

April 4, 2016

Dear Dr. Gunderson:

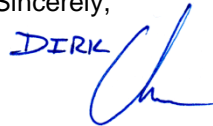
Please find below my evaluation of course *AGRI 265: Agriculture Electronic Devices and Systems* offered by Lake Region State College.

As presented in the syllabus, the course contents meet the stated objectives of providing students with knowledge and skills necessary to successfully work with direct current electrical systems and precision agriculture sensors.

Please feel free to provide me feedback and/or questions on my review. You are welcome to email (charlsond@gmail.com) or call (479-445-4339) me.

Thank you for this opportunity to join you in promoting precision agriculture education, and I am looking forward to continuing our collaboration.

Sincerely,

A handwritten signature in blue ink that reads "DIRK" followed by a stylized cursive signature.

Dirk Charlson, Ph.D.

Course Review

Summary of Course:

The *AGRI 265: Agriculture Electronic Devices and Systems* course provides students with basic knowledge and training for testing, troubleshooting, and repairing direct current electrical systems commonly used in precision agriculture technology. Students begin the course with an introduction to careers in electronics followed by an introduction of the Digital Multi-Meter (DMM) to measure voltage, resistance, and current of a circuit.

The atomic basis of electrical charge and concepts of current, resistance, and conductivity are presented to further enhance the student's understanding of electricity. Since electronic systems are used to control and monitor many functions of modern agricultural equipment, basics of hydraulics and pneumatics are presented to students followed with the topic of telecommunications.

Students learn about conductors and insulators in relation to twisted-pair cables and corresponding color coding and categories, in addition to, modular jacks and plugs, termination blocks, Metri-Pack and Deutsch electrical connectors. The basics of electronics is concluded with study of resistors, potentiometers and rheostats, batteries and direct current powers sources, switches, and circuit protectors.

The course transitions into the application of electronic systems in sensors and devices used in precision agriculture, including soil and crop sensors, Veris soil electrical conductivity mapping system, and ISOBUS and CAN bus communication systems.

Summary of Course: cont.

The course concludes with exercises in testing, troubleshooting, and repairing series, parallel, and series-parallel circuits. Upon completion of this course, the student will be able to test electronic equipment using proper diagnostic techniques to repair or replace damaged systems, as well as, calibrate electronic systems used in agriculture.

Commendations and Recommendations:

Syllabus:

1. The syllabus for the course is thorough and provides clear expectations.
2. I especially appreciate the section regarding plagiarism. From personal experience, might I recommend adding one additional comment on plagiarism. "Students working together on homework is encouraged, however, each individual student should submit homework answers in their own words and not exact wording of classmates."
3. Editorial Comments are indicated in red on the syllabus.

Course Content:

1. The instructor(s) did a nice job of developing the outline of the course and combining information from several references, which is not always an easy task.
2. The content and flow of the course is logical. Starting with basics of electricity and testing and finishing with precision agriculture application.
3. The course will be enhanced by including some emphasis on safety, including the dangers associated with electricity and use of proper Personal Protective Equipment. As discussed in more detail below in the "Reference/Textbook" Section of this evaluation, the photographs in *Introduction to Electricity* textbook demonstrate improper use of PPE. These observations could be used as a learning exercise for students to identify the proper use of PPE and identify unsafe actions.
4. The *Handbook of Precision Agriculture: Principles and Applications* is an excellent reference. I recommend taking a look at Chapter 3 in *Precision Agriculture for Grain Product Systems* and Chapter 2 of *Precision Agriculture Technology for Crop Farming* for updated advances in areas of remote sensing to supplement the current course textbook.

References/Textbooks:

1. *Introduction to Electricity* - Paynter and Boydell, 2011.
 - This is a very "student-friendly" book. The section summaries and chapter quizzes are very instructive and informative.
 - Although the textbook clearly and correctly discusses proper use of PPE, the photographs do not correspond with the text or commonly accepted best practices by professional electricians.
 - Long-sleeve cotton shirts and long pants are considered the minimum requirement for protection; However, several photographs (Fig S.4; Fig S.8; Fig 1.1; Fig 1.6; Fig 1.7; and Fig 5.8) show individuals wearing long-sleeve shirts with sleeves rolled-up exposing the person's skin to electrical hazard and burns.
 - In addition, I am a strong advocate regarding wearing safety glasses anytime working with equipment or conducting activities that could lead to eye injury. In several figures, I would emphasize the individuals should be wearing safety glasses or face shields (Fig 1.2; Fig 1.3; and Fig 1.6)
2. *Agricultural Mechanics: Fundamentals & Applications, 4th ed.* - Herren and Cooper, 2004.
 - Unit 37 of the book referenced for the course is very informative and provides excellent illustrations.
3. *Handbook of Precision Agriculture: Principles and Applications* - Srinivasan (editor), 2006.
 - This is a very in-depth book and nice primer for Precision Agriculture. Thank you for sharing this book with me; I plan to purchase a copy for my own library.
4. *Precision Agriculture for Grain Product Systems* - Whelan and Taylor, 2013. Reference Suggestion
 - "Chapter 3: Hardware for Precision Agriculture" provides practical information on remote sensing technology and application. The chapter discusses yield monitoring devices, soil sensing systems, and multi-sensor platforms as well as a list of commercially available sensing systems.
5. *Precision Agriculture Technology for Crop Farming* - Zhang (editor), 2016. Reference Suggestion
 - "Chapter 2: Sensing Technology for Precision Crop Farming" discusses the science of remote sensing. This book is a good resource for details, however, this chapter may be beyond the scope of the course.

End of Review