

Crop Production PLNT 2500 - 2021
Course Outline and Summary Notes
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Course Objectives - After completing this course, students will:

- Understand the principles and practices of grain, forage and selected horticultural crop production in Manitoba.
- Understand some of the current issues in production and utilization of field, forage and selected horticultural crops in Manitoba and Canada.
- Have an appreciation of crop production in different parts of the world and the history of crop production in Canada.
- Have experience conducting germination, emergence, yield component and other analysis on crop plants in the “home lab” portion of the course
- Have experience assessing Manitoba cropping systems through a major project
- Learn about cropping system design from farmers and agronomists

Course material posted on UM learn

Summary lecture notes and reference material for the laboratory section will be posted on UM Learn. Instructions for the “at home lab” will be described in class and will be available on UM under “Laboratory section”.

Instructional Methods

Additional reading material and on-line resources will be distributed on the UMLearn platform.

Communication

The University requires all students to activate an official University email account. For full details of the Electronic Communication with Students please visit:

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

Please note that all communication between the professor and you as a student must comply with the *electronic communication with student* policy. You are required to obtain and use your U of M email account for all communication between yourself and the university.

Summary Notes

The “skeleton” notes (page 6) provide only an outline of the basic information covered in lectures. Students are expected to participate in all lectures, where this material will be discussed and expanded upon. Students are also encouraged to supplement and personalize their class notes for effective studying.

Using Copyrighted Material

Please respect copyright. We will use copyrighted content in this course, where content 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.

Textbooks, Readings, Materials

There is no selected textbook for this course. Reference book chapters and journal articles are available through UM library links, and a reading list is provided below.

Course Technology

The course will be delivered through Cisco Webex on UMLearn.

It is the general University of Manitoba policy that all technology resources are to be used in a responsible, efficient, ethical and legal manner. The student can use all technology setting only for educational purposes approved by instructor and/or the University of Manitoba Student Accessibility Services. Students should not participate in personal direct electronic messaging / posting activities (e-mail, texting, video or voice chat, wikis, blogs, social networking (e.g. Facebook) online and offline "gaming").

Academic Integrity: See Schedule A for more details

Plagiarism or any other form of cheating in assignments or academic work is subject to serious academic penalty. A student found guilty of contributing to cheating in exams or term assignments is also subject to serious academic penalty. Students should acquaint themselves with the University's policy on plagiarism, cheating, exam impersonation and duplicate submission (see the information on website of the University of Manitoba, Online Academic Calendar, Undergraduate and Graduate).

In addition to the general information about academic integrity and student discipline under Schedule "A" (Policies and Resources), students must also be aware that:

- (i) Group projects are subject to the rules of academic dishonesty;
- (ii) Group members must ensure that a group project adheres to the principles of academic integrity.
- (iii) Students should also be made aware of any specific instructions concerning study groups and individual assignments;
- (iv) The limits of collaboration on assignments should be defined as explicitly as possible; and
- (v) All work is to be completed independently unless otherwise specified.

Other information for students - Document is available at the UMLearn site for this course.

Schedule "A", which outlines academic supports available to Students regarding:

- Mental health that includes referral information to resources and student supports, such as Student Counselling Centre, University Health Services and other supports as may be appropriate;
- University and Unit policies, procedures and supplemental regulations available online,

with special direction to review the University's policies and procedures regarding:

- Student access to final examination scripts
- Student discipline
- Grade appeals
- Student advocacy;
- Respectful Work and Learning Environment;
- Sexual Assault; and
- Intellectual Property.

Student Accessibility Services (SAS)

If you are a student with a disability, please contact SAS for academic accommodation supports and services such as 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
204 474 7423

<http://umanitoba.ca/student-supports/accessibility>

Evaluation and Marking

- Evaluative feedback will be given to students prior to voluntary withdrawal deadline.
- The final exam will be a take home format and students will be given 5 days to complete the exam.
- Failure to complete the final exam at the scheduled time will result in a grade of zero, except in properly documented cases of medical emergency.
- The course also involves assignments that students must complete in a timely manner and submit on-line.
- Detailed instructions for each exam and assignment will be provided.
- Failure to complete exams or course assignments will result in a grade of zero, except in properly documented cases of medical emergency.
- Detailed instructions for each exam and assignment will be provided.
- Grammar, spelling and composition will be evaluated and considered as part of the grading criteria for tests and assignments.
- General grading scheme (subject to modification by instructor): 90-100 A+; 80-90 A; 75-80 B+; 70-75 B; 65-70 C+; 60-65 C; 50-60 D; <50 F. Comments and grades will be provided on exams and assignments.
- Assignments handed in late will have 10% subtracted every 24 hour period. **NO EXCEPTIONS**
- Academic dishonesty will be treated very seriously (see the U of M Calendar for policies on plagiarism, cheating and impersonations at exams).

PLNT 2500 Crop Production – Lecture outline and course sketch

This course is divided into 22 lessons. Lessons typically require one full lecture period to complete, though some lessons will require 1½ lecture periods. Lecture notes for each lesson are on the UM Learn site for this course. Each lesson text is accompanied by the powerpoint slides for that lesson and any additional resource material (eg., websites, extra readings and statistical information regarding crop production).

- Lesson 1. Where do our crop plants come from?
- Lesson 2. Crop diversity for people and the planet
- Lesson 3. Some crop production history
- Lesson 4. Shifting cropping systems: Exploration and technology impacts
- Lesson 5. The crop production cycle: Systems thinking is the key
- Lesson 6. Crop rotation
- Lesson 7. When crop rotation requires environmental modification
- Lesson 8. Land management for crop production
- Lesson 9. Seed selection
- Lesson 10. Seeding and crop establishment
- Lesson 11. Crop monitoring I
- Lesson 12. Crop monitoring II
- Lesson 13. Crop quality
- Lesson 14. Pasture production and management
- Lesson 15. Organic crop production
- Lesson 16. From no-till to conservation agriculture
- Lesson 17. Plant breeding
- Lesson 18. Canola production around the world, and other global stories
- Lesson 19. Crop production and food security
- Lesson 20. Intercropping
- Lesson 21. Vegetable production
- Lesson 22. Crops in integrated farming and agricultural systems

Below is a short summary of some of the information provided in the course:

1. Introduction to crops in Canada and around the world
 - a. Definitions
 - b. Centers of crop origin and domestication
 - c. Manitoba, Canadian and Global crop production today
 - d. Deconstructing dinner – What plants go into your favourite foods?
 - e. Cultural/social/economic history of prairie crop production
 - f. Aboriginal agricultural systems on the Prairies
2. Crop Production Cycle – Practices, principles and new discoveries
This section of the course builds on what students have learned in AGRI1500 or AGRI1600, the introductory course taken before this one. We go through the major steps in crop production, but will include more detail of specific processes. Plus students will learn about the scientific discoveries that continue to guide innovation in crop production.

- a. Crop rotation planning
- b. Land preparation, tillage system and seed selection
- c. Seeding, nutrient management systems
- d. Nutrient supply systems
- e. Pest management systems (weeds, insects and diseases)
- f. Field data collection for decision making – crop scouting
- g. Crop quality for the food or industrial market
 - i. Learn about Canada’s grain grading system in relation to domestic and international markets
- h. Crop quality for the seed market
 - i. Learn about seed production and Canadian seed regulations
- 3. International crop production
- 4. Crop production topics
 - a. The conservation agriculture revolution – a response to climate stress
 - b. Precision agriculture – technological and ecological approaches
 - c. Crop-livestock integration – the story of two hamburgers
 - d. Organic and ecological crop production
- 5. Plant agriculture in future Integrated Farming and Food Systems

“At Home Lab” for PLNT 2500

Winter term, 2021

Demonstration of the lab assignments will be conducted during the class period. There will be no formal lab period in the course. There will be two opportunities each week to call in to ask Professor Entz questions about the lab.

Lab 1. Seed identification (1%)

Students will tape seeds onto the paper seed key provided in the lab kit. Students must submit an image of the completed project.

Lab 2. Yield components (5%)

Students have received pods of canola, soybean, peas, dry beans and seed heads of wheat, rye, barley, and oats, and bolls of flax. Students must separate the seeds from the non-grain material and count the seeds in each unit (ie., number of seeds per wheat head; number of seeds per canola pod). Students must submit the data for each crop.

Lab 3. Germination tests (4%)

Students will take the seeds harvested in lab 2 and conduct a standard germination test. Take the seeds from each crop and roll into a wetted paper towel. The standard germination test is conducted at room temperature so leave these samples on your kitchen counter. Make sure the paper towel stays damp for the entire 10-day period. After 10 days, open the paper towels and count the number of germinated seed. Calculate the percentage. Submit the data in an organized table.

Lab 4. Seeding emergence pattern test (5%)

Plant peas and soybeans in the same pot. Place seeds approximately 2 cm below the soil surface. Allow the two crops to emerge from the soil. 10 days after emergence, dig out the plants, tape onto paper towel and label all parts of the seedlings. Which seedling has an epigeous and which has a hypogeous emergence mechanism? Identify each seedling's growing point. Take pictures of your work and submit electronically.

Lab 5. Effect of seeding depth on emergence and growth of alfalfa and wheat (6%)

Use the root trainers provided in the lab kit. Open trainers and fill one half overflowing with soil. Place seeds at 4 different depths, 1 cm, 2, cm, 3, and 4 cm. Place the wheat and alfalfa into separate compartments within the root trainer. Allow all seeds to emerge from the soil. Then open the root trainers, gently wash away the soil and lay the seedlings onto paper towel in preparation for photographing. Take a picture of each crop separately (one image for wheat and one image for alfalfa). Import the image into powerpoint and label all the parts of the seedlings. and place seeds at different depths. Submit the powerpoint images.

Lab 6. Growing a crop (12%)

Each student has been randomly assigned a crop for you to grow at home. Fill one of your pots with soil and plant your assigned crop. Use three seeds per crop; thin down to two plants per pot after they all emerge. Take a picture of your crop each week. Import the images to a word document. Write a short description of your plant's development progress each week. Submit the word document, complete with images, at the end of the growing period.

Lab 7. Taping a tree for syrup production (2%)

Each student has been given a tree tap in your lab box. We will review how to tap a tree in class. At the end of March or beginning of April, tap a tree and try to collect some syrup. Send a video of the installed tap and any production of syrup.

Assignments/Exams with weighting or components

<u>Assignment</u>	<u>Grade</u>	<u>Due date</u>
1. Lab portion	35%	Multiple: On UMLearn
2. Crop rotation assignment	20%	March 2
3. Daily question log	20%	After each class
4. Final presentation (essay or ppt)	25%	Exam period

At Home Labs

Students will receive a lab box with all the supplies required for the lab project. Explanations on use of the lab box supplies will be given during the class period.

Daily question log (20%)

After each class, students must respond in two different ways. First, in a short paragraph (3 to 4 sentences), describe one or two interesting points you learned in the class today – and why these were interesting to you. Second, provide two thoughts (questions or ideas) you have based on the information presented and discussed in today’s class. These responses must be loaded onto the UM site within 1 days of each class. Asking students for a timely response is because all of your questions and ideas will be summarized and discussed in the following class.

Crop rotation assignment (20%)

Students will be provided with data on the yields of Manitoba’s major crops grown at Carman, MB in 2020. Students will be asked to calculate the profitability of each crop based on crop input costs and crop prices. This data will be provided in the assignment. Students will also compare the 2020 yields to the Carman area 10-year average yields for these crops. Students will write a report on their findings.