

APTC (CRSS) 3030-3030L: PRINCIPLES OF PRECISION AGRICULTURE

TENTATIVE SYLLABUS – FALL SEMESTER, 2013

Mission Statement

Provide students with a good understanding of the principles of precision agriculture, the ability to analyze and evaluate spatially distributed data, the ability to design and implement precision agriculture management plans, and the experience to use key precision agriculture tools and technologies.

Additional Objectives

1. Extend critical thinking and problem solving abilities.
2. Improve written and oral communication skills.
3. Learn how to create, present, and interpret maps.

Maps

We will use maps to display the variability of measured field parameters such as yield, elevation, soil electrical conductivity, pH, etc. Because maps are the key informational tools of precision agriculture, you will become proficient at making maps. Each map must have a title, labeled axes, and an understandable legend to receive full credit. Units must be included where appropriate. You will be required to learn specialized mapping software to complete your assignments.

Labs and Lab Reports

We will be conducting laboratories every week to reinforce the materials presented in the class and to provide hands-on training with the technologies we will be discussing. A comprehensive laboratory report summarizing the lab's activities and including requested materials (usually maps) will be due one week after the lab. Laboratory reports must be prepared using an appropriate reporting style to receive full credit. A laboratory report style guide is available in the student center. Please do not remove the guide from the student center. A lab report guide and an example lab report are attached to this syllabus. **USE THEM.** The lab reports are your opportunity to demonstrate to me that you understand the material and to also demonstrate that you can analyze information, appraise the information, assess the pros and cons, make judgments, and defend your decisions.

Design Project

You will be divided into teams of three or four. Each team will be expected to create a precision agriculture management plan for an agribusiness. Teams will function as agricultural consulting firms vying for a contract from the agribusiness. At the end of the semester, each team will submit a written proposal with their plan and will also make an oral presentation to the agribusiness owner(s). The team's grade will be a combination of how the written report and oral presentation are scored. Again, this is an opportunity to impress. Expectations for the design project are described below.

Oral Presentations

Students will be expected to give one to two oral presentations to the class during the semester. Presentation topics will vary. This will give you an opportunity to polish your public speaking skills as well as to demonstrate to me that you can read and draw appropriate conclusions from technical publications. Expectations for the oral presentations are described below.

Literature Reviews

During the semester, students will be assigned scientific journal articles relevant to the topic being discussed in class. The students will be expected to read and understand the journal article, write a one-page summary of the article, and make an oral presentation of the article to the class.

Instructor

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Guest Lecturers

Experts in various aspects of precision agriculture will occasionally present lectures or provide demonstrations of products. Students will be notified in advance of appearance by guest lecturers.

Prerequisites

MATH 1113

Credits

3 credit hours; two 50-minute lectures (Monday) and one 2-hour lab per week (Wednesday)

Text

Reading materials will be supplied by instructors and will include benchmark research articles, laboratory experiment outlines, and software manuals.

Grading

The grade you receive in this course will be determined from your performance on two announced exams, unannounced quizzes, lab reports, a team design project, and a comprehensive final exam. These factors will be weighted as follows:

Announced Exams 20%
Unannounced Quizzes 10%
Homework Assignments/Lab Reports/Presentations 40%

Design Project 20%
Final Exam 10%

Grades will be assigned as follows:

| | | | |
|----|--------------|----|--------------|
| A | 93 and above | D+ | 67-69 |
| A- | 90-92 | D | 63-66 |
| B+ | 87-89 | D- | 60-62 |
| B | 83-86 | F | less than 59 |
| B- | 80-82 | | |
| C+ | 77-79 | | |
| C | 73-76 | | |
| C- | 70-72 | | |

Up to thirty percent of the grade on written assignments (homework assignments and papers) and oral presentations will be based on quality of communication. Spelling, grammar, punctuation, and clarity of writing are evidence of written communication quality. Enunciation, voice projection, clarity and logical order of the presentation and effective use of visual aids are evidence of oral communication quality.

Attendance

Students are expected to attend class on a regular basis. If you are absent from class, it is your responsibility to make up any work that is missed.

Most labs will be conducted in the field or off-campus and cannot be made up. Lab reports for missed labs that are not made up will not be accepted.

Make-up work must be completed within a week of original due date or return of student to class after the approval of the instructor.

Exams and other assignments that are missed due to unexcused absences will be counted as zero (0).

Food and Drink in the Classroom

University policy prohibits tobacco products, food or drink in all labs and classrooms.

Academic Honesty

Students are reminded that they are bound by the University's Academic Honesty Policy. If you have misplaced your copy, the policy is posted on the Web at:

www.uga.edu/ovpi/academic_honesty/culture_honesty.htm

All academic work must meet the standards contained in "A Culture of Honesty." Each student is responsible for informing themselves about those standards before performing any academic work.

For this course, all lab reports and other assignments can be discussed with your classmates but any work you turn in must be your own.

Help Outside and Within the Classroom

Help is available to you should you have difficulty with this course. Please make an appointment to arrange for a help session immediately after class or by using email. Students with disabilities who require reasonable accommodations in order to participate in course activities or meet course requirements should contact the instructor during regular office hours or by appointment. For more information, please visit the University's Disability Resources Center at: www.drc.uga.edu or (706) 542-8719.

Note

The course syllabus is a general plan for the course; deviations announced to the class by the instructor may be necessary.

Topical Outline

Introduction
GPS
GPS Guidance
GIS
Remote Sensing
How to Use Images
Grain Yield Monitors
Peanut Yield Monitors
Cotton Yield Monitors
Other Yield Monitors
Soil Sampling
Soil Electrical Conductivity
Management Zones
Variable Rate Technology
Variable Rate Irrigation
Profitability of Precision Agriculture

Email

I will communicate with you via email. Check your UGA email every day.

A full mailbox is not an acceptable excuse for not receiving an assignment or files needed to complete an assignment.

Expectations

This class will promote critical thinking, problem solving, and technical communication. Listed below are expectations for assigned class work.

Lab Reports – To be eligible for full credit, all lab reports must:

1. demonstrate that you analyzed the problem or technique we presented during the lab, evaluated and explained the results by applying your classroom knowledge, and extended the analysis to real life situations;
2. be submitted in the proper format;
3. address all the questions/issues presented in the lab assignment; and
4. be your individually work unless I specifically say otherwise.
5. Lab reports will be due one week after the lab exercise.
6. Lab report format: see next pages.

Oral Presentation of a precision ag technical journal article

1. I will assign each of you a technical journal article.
2. You will give a 10 minute presentation to the class explaining the key points of the article and its conclusions.
3. Your grade will depend on how well you present the article's key findings.

Design Project

1. Work in design teams of 3 or 4 students.
2. The same problem will be presented to all the design teams. It will consist of developing a precision agriculture management plan for a sector of the agricultural industry.
3. Your project will consist of the following three phases:
 - a. Literature Review – read up on the topic. You will cite the sources you find in your project report.
 - b. Design phase – Develop the precision agricultural management plan with an emphasis on creativity and original solutions. This is the most important component of the project. You will be evaluated on your analysis of the problem, your evaluation of the alternatives, and your argument supporting your choices. Simply listing various technologies is not acceptable.
 - c. Submit a written report of the design project using Lab Report style described above.
 - d. Twenty-minute oral presentation of your project to the class.
4. The team's grade will be a combination of how the written report and oral presentation are scored. The team's numeric score will be multiplied by the number of students in each team. Team members will then decide collectively how many points will be assigned to each of the team's members. In other words, the team will be responsible for determining the contribution of each member to the team's overall grade.

Student Guide for Preparing a Laboratory Report

A well written laboratory report demonstrates the writer's comprehension of the scientific principles behind the laboratory.

Typical Components of a laboratory report are:

Title Page

Information on this page should include the name of the experiment, the names of student, and the date. Titles should be simple, informative, and less than ten words. Titles such as "Lab #4" are not informative and thus should not be used.

Summary

This page should summarize the essential aspects of the report including the purpose of the laboratory exercise, key findings, and significant major conclusions. The summary should be concise but enable the reader to decide whether they need to read the whole report. The summary should be 100-200 words.

Introduction

This section should include background material to the laboratory such as the theory, a description of how equipment used in the laboratory works, presentation of previous research which is relevant to the laboratory, and formulas needed to understand the work. When appropriate, the hypothesis that is to be proven by the laboratory exercise should be given. In the absence of a hypothesis, the reason for conducting the laboratory should be clearly stated.

Methods and Materials

This section can be described as an instruction manual that helps someone else to duplicate the laboratory. The equipment used should be listed or discussed. In addition, the procedures procedure used in the laboratory should be presented in a logical sequence. This section should focus on "what equipment was used", "how was the equipment used", "what sequence of events took place", "how were the data recorded", and "how were the data analyzed", etc.

Results

This section should present the data, observations, and outcome of the laboratory. While this section is the most straightforward section of the report, it is critical to give careful consideration to the proper method for presenting the data. Presenting the results in chronological order is simple and requires minimal prior planning, however this presentation method can make it difficult for the reader to identify and understand the most important information. The raw data should be summarized using statistical methods and then presented through the use of tables, graphs and/or figures. All tables, graphs/figures should have titles or captions. Titles and captions should contain enough information that the table/graph/figures can be understood without reading the report.

Discussion

This section should be considered the most important section of the report and should demonstrate your understanding of the principles behind the laboratory exercise. In this section, you should interpret the results and convince the reader that your interpretation is logical and correct. It is important that any limitations of your interpretation or of the scope of the laboratory are noted and to account for these limitations.

Conclusion

This section should be short and introduce no new ideas. The hypothesis of the study should be restated and if the hypothesis is proven should be noted. The conclusion is a good place to discuss future work that needs to be done to extend this work.

References

This section should list other work that you cited in your report or used to prepare your report.

Appendices

This section included information that augments your report but is not needed to understand your report. This can include the raw data, calculations, graphs/figures/tables not used in the main body of the report. The reader does not need to read this section unless he/she wants the raw data.