



COURSE TITLE

Precision Agriculture- Technological Tools for Decision Making

Department: Biosystems Engineering

Course Number: BIOE 0222

Academic Session Winter 2021

Credit Hours 4

Prerequisites and how they apply to this course

Classroom Location:

Online

Meeting Days and Class Hours:

MWF 9:30-10:20 am

Lab/Seminar Location: Agriculture Room 137

Lab/Seminar/Hours: Thursday, 2:30-3:55 pm
Thursday, 4:00-5:20 pm

Department Office location: E2-376

Phone Number: 474-6033

Instructor Information

Name & Title: Dr. Donald Petkau, P.Ag., P.Eng.

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Name & Title: Dr. Uduak Edet

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Course Philosophy

Students' Learning Responsibilities

Students are responsible for attending classes and laboratories, completing assignments, and attending all tests and exams. Students are responsible for completing assigned readings prior to class and contributing to class discussions. Expectations are that, by the end of term, students will understand the principles of precision farming and be able to apply these principles in an agricultural operation. Additionally, students will understand the technology behind precision farming and the basics on how it works.

Why this course is useful?

Technology is now a large component of the agricultural industry and students need training and knowledge to understand and apply these principles.

Who should take this course?

This course is applicable to a wide range of students from those who wish to work on the farm to those who need to interact with the agricultural community. It provides an understanding of the technology going into today's farming operation and of how this technology is progressing.

Course Description/Objectives

Undergraduate Calendar Description

Precision agriculture is a philosophy of agricultural management that has been enabled by modern technology. This course will examine both the technology and the techniques that can be used to improve the efficiency of agricultural operations by decreasing costs, increasing profits, and decreasing hazards to the environment. Students will be introduced to current and emerging technologies for crop, livestock and business management. Students will have the opportunity to apply data generated from these technologies to support decision making required by farm managers.

Instructional Methods

Lectures with in-class discussion.

Technical experience, computer simulation, data collection and analysis will be demonstrated and/or explained and students will demonstrate their grasp of these by hands-on analysis and production of lab reports for evaluation.

Course Objectives

- Explain the philosophy of precision agriculture
- Explain the Internet of Things (IoT)
- Explain the global positioning system
- Understand the various machinery technologies that have been developed to enable precision agriculture
- Understand how site-specific information is obtained and displayed

Learning outcomes

Learning outcomes assist: i) students to identify the knowledge, skills, attitudes and personal attributes expected of them to successfully complete their program of studies; ii) faculty to develop learning goals and objectives in their courses and programs, in prioritizing and focusing the learning experiences, and in the selection of appropriate assessment tools and; iii) potential students and outside agencies to assess the quality of our academic programs.

These learning outcomes areas include:

- Identify typical farm-related decisions or actions that influence the overall efficiency of the farm
- Identify precision agriculture concepts that can be used to address these farm-related decisions or actions
- Identify the components of the global positioning system
- Describe how the global positioning system can be used by an individual farmer
- Discuss the implications of the accuracy that can be achieved with use of the global positioning system
- Explain how guidance technologies work
- Explain how variable rate seeding technology works
- Explain how variable rate spraying technology works
- Explain how grain yield monitors work
- Explain processes used for soil sampling
- Explain processes used for crop mapping during the growing season
- Explain the concept of a geographic information system
- Interpret a yield map
- Explain the environmental benefits associated with the use of precision agriculture practices

Grade Evaluation

In class quizzes	10%
Mid term exam	20%
Lab assignments	30%
Final Examination	40%

Important Dates

Mid term exam	March 3, 2021
Voluntary withdrawal date	March 10, 2021
Final Examination	(to be scheduled)

Texts, Readings, Materials

Textbook(s) – Authors, Titles, Edition

The Precision Farming Guide for Agriculturists, An Agricultural Primer, Deere & Company

Supplementary Reading

Srinivasan, A. 2006. Handbook of Precision Agriculture: Principles and Applications.

Brase, T. 2005. Precision Agriculture.

Heege, Hermann J. 2013. Precision in Crop Farming: Site Specific Concepts and Sensing Methods:
Applications and Results

Course Policies

Late Assignments

10% of assignment grade will be lost per day late.

Missed Assignments

Will receive a zero grade

Missed Exams

There is NO make-up examination for a missed mid-term! If missed and student has a valid medical certificate or compassionate reason (e.g., death of an immediate family member), marks from mid-term will be added to marks for the final examination. Students who miss the examination without a valid reason will receive a grade of zero (0) for the mid-term examination.

In the case of a missed final examination, a student will be assigned an F no paper grade for the course unless an acceptable medical certificate or a confirmable compassionate reason is provided in which case a supplementary examination will be allowed.

Academic Integrity

Plagiarism or any other form of cheating in examinations, term tests or academic work is subject to serious academic penalty. Cheating in examinations or tests may take the form of copying from another student or bringing unauthorized materials into the exam room. Exam cheating can also include exam impersonation. A student found guilty of contributing to cheating in examinations 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 section in the University of Manitoba Undergraduate Calendar 2020/2021).

Use of Third Party Detection and Submission Tools

Electronic detection tools may be used to screen assignments in cases of suspected plagiarism.

Group Work Policies

Students are allowed to discuss laboratory results with lab partner or others but the final report must be independently written. Copying or joint production of reports will result in both reports receiving a zero mark.