COURSE TITLE
Precision Agriculture- Technological Tools for Decision Making

Department: Biosystems Engineering
Academic Session: Winter 2022
Course Number: BIOE 0222
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: 204-474-6033

Instructor Information

Name & Title: Dr. Uduak Edet, EIT
Email Address: Uduak.Edet@umanitoba.ca

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 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**

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<tr>
<th>Evaluation</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>In class quizzes</td>
<td>10%</td>
</tr>
<tr>
<td>Midterm exam</td>
<td>20%</td>
</tr>
<tr>
<td>Lab assignments</td>
<td>30%</td>
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<tr>
<td>Final Examination</td>
<td>40%</td>
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</tbody>
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**Important Dates**

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
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<tbody>
<tr>
<td>Midterm exam</td>
<td>March 10, 2022 (tentative)</td>
</tr>
<tr>
<td>Voluntary withdrawal date</td>
<td>March 17, 2022</td>
</tr>
<tr>
<td>Final Examination</td>
<td>(to be scheduled)</td>
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Texts, Readings, Materials

Textbook(s) – Authors, Titles, Edition
The Precision Farming Guide for Agriculturists, An Agricultural Primer, Deere & Company

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

Course Policies

Course Technology
The course will be delivered using Webex. Students will be asked to use their computer cameras and microphones as well as the Chat and other features this program offers to engage in classes, listen to recordings and view videos. Students who have constraints with technology should speak with the instructors while students who have technical difficulties should consult IST. UM Learn will be central for content, assignments and communication. As a courtesy to both the instructor and your classmates, distractions are to be avoided during class time. Please remember to mute your mic unless you are speaking to avoid disruptions.

Class 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/media/Electronic_Communication_with_Students_Policy-%20_2013_09_01_RF.pdf. Please note that all communication between you as a student and your instructors must comply with the electronic communication with student policy. You are required to obtain and use your UM email account for all communication between yourself and the university.

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 2021/2022).

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.

Student Accessibility Services
If you are a student with a disability, please contact SAS for 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: http://umanitoba.ca/stUDENT-Supports/accessibility
520 University Centre
204 474 7423
Student_accessibility@umanitoba.ca