

Department:

Precision Agriculture

Course Description:

This course provides an overview of precision agriculture concepts and the tools of the discipline: Global Navigation Satellite System (GNSS), Spatial Data Management Platforms, Intelligent Devices, and Implements. Introductory use of each of these tools within the processes of precision agriculture is covered. Hands-on activities with agricultural data and data collection equipment will provide an initial experience in the use of these tools. The primary and secondary economic and environmental benefits to the adoption of these practices are also discussed.

Course Competencies:

Upon completion of the course, the student should be able to:

1. Understand the basic purposes and concepts of precision agriculture.
2. Understand basic principles of the various tools of precision agriculture including GNSS, Spatial Data Management, Intelligent Devices, and Implements.
3. Recognize the use of these tools to collect data, analyze data, and interpret the information to make agronomic and economic decisions.
4. Describe justifications that demonstrate the economic or environmental benefits of adopting precision agriculture technology on the farm.

Course Content:

- A. Definition of Precision Agriculture
 1. Identify main concepts of precision agriculture.
 2. Describe various systems of farming (no-till, sustainable, organic) and relate to precision agriculture.
 3. Identify types of decisions made on the farm that could be enhanced with help from adopting precision agriculture technologies.
 4. Discuss how precision agriculture technologies can facilitate and enhance decision-making capabilities.
 5. Describe the basic components of a yield map and how they assist in making decisions on the farm.
- B. Tools of Precision Agriculture
 1. Describe the history, characteristics, and components of the Global Navigation Satellite System.
 2. Demonstrate the use of a positioning device to determine location, navigate to waypoints, or record data.
 3. Understand the sources of differential correction and the advantages and disadvantages of each.
 4. Describe the components of a spatial data management platform and its use in precision agriculture.

5. Use a spatial data management platform to generate layered maps containing information collected with agricultural implements.
 6. Describe the components of variable rate technology and its use in precision agriculture.
 7. Describe what remote sensing is and the value it brings to aid in making decisions.
- C. Protocols of Precision Agriculture
1. Describe how yield data is collected and recognize how systems differ from each other.
 2. Interpret a yield map from data collected in the field and discuss the value it brings to the decision-making process.
 3. Use GNSS equipment to map and collect soil samples and other geo-referenced data.
 4. Review nutrient map layers created from the geo-referenced soil samples and soil test laboratory results.
 5. Generate maps for visual interpretation of layered data.
- D. Benefits of Precision Agriculture
1. List the pros and cons of adopting precision agriculture technology on the farm.
 2. Design a cost-benefit budget for the purchase of precision agriculture equipment.
 3. Discuss how precision agriculture relates to the Sustainable Agriculture movement.
 4. Discuss the secondary benefits of adopting precision agriculture technology.

Learning Assessments:

Competencies may be evaluated by multiple measures, including discussion questions, graded assignments, comprehensive assignments, a research paper, projects, presentations, portfolios, quizzes, and exams.

Instructional Materials:

Textbook: Shannon, K., Clay, D., & Kitchen, N. (2018). *Precision Agriculture Basics*. Madison, WI: American Society of Agronomy. ISBN-13: 978-0891183662

Guidelines for Requesting Accommodations Based on Documented Disability or Medical Condition

It is the intention of Highland Community College to work toward full compliance with the Americans with Disabilities Act, to make instructional programs accessible to all people, and to provide reasonable accommodations according to the law.

Students should understand that it is their responsibility to self-identify their need(s) for accommodation and that they must provide current, comprehensive diagnosis of a specific disability or medical condition from a qualified professional in order to receive services. Documentation must include specific recommendations for accommodation(s). Documentation should be provided in a timely manner prior to or early in the semester so that the requested accommodation can be considered and, if warranted, arranged.

In order to begin the process all students **must** complete the “Disabilities Self-Identification Form” on our [Disability Services website](#).

This form can also be accessed at the Highland Community College homepage under Students Services/Student Resources/Disability Service or by contacting the Disabilities Coordinator.

A Note on Harassment, Discrimination and Sexual Misconduct

Highland Community College seeks to assure all community members learn and work in a welcoming and inclusive environment. Title VII, Title IX, and College policy prohibit harassment, discrimination and sexual misconduct. Highland Community College encourages anyone experiencing harassment, discrimination or sexual misconduct to talk to report to the Vice President for Student Services, the Human Resources Director or complete an [online report](#) about what happened so that they can get the support they need and Highland Community College can respond appropriately.

There are both confidential and non-confidential resources and reporting options available to you. Highland Community College is legally obligated to respond to reports of sexual misconduct, and therefore we cannot guarantee the confidentiality of a report, unless made to a confidential resource. Responses may vary from support services to formal investigations. As a faculty member, I am required to report incidents of sexual misconduct and thus cannot guarantee confidentiality. I must provide our Title IX coordinator with relevant details such as the names of those involved in the incident. For more information about policies and resources or reporting options, please review our [Equity Grievance Policy](#).