to study the biological functions of proteins from various sequenced genomes. These techniques will include, analysis of CRISPR-Cas9 system for plants, CRISPR-Cas9 mediated gene deletion in Arabidopsis, *Agrobacterium*-mediated transformation of *Arabidopsis*, extraction of genomic DNA from *Arabidopsis*, PCR analysis of *Arabidopsis* CRISPR-Cas deletion lines, phenotypic analysis of Arabidopsis gene deletion lines, construction of protein expression vectors, design of functional mutants, analysis of protein expression, purification, and crystallization. Enzymes of the shikimate pathway will be the subjects for our studies. The shikimate pathway plays an important role in the biosynthesis of secondary metabolites and plant hormones. In *Arabidopsis*, perturbations of the pathway result in distinct and visible phenotypes, some of which will be the focus of this course. The laboratories are complemented with lectures to discuss theoretical approaches and ethical issues pertinent to the laboratory materials.

**Required Text:** No required textbook. Students will be provided with primary literature as required readings.

**Evaluation:** Assignments & Grading.

This is a typical mechanism for evaluation from the previous years of offering. Please note that the official course evaluation (marking scheme) will be provided at the beginning of the semester. The official course description may differ somewhat from the one listed below.

 Lab Report 1 (Module 1) 15

 Progress report 10

 Lab Report 2 15

 Quizzes 10

 Lab Participation 15

 Final Exam 35