

Geospatial Applications: Precision Agriculture Courses Available

By John Nowatzki, Agricultural Machine Systems Specialist
NDSU Extension Service

People interested in preparing for careers in precision agriculture or updating skills in this technical area of agriculture can do so at several North Dakota colleges or universities, including North Dakota State University. Precision agriculture includes applications of the global positioning system (GPS), geographic information systems (GIS), computer programs and remote sensing in farming.

Examples of precision agriculture applications include GPS guidance systems on tractors and other farm implements, variable-rate crop input equipment, combine yield monitors and satellite imagery used to monitor crop management zones. Even though no North Dakota college or university offers degrees or certificates in precision agriculture, there are a variety of courses offered that provide opportunities for students to develop the necessary skills to apply this technology on farms or in agricultural businesses.

In 2005, the U.S. secretary of labor identified geospatial technology (GPS, GIS and remote sensing) skills as an emerging, high-growth skill area. Industry leaders are having difficulty finding enough workers with the right geospatial skills to fill high-skilled, good-paying jobs in this area. Agricultural sales and service employers hiring people to develop precision agriculture programs or to provide technical assistance to farmers who use these technologies normally seek people with degrees in agriculture, business or marketing disciplines and also have coursework in geospatial technologies.

It is unusual to find people employed in precision agricultural who only have computer technology skills or training. Employers realize knowledge of agriculture is essential to success in precision agriculture.

The NDSU departments of Agricultural and Biosystems Engineering, Geosciences and Animal and Range Sciences offer courses relevant to precision agriculture. The Agricultural and Biosystems Engineering Department offers principles of site specific agriculture, which is a course that includes data acquisition, data management and modeling, equipment management and introductions to GPS and GIS. The department awards degrees in Agricultural Systems Management and Agricultural and Biosystems Engineering. Both degrees are excellent preparation for employment in precision agriculture.

The NDSU Geosciences Department offers introductory and advanced GIS courses and is developing a remote-sensing class that will be offered during the spring 2007 semester. The Animal and Range Sciences Department offers a course in geographic information systems in range survey analysis. Each of these courses includes skills and concepts essential to success in precision agriculture.

The Agricultural and Technical Studies Department at Dickinson State University offers two classes with specific applications to precision agriculture. Applied Arc GIS includes

concepts of geographic information systems and related technologies and their application in precision agriculture and natural resource management. Students will work with ArcGIS and related GIS software programs to answer practical questions. Dickinson State University offers a field and projects class that utilizes GIS and GPS technology.

Bismarck State College and the North Dakota State College of Science at Wahpeton offer an introduction to precision farming course. The course is similar at both campuses and is designed to introduce the student to precision farming applications. Students receive hands-on training using hand-held global positioning systems, differential global positioning systems and GIS software. Students use several different GPS and GIS applications, including software and equipment from agricultural industries.

BSC recently created the Geographic Information Systems Technician program to satisfy local and state demand. BSC offers three program options. An associate in applied science degree and the certificate program are designed to prepare students for entry-level employment in the many businesses and agencies that use GIS technology. The certificate of completion program builds GIS proficiency to complement another career field. Basic program objectives include knowledge and skill in computer operations and mapping structures. Students learn technical concepts, such as cartography, scale, data structure, metadata and database management and take courses in statistics, trigonometry, physical geography and geology, visual basic programming language, photogrammetry and remote sensing, raster-based GIS and other GIS applications.

The University of North Dakota Geography Department offers three courses relevant to precision agriculture, including global positioning systems, applications and theory, introduction to geographic information systems and digital image processing. These courses provide skill development related to GPS technology, GIS capabilities and products, and the use of digital remotely sensed data in environmental sciences. The UND Geography Department also offers an on-line graduate certificate in GIS.

The UND Space Studies master's program includes a remote image processing course, with opportunities to emphasize agricultural applications. The UND Continuing Education Department offers an Online Geographic Information Science Graduate Certificate. This one-year program addresses the demand for GIS education, training and technology transfer among students and working professionals. It specifically addresses issues of formal GIS education (basic knowledge and theory) and hands-on training and exposure to technology (GIS technical training).

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Source: John Nowatzki, (701) 231-8213, jnowatzk@ndsuent.nodak.edu

Editor: Rich Mattern, (701) 231-6136, richard.mattern@ndsu.edu