**Topics in Plant Breeding and Genetics: Genetic Mapping in Plants, PLNT 7130**

Dr. Curt A. McCartney

Agriculture and Agri-Food Canada, Cereal Research Station (Morden)

204-822-7604 (office), 204-229-5540 (cell)

Email: curt.mccartney@agr.gc.ca

Office Hours: immediately following lectures, however setting an appointment time is recommended.

**Course Description:** Application of genetic mapping analyses for the dissection of traits in plant species. Linkage mapping, quantitative trait locus (QTL) mapping, and association mapping will be reviewed in detail. Emphasis will be placed on practical applications in genetic studies. The analysis and interpretation of real data will be conducted in computer tutorials sessions.

**Goals:** To understand and implement modern genetic analysis techniques to study the genetic control of plant traits.

**Objectives:** To acquire knowledge needed to conduct various genetic mapping analyses:

1. Linkage mapping
	1. Determining linkage groups
	2. Marker ordering methods
	3. Error detection
2. QTL mapping
	1. Mapping algorithms
	2. Key statistics, significance thresholds for LOD scores
3. Association mapping
	1. Population structure
	2. Kinship
	3. LD decay
4. Ability to design experiments with a working knowledge of different genetic analyses and their strengths and weaknesses.

**Format:** The class will meet on a weekly basis for an approximate duration of two and half hours. The course will consist of formal lectures, discussion periods, and computer tutorials. Meeting times and locations will be determined at the first class meeting to ensure no conflicts with other classes.

**Textbook:** None. Assigned readings will be provided for class discussions.

**Evaluation:**

**Method** **%**

Assignments 60%

Presentations 30%

Discussion/Participation 10%

**Total 100%**

**Late Submissions:** Assignments that are submitted after the deadline will be reduced by 10% of the value of the assignment per day.

**General Academic Regulations:** Please refer to the University of Manitoba General Calendar for regulations regarding plagiarism, cheating, and examination impersonation.

**Assignments:** Four assignments will be completed over the duration of the course. Tentative due dates are:

 January 30, 2015

 February 20, 2015

 March 13, 2015

 April 3, 2015

**Presentations:** The students will be assigned papers to present to the class. A presentation schedule will be determined at the beginning of the term. Presentations will be 10-12 minutes in length, with 3-5 minutes for discussion. Presentations will include a brief introduction, key results, and a summary/conclusions. Students must read all papers and have 1 or 2 questions prepared for discussion.