

Precision Agriculture - Software

From a machinery viewpoint, precision agricultural technologies can probably be summed up as the integration of electronics into agricultural equipment. Most systems are based on GPS technology for positioning, and incorporate multiple sensors in guidance systems, remote sensing, variable rate application and yield monitors.

Geographic Information Systems (GIS) are incredibly helpful in being able to map and project current and future fluctuations in precipitation, temperature, crop output, and more. By mapping geographic and geologic features of current (and potential) farmland scientists and farmers can work together to create more effective and efficient farming. GIS can analyze soil data combined with historical farming practices to determine what crops to plant, where they should go, and how to maintain soil nutrition levels to best benefit the plants.

In this section students will become familiar with: Precision Agriculture tools used in agriculture; technology options used in Precision Agriculture and the basics of how GIS, ArcGIS, Google Maps and Surety Maps are used in Precision Agriculture

Readings and Resources

Read/review:

- Virtual Lecture: [Graphic Information Systems](#)
- Pdf of Virtual Lecture: [Graphic Information Systems](#)
- All assignment documents

Student will access online:

- ArcGIS online tutorials
- Google Earth
- Surety Maps

Assignments

Complete:

- Readings
- PA 4 - Using ArcGIS Assignment
- PA 5 - Google Maps Assignment
- PA 6 - How we use Surety Maps in Precision Agriculture Assignment
- PA 7 - Discussion on the use of Drones in Agriculture

PA 4 - Using ArcGIS for Agriculture

ArcGIS is a computer system that allows you to map, model, query, and analyze large quantities of data within a single database according to their location. In this assignment students will be reviewing the basic features in the software program called ArcGIS online.

Assignment

The purpose of this exercise is to familiarize students with the capabilities of ArcGIS. Students will review ArcGIS online tutorials. As they go through the tutorials, students will locate Beatrice and Southeast Community College on the map, marking the relevant buildings on the campus.

1. Students will sign up for a 60-day trial of ArcGIS online, a free online version of the program ArcGIS.
2. After completing enrollment, students will view the guided tours:
 - a. Learn to make a map
 - b. Learn to style a map
 - c. Learn to explore Esri map layers

Read/review:

- Precision Ag Technology – GIS
- Virtual Lecture: [Graphic Information Systems](#)
- Pdf of Virtual Lecture: [Graphic Information Systems](#)
- All assignment documents

Requirements:

The assignment must

- Locate and mark Beatrice and Southeast Community College on the map
- Locate and mark the relevant buildings on the map
- Save and upload a copy of the map to assignment folder

This assignment has a point value of: 20 points

PA 5 - Using Google Earth in Agriculture

Google Earth allows you to fly anywhere on Earth to view satellite imagery, maps, terrain, 3D buildings, from galaxies in outer space to the canyons of the ocean. With Google Earth Pro you can create customized mapping applications for agricultural purposes.

Assignment

- Explore Google Earth's capabilities for use in agriculture
- Practice using Google Earth to map a farm

Read/review:

- Precision Ag Technology – Google Earth Assignment
- [Drawing your farm map in Google Earth](#)

Requirements:

Download *Google Earth* to your computer from this site: www.earth.google.com

Go to *Draw Your Farm Map* in Google Earth at:

http://www.gpsfarmmap.com/en/tutorial_sections/index/#page=page-2

Follow the directions for *Draw Your Farm Map* with these coordinates:

This assignment has a point value of: 20 points

PA 6 – Surety Maps

Precision maps assist farmers by showing them precise locations in the field and providing them specific information about that location. A precision map is a map that is made up of geo-referenced data that can then be used to show information about a precise location in a field, as well as information on crop moisture levels, soil nutrients levels, crop yield and much more. (www.farms.com)

One of the tools available for precision agriculture is Surety Maps. For this assignment students will work with Surety Maps to investigate its basic features and how it operates.

Assignment

Read/review:

- [PA 6 Surety Maps Outline](#)
- Precision Maps <http://www.farms.com/precision-agriculture/precision-maps/>
- Instructor Tutorial Videos
- Instructor Tutorial Instructions

Requirements:

After reviewing the instructor videos and working through the tutorials complete:

- PA 6 - 1 Surety Maps Activity
- PA 6 - 2 Surety Maps Activity

This assignment has a point value of: 20 points

Ag Technology – Topic 5b - Precision Agriculture Technology Outline