MORRISVILLE EST. 1908 STATE UNIVERSITY OF NEW YORK

School of Agriculture, Business, and Technology

AGSC 132
An Introduction to Computer Applications in Precision Farming
Fall 2023

Final Examination Study Guide

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Precision Farming Topics:

- Understand the concept of spatial variability and how it relates to precision agriculture.
- Know the crop production inputs that can be varied in SSCM.
- Know the basic principles of instantaneous yield monitoring and how does the latter compare to other methods of measuring yield.
- Know the components of an instantaneous yield monitoring system.
- Know how yield mapping relates to yield monitoring and data collection.
- Understand the need for soil sampling and testing.
- Understand soil sampling-related factors that influence yield.
- Know the basic soil sampling methods that may be followed in precision agriculture.
- Understand the factors that one should consider in a soil sampling program.
- Know the basic steps of soil sampling.
- Understand the potential impacts of a soil sampling exercise under SSCM on a soil fertility program.
- Understand the need for a variable rate application.
- Know the two methods for implementing variable rate application.
- Understand the benefits and drawbacks of the methods that can be followed in implementing variable rate application?
- Know the primary components of map-based variable rate application systems.
- Know variable rate controllers and actuators and where to use them.
- Understand the issues that should be considered in VRA systems.
- Have a basic understanding of the framework and components of Trimble Ag Software and how useful would such a software be in farm record keeping and management.

Positioning Systems Topics:

- Know the basic types of positioning systems.
- Understand the basic operation of GPS and GLONASS.
- Know the three components of GPS.
- Understand the concept of satellite ranging.
- Understand how a position can be determined using GPS.
- Name the factors that affect GPS accuracy.
- Understand the principles of DGPS and the types of DGPS discussed in class?
- Know the possible sources for real-time DGPS.
- Know the basic components of a DGPS receiver, including the two demonstrated in the class.
- Understand the positional accuracy is needed in precision farming.
- Know the different types of GPS systems covered in the class (including the two that were demonstrated in the field) and how do these systems differ.

Geographic Information System Topics:

- Know how to define GIS.
- Understand the capabilities and primary benefits of GIS
- Know the GIS-related fields.
- Understand the primary advantages, capabilities, current uses, and the potential sources of data for GIS.
- Know the primary differences between vector and raster data as well as the three types of vector data used in QGIS.
- Know how to convert the units of measurements based on provided conversion factor(s).
- Understand the meaning of map scale and the three ways to depict it on a map.
- Know how to use a map scale to find distances on the ground given measurements on the map or vice versa.
- Understand what is unique about topographic maps and how to interpret them.
- Know what contour lines correspond to and how these provide information about topography.
- Understand how to read contour lines.
- Understand the term “thematic map”.
- Know the basic “tools” and buttons covered in QGIS (you need to review all the questions on the completed laboratory exercises and be familiar with the answers).

Remote Sensing and Digital Orthoimagery Topics:

- Understand remote sensing and what does it provide.
- Understand the applications of remote sensing in farming.
- Understand the basics of remote sensing.
- Understand the two types of remote sensing systems and which one is more widely used.
- Understand the difference between spatial resolution, spectral resolution, spectral response, and frequency of coverage (or temporal resolution).
- Understand the steps involved in the process of applying remotely-sensed data and images in site-specific crop management.
- Know the two widely used sources of remotely-sensed data and which one is more useful to farmers.
- Have a basic understanding of the basic concepts of DOI, the key characteristics of DOI (including those available from the NYS GIS Clearinghouse), and the advantages of DOI.

Please note that the final exam for AGSC 132 will be comprehensive. The exam will be scheduled during the finals week.

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