

Syllabus

PLNT 4330: Intermediate Plant Genetics
(Fall Term 2022)

**Faculty of Agricultural and
Food Sciences**



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COURSE DETAILS

Course Title & Number:	Intermediate Plant Genetics, PLNT 4330
Number of Credit Hours:	3
Class Times & Days of Week:	11:30 am – 12:20 pm, Monday, Wednesday, Friday
Location for classes/labs/tutorials:	Lectures: 134 Agriculture Building Tutorials: 138 Agriculture Building
Pre-Requisites:	PLNT 2520 or BIOL 2500, or the former BOTN 2460

Instructor and Teaching Assistant Contact Information

Instructor's Name & Preferred Form of Address:	Dr. Curt McCartney Curt or Dr. McCartney
Office Location:	328 Agriculture Building (September) 247A Agriculture Building (October to December)
Office Hours or Availability:	By appointment, 8:30 am – 4:30 pm Monday to Friday
Office Phone No.	(204) 698-7234
Email:	curt.mccartney@umanitoba.ca Emails should be professional, but do not have to be formal. I will generally return emails and phone calls within 24 hours.
Contact:	Please contact me by email or in-person before/after class. Feel free to contact me if anything is unclear about course content, expectations, etc.
Teaching Assistant's Name:	Alexa Peterson
Email:	peters86@myumanitoba.ca
Office Hours or Availability:	To be determined.

Course Description

U of M Course Calendar Description

A study of gene behaviour as related to genetic analyses of data from plant populations; multiple allelic systems and polygenic inheritance of quantitative traits; extra-chromosomal inheritance and the significance of cytoplasmic influence. Examples will be drawn from experimental data where available.

General Course Description

PLNT 4330 (Intermediate Plant Genetics) provides students with information required to proceed into a breeding and/or genetics option, into biotechnology, and for preparation for graduate studies. This course builds off the introductory genetics principles from PLNT 2520 (Genetics) or BIOL 2500 (Genetics 1), providing students with a thorough understanding of plant genetics. The course provides an overview into the development of the field of plant genetics, and prepares the student for further study in plant genetics. The course is particularly valuable for students considering a career in genetic research, including plant biotechnology, breeding, pathology, and physiology.

Course Goals

The course goals are: (1) to expand and deepen understanding of plant genetics and (2) to apply this knowledge and information to problem solving. The topics covered will range from altered segregation, statistics, genetic linkage and mapping, large changes in genetic material, population genetics, quantitative genetics, cytoplasmic genetics, mutation, and genetic engineering.

Course Learning Objectives

Students will gain a broad knowledge of the field of plant genetics and will be able to apply course concepts to solve genetic problems. This will include interpretation of experimental data to draw conclusions about the underlying genetic control of traits. e.g., students will be able to determine whether genes are independently inherited or linked, determine gene order on a chromosome based on phenotypic data, make predictions about plant populations, etc.

Textbook, Readings, and Course Materials

Optional Textbook: Elrod, S. and Stansfield, W. D. (2010) GENETICS 5th Edition. Schaum's Outlines Series. McGraw-Hill Inc. Toronto (not in bookstore, available on Amazon).

Supplementary Reading: as assigned.

Using Copyrighted Material

Please respect copyright. We will use copyrighted content in this course. I have ensured that the content I use is appropriately acknowledged and is copied in accordance with copyright laws and university guidelines. Copyrighted works, including those created by me, are made available for private study and research and must not be distributed in any format without permission. Do not upload copyrighted works to a learning management system (such as UM Learn), or any website, unless an exception to the *Copyright Act* applies or written permission has been confirmed. For more information, see the University's Copyright Office website at <http://umanitoba.ca/copyright/> or contact um_copyright@umanitoba.ca.

Course Technology

Course notes and tutorial questions will be posted on UM Learn. Lecture notes will be posted the day before the lecture. Tutorial questions will be distributed one week before the tutorial session that illustrates how the questions are solved.

Expectations: I Expect You To

I will treat you with respect and would appreciate the same courtesy in return. See [Respectful Work and Learning Environment Policy](#). I expect you to follow these policies around Class Communication, Academic Integrity, and Recording Class Lectures.

Class Communication:

You are required to obtain and use your University of Manitoba email account for all communication between yourself and the university. All communication must comply with the Electronic Communication with Student Policy:

http://umanitoba.ca/admin/governance/governing_documents/community/electronic_communication_with_students_policy.html.

Academic Integrity:

Each student in this course is expected to abide by the University of Manitoba [Academic Integrity principles](#). Always remember to reference the work of others that you have used. Also be advised that you are required to complete your assignments independently unless otherwise specified. If you are encouraged to work in a team, ensure that your project complies with the academic integrity regulations. You must do your own work during exams. Inappropriate collaborative behavior and violation of other Academic Integrity principles, will lead to the serious [disciplinary action](#). Visit the [Academic Calendar](#), [Student Advocacy](#), and [Academic Integrity](#) web pages for more information and support.

Recording Class Lectures:

No audio or video recording of lectures or presentations is allowed in any format, openly or surreptitiously, in whole or in part without permission of Dr. Curt McCartney. Course materials (both paper and digital) are for the participant's private study and research.

Student Accessibility Services:

The University of Manitoba is committed to providing an accessible academic community. [Students Accessibility Services \(SAS\)](#) offers academic accommodation supports and services such as note-taking, interpreting, assistive technology and exam accommodations. Students who have, or think they may have, a disability (e.g. mental illness, learning, medical, hearing, injury-related, visual) are invited to contact SAS to arrange a confidential consultation.

Student Accessibility Services
520 University Centre
Phone: (204) 474-7423
Email: Student_accessibility@umanitoba.ca

Expectations: You Can Expect Me To

I will be in class for 10 minutes prior to and after the class time to discuss any questions or comments you may have. Exams will be marked within 14 days of the exam date. Students will have their marks for the Midterm Lecture Exam I, Midterm Lecture Exam II, and Tutorial Exam 1 prior to the Voluntary Withdrawal

deadline. Exams papers will be returned to the students with feedback. Correct exam answers will be reviewed during lectures and tutorials after exams are returned to students.

CLASS SCHEDULE AND COURSE EVALUATION

This schedule is subject to change at the discretion of the instructor and/or based on the learning needs of the students but such changes are subject to [Section 2.8 of ROASS](#).

Class Schedule:

Date	Description
Sep. 7, 2022	Introduction to plant reproductive morphology and function
Sep. 9, 2022	DNA, cell cycle, mitosis, meiosis, gametogenesis
Sep. 12, 2022	Mendel's laws, dominance, allelic series
Sep. 14, 2022	Usual segregation, altered segregation
Sep. 16, 2022	Altered segregation
Sep. 19, 2022	Epistasis (gene interaction)
Sep. 21, 2022	Statistics in genetic research
Sep. 23, 2022	Probability, chi-squared tests
Sep. 26, 2022	Minimum family size, detection of linkage
Sep. 28, 2022	Gene mapping in diploids I
Sep. 30, 2022	National Truth and Reconciliation Day (no class)
Oct. 3, 2022	Linkage and mapping in fungi I
Oct. 5, 2022	*** Midterm Lecture Exam I ***
Oct. 7, 2022	Linkage and mapping in fungi II
Oct. 10, 2022	Thanksgiving (no class)
Oct. 12, 2022	Linkage determination in bacteria
Oct. 14, 2022	Variation in chromosome number
Oct. 17, 2022	Segregation in polyploids I
Oct. 19, 2022	Segregation in polyploids II
Oct. 21, 2022	Changes in chromosome structure
Oct. 24, 2022	Population genetics: Hardy-Weinberg
Oct. 26, 2022	Population genetics: Hardy-Weinberg, mutation
Oct. 28, 2022	Population genetics: Migration, random drift
Oct. 31, 2022	Population genetics: Selection I
Nov. 2, 2022	Population genetics: Selection II
Nov. 4, 2022	*** Midterm Lecture Exam II ***
Nov. 7, 2022	Fall term break (no class)
Nov. 9, 2022	Fall term break (no class)
Nov. 11, 2022	Remembrance Day (no class)
Nov. 14, 2022	Population genetics: Inbreeding
Nov. 16, 2022	Quantitative genetics
Nov. 18, 2022	Quantitative genetics: Multiple factors, breeding, heritability
Nov. 21, 2022	Quantitative genetics: Variance components

Nov. 23, 2022	Quantitative genetics: Quantitative trait loci
Nov. 25, 2022	Cytoplasmic male sterility in plant breeding
Nov. 28, 2022	Maternal effects and cytoplasmic inheritance
Nov. 30, 2022	Mitochondrial and plastid genes
Dec. 2, 2022	Genetic engineering I
Dec. 5, 2022	Genetic engineering II
Dec. 7, 2022	To be determined
Dec. 9, 2022	To be determined
Dec. 12, 2022	Final class, student-directed review.

Course Evaluation Schedule:

Date	Evaluation Method	Grade %
Oct. 5, 2022	Midterm Lecture Exam I	20%
Oct. 28, 2022	Tutorial Exam I	15%
Nov. 4, 2022	Midterm Lecture Exam II	20%
Dec. 2, 2022	Tutorial Exam II	15%
TBA ¹	Final Lecture Exam	30%

¹ Scheduled by Student Records in the December examination period.

Lab Expectations

Students are expected to attend Tutorials. Tutorial questions will be distributed to students 7 days in advance of each tutorial. Please try these questions before the tutorial. This will ensure that you get the most out of each of the tutorials. Students are expected to treat the tutorial TA with respect.

Lab Schedule

Date	Description
Sep. 16, 2022	Mendelian genetics
Sep. 23, 2022	Altered segregation problems
Oct. 7, 2022	Statistics in genetics problems
Oct. 14, 2022	Linkage problems I
Oct. 21, 2022	Linkage problems II
Oct. 28, 2022	Tutorial Exam #1
Nov. 4, 2022	Population genetics problems I
Nov. 18, 2022	Population genetics problems II
Nov. 25, 2022	Population genetics problems III
Dec. 2, 2022	Tutorial Exam #2

Grading

The following grading scale will be applied to this course.

Letter Grade	Percentage out of 100	Grade Point Range	Final Grade Point
A+	93-100	4.25-4.5	4.5
A	85-92	3.75-4.24	4.0
B+	78-84	3.25-3.74	3.5
B	72-77	2.75-3.24	3.0
C+	66-71	2.25-2.74	2.5
C	60-65	2.0-2.24	2.0
D	50-59	Less than 2.0	1.0
F	Less than 50		0

Voluntary Withdrawal

Sep. 20, 2022	Last date to DROP Fall term courses with 100% refund
Nov. 22, 2022	Voluntary Withdrawal (VW) deadline (no refund)

Students who did not drop the course by these deadlines will be assigned a final grade. Voluntary Withdrawal courses will be recorded on official transcripts. Please refer to the [Registrar's Office](#) web page for more information. I am willing to discuss student's progress and strategies for improvement prior the withdrawal date.

Other Important Dates

Sep. 30, 2022	National Truth and Reconciliation Day – no classes.
Oct. 10, 2022	Thanksgiving – no classes.
Nov. 7, 2022 - Nov. 10, 2022	Fall term break – no classes.
Nov. 11, 2022	Remembrance Day (Holiday)
Dec. 12, 2022	Last day of classes

ASSIGNMENT DESCRIPTIONS

Not applicable. The course does not have any assignments.

UNIVERSITY SUPPORT OFFICES & POLICIES

Writing and Learning Support

The Academic Learning Centre (ALC) offers services that may be helpful to you throughout your academic program. Through the ALC, you can meet with a learning specialist to discuss concerns such as time management, learning strategies, and test-taking strategies. The ALC also offers peer supported study groups called Supplemental Instruction (SI) for certain courses that students have typically found difficult. In these study groups, students have opportunities to ask questions, compare notes, discuss content, solve practice problems, and develop new study strategies in a group-learning format.

You can also meet one-to-one with a writing tutor who can give you feedback at any stage of the writing process, whether you are just beginning to work on a written assignment or already have a draft. If you are interested in meeting with a writing tutor, reserve your appointment two to three days in advance of the time you would like to meet. Also, plan to meet with a writing tutor a few days before your paper is due so that you have time to work with the tutor's feedback.

These Academic Learning Centre services are free for U of M students. For more information, please visit the Academic Learning Centre website at: <http://umanitoba.ca/student/academiclearning/>

You can also contact the Academic Learning Centre by calling 204-480-1481 or by visiting 205 Tier Building.

University of Manitoba Libraries (UML)

As the primary contact for all research needs, your liaison librarian can play a vital role when completing academic papers and assignments. Liaisons can answer questions about managing citations, or locating appropriate resources, and will address any other concerns you may have, regarding the research process. Liaisons can be contacted by email or phone, and are also available to meet with you in-person. A complete list of liaison librarians can be found by subject: <http://bit.ly/WcEbA1> or name: <http://bit.ly/1tJObB4>. In addition, general library assistance is provided in person at 19 University Libraries, located on both the Fort Garry and Bannatyne campuses, as well as in many Winnipeg hospitals. For a listing of all libraries, please consult the following: <http://bit.ly/1sXe6RA>. When working remotely, students can also receive help online, via the Ask-a-Librarian chat found on the Libraries' homepage: www.umanitoba.ca/libraries.

For 24/7 mental health support, contact the Mobile Crisis Service at 204-940-1781.

Student Counselling Centre

Contact SCC if you are concerned about any aspect of your mental health, including anxiety, stress, or depression, or for help with relationships or other life concerns. SCC offers crisis services as well as individual, couple, and group counselling. *Student Counselling Centre:*

<http://umanitoba.ca/student/counselling/index.html>

474 University Centre or S207 Medical Services

(204) 474-8592

Student Support Case Management

Contact the Student Support Case Management team if you are concerned about yourself or another student and don't know where to turn. SSCM helps connect students with on and off campus resources, provides safety planning, and offers other supports, including consultation, educational workshops, and referral to the STATIS threat assessment team.

Student Support Intake Assistant <http://umanitoba.ca/student/case-manager/index.html>

520 University Centre
(204) 474-7423

University Health Service

Contact UHS for any medical concerns, including mental health problems. UHS offers a full range of medical services to students, including psychiatric consultation.

University Health Service <http://umanitoba.ca/student/health/>

104 University Centre, Fort Garry Campus
(204) 474-8411 (Business hours or after hours/urgent calls)

Health and Wellness

Contact our Health and Wellness Educator if you are interested in [peer support from Healthy U](#) or information on a broad range of health topics, including physical and mental health concerns, alcohol and substance use harms, and sexual assault.

Health and Wellness Educator <https://umanitoba.ca/student/health-wellness/welcome-about.html>
britt.harvey@umanitoba.ca

Live Well @ UofM

For comprehensive information about the full range of health and wellness resources available on campus, visit the Live Well @ UofM site:

<http://umanitoba.ca/student/livewell/index.html>

Copyright

All students are required to respect copyright as per Canada's *Copyright Act*. Staff and students play a key role in the University's copyright compliance as we balance user rights for educational purposes with the rights of content creators from around the world. The Copyright Office provides copyright resources and support for all members of the University of Manitoba community. Visit

<http://umanitoba.ca/copyright> for more information.

Your rights and responsibilities

As a student of the University of Manitoba you have rights and responsibilities. It is important for you to know what you can expect from the University as a student and to understand what the University expects from you. Become familiar with the policies and procedures of the University and the regulations that are specific to your faculty, college or school.

The [Academic Calendar](http://umanitoba.ca/student/records/academiccalendar.html) <http://umanitoba.ca/student/records/academiccalendar.html> is one important source of information. View the sections *University Policies and Procedures* and *General Academic Regulations*.

While all of the information contained in these two sections is important, the following information is highlighted.

- If you have questions about your grades, talk to your instructor. There is a process for term work and final **grade appeals**. Note that you have the right to access your final examination scripts. See the Registrar's Office website for more information including appeal deadline dates and the appeal form <http://umanitoba.ca/registrar/>
- You are expected to view the General Academic Regulation section within the Academic Calendar and specifically read the **Academic Integrity** regulation. Consult the course syllabus or ask your instructor for additional information about demonstrating academic integrity in your academic work. Visit the Academic Integrity Site for tools and support <http://umanitoba.ca/academicintegrity/>. View the **Student Academic Misconduct** procedure for more information.
- The University is committed to a respectful work and learning environment. You have the right to be treated with respect and you are expected to conduct yourself in an appropriate respectful manner. Policies governing behavior include the:

Respectful Work and Learning Environment

http://umanitoba.ca/admin/governance/governing_documents/community/230.html

Student Discipline

http://umanitoba.ca/admin/governance/governing_documents/students/student_discipline.html and,

Violent or Threatening Behaviour

http://umanitoba.ca/admin/governance/governing_documents/community/669.html

- If you experience **Sexual Assault** or know a member of the University community who has, it is important to know there is a policy that provides information about the supports available to those who disclose and outlines a process for reporting. The **Sexual Assault** policy may be found at:
http://umanitoba.ca/admin/governance/governing_documents/community/230.html More information and resources can be found by reviewing the Sexual Assault site <http://umanitoba.ca/student/sexual-assault/>
- For information about rights and responsibilities regarding **Intellectual Property** view the policy https://umanitoba.ca/governance/sites/governance/files/2021-06/Intellectual_Property_Policy_-_2013_10_01_RF.pdf

For information on regulations that are specific to your academic program, read the section in the Academic Calendar and on the respective faculty/college/school web site <http://umanitoba.ca/faculties/>

Contact an **Academic Advisor** within our faculty/college or school for questions about your academic program and regulations <http://umanitoba.ca/academic-advisors/>

Student Advocacy

Contact Student Advocacy if you want to know more about your rights and responsibilities as a student, have questions about policies and procedures, and/or want support in dealing with academic or discipline concerns.

<http://umanitoba.ca/student/advocacy/>

520 University Centre

204 474 7423

student_advocacy@umanitoba.ca