Bringing Agriculture to Life with Precision Technology

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Precision Agriculture Instructor

HIGHLAND COMMUNITY COLLEGE
Overview

1. Introduction
2. Sharing information
3. Program logistics
4. Reasons to adopt technology
5. Various areas
6. Implementing in the classroom
7. Take a look at mobile apps
## 34 Hour Certificate

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Name</th>
<th>Credits</th>
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<tbody>
<tr>
<td>AB 114</td>
<td>Agriculture Orientation</td>
<td>2</td>
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<tr>
<td>AB 128</td>
<td>Ag Electronic Devices &amp; Systems</td>
<td>3</td>
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<tr>
<td>AB 130</td>
<td>Precision Farming Systems</td>
<td>3</td>
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<tr>
<td>AB 132</td>
<td>Ag Data Management &amp; Systems</td>
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<td>AB 134</td>
<td>Precision Farming Hardware</td>
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<td>AB 136</td>
<td>Into to Ag GIS</td>
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<td>AB 138</td>
<td>Remote Sensing</td>
<td>3</td>
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<td>AB 142</td>
<td>Filed Mapping for Decision Making</td>
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<td>AB 144</td>
<td>Intermediate Ag GIS</td>
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<td>AB 146</td>
<td>Ariel Systems Management</td>
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<td>AB 148</td>
<td>Positioning Systems Management</td>
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<td>AB 244</td>
<td>Precision Ag Capstone</td>
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## AAS in Precision Agriculture

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<tr>
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<tbody>
<tr>
<td>AB 126</td>
<td>Principles of Agronomy</td>
<td>3</td>
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<tr>
<td>AB 203</td>
<td>Soils and Soils Lab</td>
<td>4</td>
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<tr>
<td>AB 277 OR BUS 130</td>
<td>Agriculture Microcomputer OR Microcomputer Applications I</td>
<td>3</td>
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<tr>
<td>ENG101</td>
<td>Composition I</td>
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<tr>
<td>ENG 102 OR SP 106</td>
<td>Composition II OR Public Speaking</td>
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<td>PS 107</td>
<td>General Chemistry with Lab</td>
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<td>Humanities &amp; Fine Arts</td>
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<tr>
<td>Social &amp; Behavioral Science</td>
<td>Any Course</td>
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Precision agriculture was introduced in the 1990’s as a way of providing producers with a more effective way of guiding through their fields. Today, it has grown to be a much more complex process where it focuses on accuracy and controlled techniques for planting and growing crops. Some of the specific applications include but are not limited to variable rate technology (VRT), soil sampling, computer-based applications, and remote sensing. This workshop will inspire educators to incorporate precision technology applications into their classroom through project-based learning.
How does precision agriculture vary?
Why Precision Agriculture?

Source: U.S. Census Bureau, International Data Base, July 2015 Update.
Why Precision Agriculture?

Agricultural input prices have risen faster than farm commodity prices in the U.S.

Index of agricultural input relative to output prices

- Fertilizer
- Crop seed
- Farm machinery
- Ag chemicals
- Animal feed

Prices paid by U.S. farmers for farm inputs divided by prices received for farm commodities (indexes, 1990=1.00).

Why Precision Agriculture?
Other Considerations

- Skilled labor is becoming harder to find
- Consumer preference
- Bureau of Labor Statistics expect growth rate of 10-19% through 2020
- Implemented more than just in agriculture
  - Architecture, Engineering, and Construction (AET)
  - Cell Tower Inspection
  - Pipeline
  - Utilities and Gas Companies
  - Wind Turbines
  - Railroad
  - Department of Roads and Transportation
GPS and Guidance

• Critical piece of precision ag
• Auto steer systems & mapping work together
• GPS correction options ($$$)
  • WAAS (Wide Area Augmentation System)
  • Differential Correction
  • RTK (Real-Time Kinematic)
Variable Rate Technology (VRT)

- Ability to change rates of product applied
- Fertilizer, seed population, and seed variety
- Delineate uniformity
- More precise management
Section and Row Control

- Planters and air seeders
- Section and nozzle control on sprayers
- Boom height control
- As-applied maps
Soil Sampling Fields

- Late fall and early winter are optimum times
- Properly determine plant available nutrients
- Prevent contamination by runoff and leaching
- Record long-term soil fertility trends
- Use compatible and network sharing systems
Computer-Based Applications

• Discovering spatial relationships among types of maps
• Multi-year analysis (5+ years)
• Yield vs. field attribute
• Fertility vs. observed field attribute
• Desktop GIS and web-based GIS
• Exporting and importing information
Mobile-Based Applications

• Convenient
• Meeting the rising demand and needs of global growers
• User-friendly
• Vary among IOS and Android
Remote Sensing Technology

- What factors are stressing a crop at a specific point in time?
- Satellite or aerial photography
- Infrared imagery
- Electrical conductivity (EC)
- Chlorophyll meters
- Crop height monitoring
Unmanned Aerial Systems (UAS)

• Soil and field analysis
• Crop stress
• Bacterial and fungal infections
• Irrigation
• Livestock observation
• Monitor rangeland conditions
How do I implement these concepts in the classroom?
Multidisciplinary Process

1. What is the farmer’s individual goal?
2. What causes variability in a field?
3. What kinds of tools are needed to meet goals?
Questions?

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