

Organic Crop Production on the Prairies PLNT 3560

Course Outline and Summary Notes

Dr. Martin H. Entz

Room 309 Agriculture Building (East Wing)

Phone 474-6077 M.Entz@umanitoba.ca

Why this course is useful?

The organic food market is growing rapidly and hence organic agriculture represents an important opportunity for farmers and processors. There are approximately 300 certified organic farmers in Manitoba and close to 5000 across Canada. Some Canadian farmers have converted a portion of their farms to certified organic in an effort to capture new markets for traditional crops; learn new ways of enriching soils with nutrients; and managing herbicide resistant weeds. Canadian companies are starting to hire organic crop and soil consultants, so training in organic crop production is an asset. Organic methods are increasingly seen as useful for conventional production as well. For example, herbicide resistance management requires that farmers employ alternative weed control methods – methods that have been developed on organic farms and organic research. Finally, this course is unique because it emphasizes a *systems* or *whole farm* approach to crop production.

Who should take this course?

Students who want to learn more about organic agriculture. The course will also interest students who want to learn about holistic, systems-based approaches to agriculture. The course will also provide students with practical approaches to improving soil health and teach students about new and exciting weed management strategies.

How this course fits into the curriculum

Organic Crop Production on the Prairies is an elective or restricted elective course (depending on which degree stream you are in). It is best taken later in your program when students have completed foundational courses in soils and crops. There will be some new concepts introduced so students are encouraged to engage the instructor for clarification whenever necessary. Asking questions is encouraged, and a great way to learn.

Undergraduate Calendar Description

This course provides a detailed overview of organic crop production on the Canadian prairies. The course focusses on organic crop production principles and practices, and information is targeted to wet and dry areas of the prairies. The course focuses on both the science and art of organic farming.

Student learning outcomes

- Learn the principles and practices of organic crop production in Canada
- Become aware of the scientific basis for organic crop production practices
- Gain insight into the history and philosophy of organic agriculture
- Learn how to design organic crop production systems for Manitoba and Canadian farms, including management of nutrient flows
- Learn from organic farmers about design and maintenance of profitable and productive organic systems

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 D2L 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).

Assignments/Exams with weighting or components

<u>Assignment/exam</u>	<u>Grade</u>	<u>Due date</u>
1. Crop rotation plan	20%	Feb 4
2. Nutrient management plan	20%	March 2
3. Weed management plan	20%	April 1
4. Daily question log	15%	Each class period
5. Final exam (open book)	25%	Exam period

Course assignments

Crop rotation plan (20%)

Students will work with a case farm located in Manitoba. It could be your farm, or the farm of a relative or friend. If you do not have a farm, I will assign you one. Based on the climate and soil conditions, you will be asked to design an organic crop rotation for the farm. The design needs the following elements:

- Must be a 7-year rotation
- Must include at least one full-season green manure crop
- Must include at least one late season cover crop
- Must include grain crops for export off the farm

- Must include a perennial crop
- Must be profitable (have a positive net return)

This assignment includes three parts. The first involves filling in a template table which describes your crop rotation. A word document template for this report is available in UM learn under “assignments”. One of the columns includes net return. For this you must use the organic cost of production data available from Manitoba Agriculture (<https://www.gov.mb.ca/agriculture/farm-management/production-economics/pubs/cop-crop-organic-production.pdf>). Crop prices for organic crops are available at: <https://organicbiz.ca/organic-price-quotes-late-november-5/>. You must also estimate the yields for your organic crops. Data for organic yields must come from studies or on-farm experiences in Manitoba.

The second part of the rotation assignment includes a 500-word narrative where you explain your rotation and cropping system.

The third part of the assignment is a 700-word literature review that describes the role of crop rotation in organic production systems in Canada. This 700-word literature review must include a minimum of 3 peer-reviewed references. Other “grey literature” resources such as Manitoba Agriculture (or other) websites may also be included.

Nutrient management plan (20%)

Now that you have the rotation set, the next assignment involves creating a nutrient management plan for your organic rotation. The first resource to complete this assignment comes from your soil test results (or your case study soil). Hopefully you all had a chance to collect soils as I instructed several months ago. This soil test data will form baseline information and guide the types of remedial nutrient additions that are required – with special emphasis on nitrogen and phosphorous. The other resources for the assignment include: 1) nutrient removal information in lesson 5; 2) the yield estimates from assignment one; 3) sources of nutrients you wish to apply to the land; and 4) nutrient concentration of those nutrients (data provided in UM learn under “assignments”). Therefore, the nutrient management plan really becomes a budgeting exercise. Keep in mind that the “math has to add up”. Use the word document template available in UM learn under “assignments”.

The second part of the assignment is to write a 700-word literature review on nutrient use in organic agriculture. This 700-word literature review must include a minimum of 3 peer-reviewed references that describe nutrient use in organic cropping systems. Other “grey literature” resources such as Manitoba Agriculture (or other) websites may also be included.

Weed management/tillage plan (20%)

You have collected soil from your farm (or case farm), plus you have been provided soil samples from two additional fields. Earlier in the course, you will have determined the weed species in these soils based on the weed seed grow-out activity. Based on the weed population results, you must develop a weed management plan for the farm. The weed management plan deals with two goals: 1) weed management and 2) soil health. That is, while tillage will definitely be

part of your weed management plan, you must show that you are able to maintain soil health despite the use of tillage.

You will develop a powerpoint presentation on weed control for your organic cropping system. The powerpoint presentation should be aimed at beginning organic farmers looking for weed management ideas. In the presentation, briefly show the life cycle of your major weeds. Be sure to indicate the practices you will use in each crop to address these weeds? How will you maintain soil health while managing these weeds?

Daily question log (15%)

After each class, students must respond in two different ways. First, in one sentence, describe one interesting point you learned in the class today. Second, what is a question you have based on the information presented and discussed in today's class. These responses must be loaded onto the UM site right at the end of each class.

PLNT 3560 Summary Notes

The course is divided into 11 separate topics, referred to as lessons.

- Lesson 1. Introduction to organic agriculture
- Lesson 2. Learning systems
- Lesson 3. Transition to organic crop production
- Lesson 4. Soil fertility – Nitrogen
- Lesson 5. Soil fertility – Phosphorous and beyond
- Lesson 6. Seeds, seeding and crop establishment
- Lesson 7. Tillage and weed control
- Lesson 8. Pest and disease management
- Lesson 9. Marketing organic products
- Lesson 10. Farm case studies
- Lesson 11. Additional depth packages of information
 - 11.1 Soil organic matter in organic production
 - 11.2 Crop-livestock integration in organic crop production
 - 11.3 Organic agronomists of the future
 - 11.4 Research update

Reading list

Drinkwater, L. E. 2009. Ecological knowledge: Foundation for sustainable organic agriculture. In: *Organic farming: The ecological system*, pp.19-47. American Society of Agronomy Monograph 54. (Read pages 27-30).

Francis, C. and Van Wart, J., 2009. History of organic farming and certification. Organic farming: The ecological system. In *Organic farming: The ecological system*. (pp. 3-17). American Society of Agronomy Monograph 54.

Frey, J.B. and Entz, M.H., 2014. Organic voices: Agronomy, economics, and knowledge on 10 Canadian organic farms. In *Managing Energy, Nutrients, and Pests in Organic Field Crops* (pp. 286-305). CRC Press.

Heckman, J.R., Weil, R., Magdoff, F. and Francis, C., 2009. Practical steps to soil fertility for organic agriculture. In: *Organic farming: The ecological system*, pp.139-172. American Society of Agronomy Monograph 54. (Read pages 140-143).

Kristiansen, P. and C. Merfield. 2006. Overview of organic agriculture. In: *Organic agriculture: A global perspective* (pp.4-7). Comstock Publishers, Division of Cornell University Press.

Thiessen Martens, J.R.T., Lynch, D.H. and Entz, M.H., 2019. A survey of green manure productivity on dryland organic grain farms in the eastern prairie region of Canada. *Canadian Journal of Plant Science*, 99(5), pp.772-776.