

# Precision Agriculture for Practitioners

June-July, 2013

*offered by the American Society of Agronomy*

## **Primary Instructor**

Bruce J. Erickson, Ph.D., Certified Professional Agronomist  
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**Class Schedule/Time** Orientation Wednesday June 5, then successive Wednesdays as shown on the syllabus through the end of July. 12:00 pm Noon to 1:30 pm Eastern, 11:00 am to 12:30 pm Central, 10:00 am to 11:30 am Mountain, 9:00 am to 10:30 am Pacific. Most class periods will last about 90 minutes.

To maximize their learning, students will be expected to spend time reading and studying outside of class in addition to the scheduled class periods. The instructor may be contacted at any time via telephone or email with questions or comments.

**Communication Requirements** The course is delivered live via the Web using GoToMeeting soft software. ***An email address and high-speed internet access are required.***

## **GoToMeeting Systems Requirements**

[http://support.citrixonline.com/GoToMeeting/help\\_files/GTM010003#What](http://support.citrixonline.com/GoToMeeting/help_files/GTM010003#What)

**Assessment** A ten question quiz will be offered after each lesson, available for students to take on-line during their own time. Quizzes must be completed by Midnight Central Time on the last day specified for each quiz (see Syllabus/Schedule). Individual performance on weekly quizzes will be provided confidentially to students via email to give an indication of mastery of various topics. **No make-up quizzes will be offered.** There will not be a final exam for this course, and grades will not be assigned. Students who accumulate at least 49 of the 70 quiz points (70%) can request a certificate of completion for the course. Missed quizzes will count as zero.

Certified individuals seeking Continuing Education Units (CEUs) must get a passing score (at least 7 of 10 or 4 out of 5) on a quiz to get credit for that particular session. The system allows you to take quizzes multiple times, but only your first score is counted. Total CEUs include 3.0 in Nutrient Management, 1.0 in Soil & Water Management and 8.0 in Crop Management.

**Student Directory Information** Student name, city/state/country, phone, and email will be included in a listing on the class web site, available only to the other students and those administering this class. Students can opt out of this listing when they register for the class.

**Use of Class Materials** Registrant agrees that the name indicated on the registration form is the sole individual receiving the on-line instruction and the only person completing the on-line quizzes. Individuals found in violation of this policy will be subject to dismissal from this course, revocation of certification, and possible loss of privileges to participate in future offerings from the American Society of Agronomy.

The PowerPoint presentations, class recordings, quizzes, worksheets, and other materials developed specifically for this class are for the educational purposes and use of students registered for this class. They are not to be copied, forwarded or shared in any way with anyone for any other use without the permission of the American Society of Agronomy.

**Class Web Site** Students registered for the class will have access to the class web site where the following will be posted:

Lecture video recordings (audio with PowerPoint slides)

PowerPoint slides in PDF format.

Link to quizzes

Answer keys to quizzes

Access to the class web site will begin by June 5 and end one month following the last class period, ending August 31, 2013.

**Course Description** Precision Agriculture for Practitioners provides a base-level understanding of the technology that drives precision farming, but also takes that to the field level so that learners can understand and apply practical applications in the regions and with the crops with which they work. Upon completion, the learner should have a solid grasp of Global Positioning Systems and GPS correction, how guidance systems work, collecting, integrating, and utilizing site-specific information such as soil test data, remote sensing, yield monitor, electrical conductivity, and soil mapping information, using variable rate technology for seeding, fertilization, and pest management, spatial data analysis, and the forces that drive precision farming economics and adoption.

The course is taught using distance education technology, but a variety of practical examples and case situations will be woven into content delivery to maximize understanding and its application in the field. Whether you are personally involved in production agriculture, advising farmers as an agricultural retailer or consultant, a representative for an agricultural business or government agency, or just looking to build your expertise, this course will cover topics that should be of direct interest to you.

**Syllabus/Schedule** (subject to change)

<b>Date</b>	<b>Topics (CEU'S)</b>	<b>Reading Assignments Prior to Class</b>	<b>Quiz</b>
Wed June 5	<b>Orientation: Using the Online Classroom, Introductions, Learning Objectives Precision Farming Basics</b> Dr. Bruce Erickson, Agronomic Education Manager, American Society of Agronomy, and Purdue University, West Lafayette, IN		
Wed June 12	<b>Lesson 1: Guidance Systems, Corrections, Guidance Applications</b> (1.5 CM) Wade Stewart, Technical Training Manager, Ag Division at Trimble Navigation, Westminster, CO.	Trimble Ag Learning Center <a href="http://www.trimblelms.com/login/1049/trimble_agriculture.html">http://www.trimblelms.com/login/1049/trimble_agriculture.html</a> GNSS Planning Tool <a href="http://www.trimble.com/GNSSPlanningOnline/#/Settings">http://www.trimble.com/GNSSPlanningOnline/#/Settings</a>	Last Day for Quiz 1 is June 25
Wed June 19	<b>Lesson 2: Gathering Data for Site-Specific Crop Nutrient Management: Grid Soil Sampling, Use of Tools to Direct Zone Soil Sampling, and Use of Active-Optical Sensors for In-Season Nitrogen Management</b> (1.5 NM) Dr. Dave Franzen, Extension Soil Specialist, North Dakota State University, Fargo, ND.	What is Site-Specific Farming? <a href="http://www.ag.ndsu.edu/pubs/plantsci/soilfert/sf1176-1.pdf">http://www.ag.ndsu.edu/pubs/plantsci/soilfert/sf1176-1.pdf</a> Developing Zone Soil Sampling Maps <a href="http://www.ag.ndsu.edu/pubs/plantsci/soilfert/sf1176-2.pdf">http://www.ag.ndsu.edu/pubs/plantsci/soilfert/sf1176-2.pdf</a> Yield Mapping and Use of Yield Map Data <a href="http://www.ag.ndsu.edu/pubs/plantsci/soilfert/sf1176-3.pdf">http://www.ag.ndsu.edu/pubs/plantsci/soilfert/sf1176-3.pdf</a> Site-Specific Farming: Economics and Environment <a href="http://www.ag.ndsu.edu/pubs/plantsci/soilfert/sf1176-4.pdf">http://www.ag.ndsu.edu/pubs/plantsci/soilfert/sf1176-4.pdf</a>	Last Day for Quiz 2 is July 2
Wed June 26	<b>Lesson 3: Collecting Site-Specific Information: Remote Sensing</b> (1.0 CM, 0.5 SW) Dr. Bruce Erickson		Last Day for Quiz 3 is July 9
Wed July 3	<b>Lesson 4: Collecting Site-Specific Information: Yield Monitoring and Mapping</b> (1.5 CM) Dr. John Fulton, Associate Professor and Extension Specialist, Auburn University, Auburn, AL		Last Day for Quiz 4 is July 16
Wed July 10	<b>Lesson 5: Field Variability Management/Variable Rate Technology—Nutrient and Soil Management, Seeding, Pest Management</b> (1.5 NM) Dr. Brian Arnall, Assistant Professor, Precision Nutrient Management, Oklahoma State University, Stillwater, OK		Last Day for Quiz 5 is July 30
Wed July 17	<b>Lesson 6: Telematics, Automation, Control Systems</b> (1.5 CM) Dr. John F. Nowatzki, Agricultural Machine Systems Specialist, North Dakota State University, Fargo, ND.		Last Day for Quiz 6 is August 13

<b>Date</b>	<b>Topics (CEU'S)</b>	<b>Reading Assignments Prior to Class</b>	<b>Quiz</b>
Wed July 24	<b>Lesson 7: Spatial Data Analysis/Precision Farming Economics and Adoption</b> (1.5 CM) <b>Dr. Jose Hernandez</b> , Assistant Professor of Extension, Precision Agriculture Center, University of Minnesota, St. Paul, MN, and <b>Dr. Bruce Erickson</b>		Last Day for Quiz 1 is August 20
Wed July 31	<b>Lesson 8: Putting all the Precision Pieces Together in Practice</b> (1.0 CM, 0.5 SW) <b>Terry Brase</b> , Professor, Agriculture Geospatial Technology, Kirkwood Community College, Cedar Rapids, IA		Last Day for Quiz 2 is August 20

## Course Instructors

Precision Agriculture for Practitioners will utilize the recognized experts in each topic area to deliver the instruction for each lesson. Bruce Erickson will assist with the instruction and will facilitate each lesson.

**Bruce Erickson** is a Certified Professional Agronomist employed by the American Society of Agronomy as their Agronomic Education Manager, and is also Adjunct Assistant Professor of Agronomy at Purdue University. Erickson's areas of expertise include corn and soybean production, remote sensing and its application in precision agricultural practices, instructional design, and competency-based education and assessment. Erickson grew up on an Iowa farm, completed his undergraduate work at Iowa State University in Agronomy, then began his professional career as an agronomist with Pioneer Hi-Bred. After completing his Master's at Iowa State in Crop Production and Physiology and his PhD in Agronomy at Purdue, Erickson was on the staff of the Purdue Department of Agronomy where he taught the introductory agronomy course and played a leading role in developing and maintaining the performance objective documents and the minimum proficiency exams for the International Certified Crop Adviser Program (CCA). For three years Erickson served as Senior Technical Designer at Agri Business Group in Indianapolis (now Adayana), an agricultural consulting company. Most recently Erickson was Director of Cropping Systems Management and Associate Director of the Center for Commercial Agriculture, where he coordinated the Top Farmer Crop Workshop, and worked extensively with precision farming and crop production economics research and Extension.

**Dr. Brian Arnall** is an Assistant Professor of Precision Nutrient Management at Oklahoma State University. He completed his BS in Agronomy and MS and PhD in Soil Science at Oklahoma State University. Dr. Arnall's extension, teaching, and research efforts are focused on nutrient management in all of Oklahoma's cropping systems with an emphasis in site specific techniques. He works closely with extension educators and industry personnel to improve nutrient management practices in Oklahoma that will lead to increased profitability of Oklahoma producers. He currently has several ongoing studies that are focused at fertilizer management of canola production. Also being researched and documented is impact of soil acidity on multiple crops, impact of N management strategies on yield on environment, and the evaluation of products which are on the market in Oklahoma. Dr. Arnall teaches courses in soil nutrient management and precision ag.

**Terry Brase** is a Professor of Agriculture Geospatial Technology at Kirkwood Community College. He completed his AS in Agriculture Science at Ellsworth Community College and BS and MS degrees in Agriculture Education at Iowa State University. His responsibilities include teaching courses such as Precision Ag Hardware, Geospatial Data Collection, Remote Sensing, and Agricultural Spatial Analysis; advising precision farming students; and overseeing the use of technology on the Kirkwood Farm Laboratory. In his position as an instructor, he has tried to concentrate on the practical technology skills needed by farmers and technicians. For 20 years Terry has been working with industry and colleges nationwide to develop college level precision ag curriculum. In 2001, he was the originator and first Principal Investigator of AgrowKnowledge, the National Center for Science and Technology in Agriculture.

**Dr. Dave Franzen** is an Extension Soil Specialist at North Dakota State University. He completed his BS, MS and PhD degrees at the University of Illinois-Urbana. Dr. Franzen provides educational programs on soil and soil fertility topics to extension agents and specialists, industry professionals, farm producers and the public. He also performs applied soil research projects as are relevant to North Dakota producers. His research interests are in site-specific agriculture and soil fertility research.

**Dr. John Fulton** is an Associate Professor and Extension Specialist at Auburn University. He completed his BA in Physics at Witterberg University, MS in Agricultural Engineering and PhD in Biosystems and Agricultural Engineering at the University of Kentucky. He teaches courses in Precision Agriculture, Geospatial International Applications and GIS Mapping and Analysis. Dr. Fulton's areas of interest are precision agriculture/forestry, machine systems, harvesting, processing and transporting agricultural and forestry cellulosic biomass, on-farm bioenergy production, conservation management strategies and irrigation of crop and biomass production.

**Dr. José Hernandez** is an Assistant Professor of Extension in the Precision Agriculture Center at the University of Minnesota. He completed his BS at EARTH University of Agricultural Sciences and Natural Resources and his PhD in Soil Science from the University of Minnesota. Dr. Hernandez's interests lie in the fields of nutrient management, manure management, precision crop management, analysis of landscape-scale on-farm experiments, and estimation and uncertainty of economically optimum fertilizer rates. His research focuses on using traditional small-plot as well as on-farm large-scale trials to address questions related with nutrient management and water quality. He is the principal educator/researcher on the 319 project "Maximizing the economic benefits of manure to reduce nutrient loading." The project combines small-group education on calculating the value of manure for individual operations with on-farm trials on corn response to the timing of manure applications.

**Dr. John F. Nowatzki** is an Agricultural Machine Systems Specialist at North Dakota State University. He completed his BS and MS in Agricultural Education at North Dakota State University. Dr. Nowatzki develops and teaches educational programs related to agriculture machinery selection and operation, geospatial technology for precision resource management, conservation tillage technologies, agricultural chemical application technology, energy conservation and alternative energy use. His areas of expertise are agricultural machine systems, precision agriculture, conservation technology, farm equipment energy conservation, energy efficiency, farm chemical application technology and Wireless technology on Farms.

**Wade Stewart is the** Training Manager for the Ag Division at Trimble Navigation Limited. Wade's team is responsible for training resellers, end-users, and OEM partners around the World on the entire suite of Trimble Ag products. He holds a B.S. in Crop Science and an MBA. Prior to joining Trimble, Wade worked for AGCO Corporation and AutoFarm.