Syllabus - AGRY 598 - Precision Crop Management – Fall 2016

AGRY 598 Precision Crop Management. Sem. 1 Cr. 3. CRNs 10212 and 10211.
An experiential lecture, discussion and field laboratory course for graduating seniors (December 2016 or May 2017). May be used in combination with AGRY 498 to meet the Agronomy undergraduate capstone requirement; will also meet the GIS/GPS requirement in Agronomy plans of study.

Topics planned include but are not limited to GPS, GIS, RTK, auto steer basics, GIS data collection, crop management software and the use of integrated spatial data in zone management decision-making. Includes harvest operations and accurate yield mapping, soil sampling, precision zone P, K and pH management, N management, remotely-sensed data interpretation, variable rate and variable genetic planting, planting systems, spray systems, tile drainage design and installation, field operation logistics, crop residue management, cover crops, soil compaction, irrigation management and crop diagnostics. Consent of instructor required.
Team taught by Drs. Lee Schweitzer and Bruce Erickson with support from Drs. Darrell Schulze and Eileen Kladivko.

1. Course Resource Website
https://ag.purdue.edu/agry/courses/Pages/agry598.aspx

2. Class Meetings
The class meets each Tuesday 1:30 to 5:20 p.m. (includes travel time for off-campus field demonstrations). Please see the class schedule for meeting locations. Class meetings are held in 2-425 Lilly Hall except when field trips are scheduled.

3. Field Trips
2. On days scheduled for field trips (see the class schedule) please board the bus at the curb of Russell Street west of Lilly Hall. The bus will leave promptly at 1:30 p.m. so please plan to arrive on time. If an emergency arises and you can not attend class please notify Dr. Schweitzer prior to class if possible (cell phone 765 413 5994 ; email lschweit@purdue.edu).

4. Grading Policy and Performance Evaluation
This class is structured to provide students with opportunities to gain practical insight an experience with a wide array of emerging crop management technologies and strategies.

Each student initially has an A in the course and it is our goal to work with each student to maintain that level of performance. However, unsatisfactory participation or incompletion of the requirements listed below will result in a one-letter grade reduction for each requirement not met.

a) Attendance: Attendance is required. Unexcused absence will result in grade deductions as follows (with the exception of the first week’s class meeting).

1 letter grade with 2 unexcused class absences
2 letter grades with 3 unexcused class absences
3 letter grades with 4 unexcused class absences
4 letter grades with 5 unexcused class absences

b) **Participation:** As a capstone course active participation by all students is expected in each class meeting. Ask questions which exercise critical and analytical thinking and communicate as a professional in interactions with industry representatives, farmers, fellow students and the faculty.

Each student is expected to make written notes of the **key points and observations made / lessons learned during** each day’s presentation. Your notes will serve as a valuable reference for use as you prepare your team presentation and as a future professional resource.

c) **Team Presentation**
Each student will be a part of a team of 3 to 4 students to compose, practice and present a Precision Crop Management topic selected from a list provided and targeted for an industry or extension farmer audience.

PowerPoint presentations are to be 30 to 40 minutes in length, professional grade, supported by valid data, photos, graphics and video clips as appropriate. Each presentation is to be informative, well organized, practiced and structured in such a way that an industry or extension farmer audience member will be able to take home key points and translate them to action.

Team presentations may be added to each students’ academic portfolio and will boost students’ professional prospects as evidence of professional presentation capability and experience.

**Each presentation should include (but is not limited to) answers to the following questions for the intended audience.**

1. What is the technology, how does it work and why is it relevant and of potential value to the farmer?
2. Is the technology adaptable to their farm?
3. How could it return positively on investment?
4. Will utilization of this technology produce a significant improvement in crop management efficiency (lower cost per bushel) and or reduce risk?

Please begin preparation of your presentation early in the semester and take full advantage of university faculty, industry representative, farmer, library database and university and industry web-based resources. Sources other than your own original work must be properly cited.

There are no restrictions on the range of resources you can utilize so please think broadly and be imaginative.
The key is to start preparation planning early and to adhere to a time line that allows sufficient time for preparation and multiple practice/upgrade cycles. Gaps in coverage and support show up best through formal practice.

A well-developed outline of each team’s presentation content (including Power Point slides) is due in class on **November 8**. Each team will present a formal practice dry run in class on **November 15** for constructive peer and faculty review and critique. Final presentations are scheduled for **November 29 and December 6** in 2-425 Lilly Hall.

**Presentation Topics (Student Topic Preferences Indicated By Sign Up)**

Topic Areas Are A General Guideline – Student Teams May Narrow (But Not Broaden) The Scope Of Their Presentation – Class Discussion And Draft Outlines Will Assist Teams In Avoiding Topic Overlap.

A. **Agronomics Of Corn Planting Management By Zones – Variable Seeding Rate and Genetics (Multiple Corn Hybrids), Twin Or Narrow Row Corn. Population Optima. Data Supporting Or Refuting Response To These Management Alternatives** In Light Of In-Field Variability. Required Concurrent Changes In Other Inputs (Interactions).

B. **Corn Planting Equipment** – Active / Passive Downpressure Control – Margin Management, Metering, Seed Singulation, Spacing and Monitoring/Mapping, Fast Planters (Meters, Brush Belts and Other Technologies For High Speed Planting), Row Residue Management – Clean Sweep & Other Residue Management, Starter Fertilizer Placement Attachments, Multiple Hybrid Planters, Narrow and Twin Row Planters. Variable Rate Planter Drives.

C. **Agronomics Of Soil Fertility Zone Management** – Soil Sampling Strategies/ Sensor Data / Other GIS Data Such As Yield Maps – Strategies For Writing Profitable Variable Rate P, K, Ag Lime and Nitrogen Prescriptions (include data to back up or refute zone management strategies for crop nutrient management).

D. **Economic and Efficiency Perspective.** Auto Steer, Swath Control, Boom Control, Section Control, Direct Injection Spray System And Other RTK **Efficiencies** / Machine Synchronization (Multiple Planters/Combinies/Sprayers/Combines & Grain Carts), **Labor and Equipment Utilization, Pesticide and Fuel Savings, Environmental Stewardship, Family Time, Farm Business Operations.** (Please leave out agronomic response of variable seeding rate and multiple hybrid/variety (Group A) and variable rate fertilizer and ag lime rate prescription recommendations by zones (Group C).
E. Combine And Software Set Up, Calibration and Operation For Accurate Monitoring and Mapping Of Yield Monitor.

F. Integrative Precision Ag Software – Integrating Data Sources And Utilizing Data For Zone Management Agronomic Decision Making – Yield, Soil Fertility P, K, pH, SURGO, CTI, Topography, Tile, Field Boundaries, Soil Productivity Indices, Sensor Data (Capacitance Probe Soil Moisture/Remote NDVI or Other Spectral Data Such As Greenseeker), Economic Summaries (Profit Or Loss $/Acre, $/Bushel).

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Please ask questions and let Dr. Schweitzer or other participating faculty know if we may be of assistance.

HAVE A GREAT SEMESTER!