



# Precision Technology Specialist Program Proposal

Presented to the  
South Dakota State Board of Education  
November 2010  
For Implementation Fall 2011



**Mitchell Technical Institute**  
821 North Capital • Mitchell, SD 57301



## **Mitchell Technical Institute**

### **PRECISION TECHNOLOGY SPECIALIST PROGRAM**

#### **Executive Summary**

**Program Title:** Precision Technology Specialist

**Length of Program:** Two-Year AAS Degree

**Number of Students:** 15

**Projected Start Date:** Fall 2011

It is the intent of MTI to begin the Precision Technology program with a focus on educating a skilled workforce to support the growing industry of precision technologies like GPS, GIS, geospatial mapping and other skills. The program will evolve over time to allow its students to specialize in their chosen industry's applications and will include options to 'specialize' in other industry applications through elective courses. Power Line, Propane and Natural Gas, Architectural Design & Building Construction, and Automation Controls/SCADA would be able to utilize the classes on geospatial surveying and mapping. Integrating these classes would offer Mitchell Technical Institute students a broader skill range and would positively update some programs. Targeted students for the Precision Technology Specialist program would most likely have an interest in engineering technologies.

MTI has planned for the program to start with a stronger slant towards agriculture as there is currently a higher demand in this industry. Precision agriculture involves using technology and data to make efficient decisions about raising crops, making of detailed maps of the land and the use of electronic yield monitoring, locations to add fertilizer, herbicides, and water. Together these specialty applications help farmers determine which sites on the farm may need extra nutrients to boost production.

By combining aspects of MTI's engineering, business, agriculture and energy programs already in place, partnering with business and industry, and developing new classes specific to geo-referenced data collection and analysis, a program can be built to meet all the needs of current and future industry trends. General education courses will include technical writing, technical math, behavioral and social sciences, and computers.

Mitchell Technical Institute has conducted formal and informal surveys of dealers, agronomy centers and Advisory Committees across South Dakota and determined that in the next five years these companies were anticipating an increased need to hire Precision Technology Technicians.

# Mitchell Technical Institute

## PRECISION TECHNOLOGY SPECIALIST PROGRAM

### Application Overview

**Program Title:** Precision Technology Specialist

**Length of Program:** Two-Year AAS Degree

**Number of Students:** 15

**Projected Start Date:** Fall 2011

## 1.0 Identification and Description

Mitchell Technical Institute proposes to offer a new program in Precision Technology Specialist beginning in Fall 2011. The demand for new employees with training in geospatial data processing and equipment installation is expanding in several industries and is outpacing the companies' ability to train employees. Graduates of this program would be prepared to enter a variety of growing industries from energy to high-tech manufacturing to communication to agriculture, all critical components of the economy of South Dakota.

It would be MTI's intent to begin by training a skilled workforce to support the growing industry of precision agriculture and its focus on geospatial data collection and site specific management. The two-year program includes courses in computers, GPS (Global Positioning Systems), ArcView and data collection, in addition to agronomy and agriculture economics. Students also complete an internship during the summer. This degree can apply to many career areas and can be customized as needed. A strong background in math and science is recommended for this program.

Many of MTI's existing programs like Power Line, Propane and Natural Gas, Architectural Design and Building Construction, and Automation Controls/SCADA would be able to use the classes on geospatial surveying and mapping. Many of the programs already offered would benefit from the enhanced instruction that Precision Technology would bring to the curriculum and would give Mitchell Technical Institute students a broader skill range.

While there are schools beginning to offer this training to their students in these areas, there is still a distinct lack of programs geared strictly towards geospatial data processing and equipment installation. MTI has the ability to fill the requirements for a program of this caliber. By combining aspects of engineering, business and energy programs already in place, partnering with business and industry and developing new classes specific to geo-referenced data collection and analysis, a program can be built to meet the needs of the current and future industry trends.

## **2.0 Objective and Purpose**

The Precision Technology Program at Mitchell Technical Institute will be dedicated to offering students the experience and overall training to become a successful Precision Technician. The program will provide attention to professionalism, communication and technical skills. Objectives of the program include helping students to:

- Understand the basic purposes and concepts of precision technology
- Understand basic principles of the various tools of precision technologies including GPS, GIS and VRT
- Recognize the use of these tools to collect data, analyze data and use the information to make a decision
- Describe justifications that demonstrate the economic or environmental benefits of precision technology
- Communicate effectively through both oral and written means
- Demonstrate a professional attitude and work ethic
- Apply reasoning and critical thinking to solve problems and seek information
- Work cooperatively in a team environment
- Use computer technology within a field of study
- Apply technical skills required of an entry-level technician in a chosen field

## **3.0 Methods of Attaining the Objectives of the Program**

Pending approval, MTI will develop marketing materials and recruit students. MTI will hire instructors and, with assistance from an advisory committee, will finalize course syllabi, purchase equipment and supplies, arrange classrooms, develop schedules, secure resource materials, arrange internship sites, and interview staff to hire.

MTI provides assurance that it possesses the resources and staff necessary to:

- Develop marketing materials and recruit students
- Recruit and supervise qualified staff
- Assess the abilities of students for good program and course placement
- Provide tutoring for students needing extra academic help
- Provide access to library materials and computer labs
- Develop and administer budgets
- Make available textbooks and other instructional resources
- Provide career and personal counseling to students
- Evaluate programs and staff

- Assist students in finding jobs
- Secure input from industry through advisory committees
- Maintain membership in professional organizations and provide time and fiscal resources for professional development
- Provide financial aid and scholarships
- Provide for internships
- Provide a typical two-year technical institute climate
- Assist students with housing and provide daytime food service
- Provide services to disabled and nontraditional students
- Provide classrooms and laboratories
- Provide a variety of general education courses

## 4.0 Description of Labor Market Demands of the United States and South Dakota

### Career opportunities:

- GPS technicians
- Custom applicators
- GIS specialists
- GIS coordinators in agriculture, natural resources and other industries that apply geospatial technologies.

Most technicians currently employed under the title of Precision Technician are individuals who started in mechanical, agronomic or applicator positions and after showing an aptitude for the technology, were moved into the positions they now hold. With increasing demand for precision equipment, dealerships and agronomy centers are looking at expanding the number of precision technician positions. In a survey of eleven agriculture companies across central South Dakota, it was indicated that they will be hiring a larger number of technicians within the next five years. Companies are finding it increasingly difficult to find qualified applicants with very few that have the experience or knowledge desired or the ability to handle the on-the-job learning curve.

Employment opportunities for those with precision training are not restricted specifically to installation and calibration positions. Knowledge of the equipment and data is vital to people in equipment sales and service, seed dealers, applicators, crop consultants and agronomists among others. As data processing rises in demand there will be an increase in need for personnel who work strictly with data transfer and map production.

Because of the highly technical nature of this occupation, it is projected that salaries could be equivalent to a data analyst, a SCADA technician, or a specialty electronic technician. MTI believes based upon

research that a conservative starting wage could be \$40,000-\$45,000 with increases up to \$70,000-\$80,000 with experience.

## 5.0 Population Served

The program is available to any applicant who has successfully completed the admission requirements set by Mitchell Technical Institute. MTI does not discriminate in its educational programs on basis of race, color, creed, religion, age, sex, disability, national origin or ancestry. The program will draw its students from South Dakota and surrounding states, and the opportunities for employment will favor that same geographical area. This program will not only be targeted at traditional-age college students, but will also be appealing to career changers and older workers looking to change or enhance skills. It may be of particular interest to students from rural areas who wish to stay in smaller communities after graduation.

## 6.0 Projected Three Year Budget

	2010-2011	2011-2012	2012-2013
Salaries/ Benefits	\$75,000	\$80,000	\$85,000
Equipment	\$50,000	\$10,000	\$ 5,000
Supplies	\$ 5,000	\$ 5,000	\$ 5,000
Travel	\$ 3,500	\$ 3,500	\$ 3,500
<b>Total</b>	<b>\$133,500</b>	<b>\$ 98,500</b>	<b>\$98,500</b>

## 7.0 Program Competencies and Entry and Exit Points

Entry point will be the fall of 2011. The exit point will be at the completion of coursework. Graduates will receive an Associate Degree in Precision Technology Specialist. Graduate must maintain an overall GPA of 2.0 to graduate. The curriculum is competency based and will be reviewed and approved by an program advisory committee. Additionally, MTI will adhere to any future guidelines or certifications set by the Precision Technology industry.

**See Attachment A**

## 8.0 Statement of Non-duplication

At the present time we are not aware of a similar degree offered anywhere in South Dakota.

## **9.0 Curriculum Design and Research**

Information was researched and gathered from April to June 2010 as part of a research project proposed by Mitchell Technical Institute (MTI) President, Mr. Greg Von Wald. The purpose of this project was to learn about precision technology, how it relates to our current programs with the focus on agriculture and what MTI can do to offer workforce readiness to students intending to get involved in the precision industry.

**See Attachment B**

## **10.0 Wage Factor**

Because the career is in an emerging industry, official job and wage statistics are not yet available from the usual government labor resources.

Individuals currently working in ag dealerships or with cooperatives in South Dakota earn a salary of between \$45,000 and \$90,000 depending on experience and location. Those working in the private sector have been offered salaries of \$100,000 and up while those with precision agriculture training and management experience are open to making \$150,000 or more a year. The average starting salary, according to our survey, would range between \$35,000 and \$45,000. Potential salary after five to ten years is listed at \$70,000 and up.

## **11.0 Suggested CIP Code**

45.0702 Geographic Information Science

## **ATTACHMENT A**

# Program Outcomes – Precision Technician Specialist

## Main Program Outcomes

## General Precision Competencies

## Agriculture Specific Competencies

1. Develop basic knowledge of products and equipment

A. Install and calibrate a yield monitoring system	B. Demonstrate basic knowledge of GPS systems	C. Describe product capabilities and limitations	D. Setup and describe RTK & base station systems	E. Discuss the history and future trends for GPS technology (all brands)	F. Install and calibrate an application control unit	G. Demonstrate an understanding of Precision Agriculture best practices	H. Install and calibrate an electronic steering system	I. Install and calibrate a hydraulic-based system
--	---	--	--	--	--	---	--	---

2. Perform technical support

A. Respond to inbound technical support calls	B. Gather relevant technical information from customers	C. Identify and resolve common operator errors (GPS, operation and data)	D. Troubleshoot and resolve faulty installations	E. Prepare for and perform field service calls	F. Complete accurate service reports
---	---	--	--	--	--------------------------------------

3. Perform basic equipment technician duties

A. Demonstrate basic equipment operation: startup, operation, safe practices, shutdown	B. Record and interpret hydraulic pressure and flow readings	C. Demonstrate proper use of multimeters	D. Read and interpret hydraulic schematics	E. Read and interpret electrical prints (schematics and connection)	F. Demonstrate best troubleshooting practices	G. Demonstrate proper use of service tools and manuals	H. Demonstrate general knowledge of agricultural electronics (sensors, calibration, etc.)	I. Demonstrate safety/EHS awareness	J. Demonstrate an understanding of Can bus systems
--	--	--	--	---	---	--	---	-------------------------------------	--

4. Perform sales support

A. Gather details on customer/prospective customer's equipment info (serial#, models)	B. Assist sales by validating proposed equipment applications (demonstrate knowledge of product applications and confirm expectations)	C. Demonstrate an understanding of the competing products on the market	D. Demonstrate an understanding of prescriptions	E. Assist sales reps with customer clinics
---	--	---	--	--

5. Maintain and interpret data

A. Demonstrate basic computer skills	B. Demonstrate an understanding of database operations (integrated AMS systems)	C. Demonstrate an understanding of available agronomic tools and resources (identify file types)	D. Demonstrate general knowledge of SCADA remote systems (wireless, etc)	E. List common causes of inaccurate data and consequences	F. Read/load/convert prescriptions into applicable hardware	G. Demonstrate an understanding of GIS systems
--------------------------------------	---	--	--	---	---	--

6. Develop basic knowledge of current agronomic principles

A. Demonstrate an understanding of basic crop biology	B. Read and interpret soil tests	C. Identify various soil types	D. Demonstrate an understanding of land management practices	E. Demonstrate an understanding of ag business management
---	----------------------------------	--------------------------------	--	---

7. Apply general education skills

A. Understand and apply essential mathematical processes and analysis	B. Apply human relationship skills to work successfully in a diverse society	C. Use computer technology to access, organize and communicate information	D. Communicate effectively with others using a variety of contexts and formats
---	--	--	--

# Continuing Education Career Development

## 1. Develop industry relationships (networking)

A. Develop relationships with dealers

B. Develop relationships with manufacturer reps

C. Develop relationships with customers

D. Develop relationships with local seed dealers

E. Develop relationships with local agronomists

F. Develop relationships with IT support

G. Develop relationships with all data providers

H. Perform job shadowing with other related PA functions

## 2. Continue education and professional development

A. Attend yearly industry conventions

B. Complete distance learning classes

C. Attend new product demonstrations and workshops

D. Attend seminars held by regulating agencies (OSHA, FDA, etc)

E. Stay current with industry related topics. Read industry publications

## **ATTACHMENT B**

# **Precision Technology Specialist**

## **First Semester**

EC 167	IT Essentials	3
EC 112	Electronics Theory	4
PTS 101	Intro to Precision Ag	2
AG 112	Crop Science I	2
TRAN 100	CDL Training	1
SSS 100	Student Success	1
MATH 101	Intermediate Algebra	3
CIS 105	Microcomputer Software Applications	3
		19

## **Second Semester**

PTS 102	Principles of GPS/GIS	2
PTS 103	Intro to Yield Monitor Systems	3
SD 140	Intro to SCADA	4
WTT 107	Basic Hydraulics	2
AG 172	First Aid/CPR	.5
AG 264	Pesticide Certification	1
ENGL 201	Technical Writing	3
PSYC 101	Psychology	3
		18.5

## **Third Semester**

PTS 104	Internship	6
---------	------------	---

## **Fourth Semester**

PTS 201	Intro to Guidance Systems	3
PTS 202	GIS Applications	3
WTT 108	Intermediate Hydraulics	1
AG 246	Advanced Ag Computers	2
PTS 203	Lab I	4
AG 211	Soil Science	3
ENGL 202	Technical Communications	3
		19

## **Fifth Semester**

PTS 204	Intro to Variable Rate Systems	3
PTS 205	Agronomic GIS Data Processing	3
EC 211	Wireless Communications	3
AG 243	Sales and Advertising	3
PTS 206	Lab II	4
SOC 110	Industrial Relations	3
		<b>19</b>

## **ATTACHMENT C**



JOHN DEERE

# ELLEFSON IMPLEMENT, INC.

WEST HIGHWAY 16  
2600 WEST HAVENS  
MITCHELL, SOUTH DAKOTA 57301  
(605) 996-6633  
1-800-952-2362

08 November 2010

Greg Von Wald  
Mitchell Technical Institute  
821 N. Capital  
Mitchell, SD 57301

**RE: Precision Technology Specialist Program**

Dear Mr. Von Wald

I am providing this letter of support for the Precision Technology Specialist Program at MTI.

Representing the JOHN DEERE line of farm equipment, and AMS products, we here at Ellefson Implement, Inc. in Mitchell, SD have seen an increase of 300%+ in the last three years in sales of AMS related products. Because of the technical degree involved with these products, additional specific training in this field is a must. Our customers have come to expect the support we now provide, and in order to maintain that level of support, additional people will be needed. We would welcome the chance to not only support, but participate in whatever way possible, a program of this nature.

In our application of precision technology, we have identified a number of skills needed to be successful to include troubleshooting skills, an understanding of electronics, hydraulics and mechanics, and the ability to program and understand the use of data. It appears that your intent is to build these skills in the program. We anticipate the need for a number of people with these skills over the next several years and applaud MTI's efforts to help fill the needs in this area.

The use of precision technology is becoming a staple of the ag industry and we believe it will expand exponentially over the next decade becoming a necessary component of production agriculture. The proposed MTI program will be a critical component in training a workforce ready to assume positions critical to the implementation of precision agriculture and we endorse their efforts

Sincerely,

Max Ellefson  
Sales Manager  
Ellefson Implement, Inc.  
[max@ellefsonimplement.com](mailto:max@ellefsonimplement.com)

Corey Thelen  
AMS Specialist  
Ellefson Implement, Inc  
[corey@ellefsonimplement.com](mailto:corey@ellefsonimplement.com)



2800 West Havens Street • Mitchell, South Dakota 57301 • 605-996-7704 • 1-800-952-2308

October 5, 2010

Greg Von Wald  
Mitchell Technical Institute  
821 North Capital Street  
Mitchell, SD 57301

RE: Precision Technology Specialist Program

Dear Mr. Von Wald:

I am writing this letter in support of the Precision Technology Specialist Program at MTI.

I am the fourth-generation owner of Scott Supply Company, a single-location Case IH and New Holland farm equipment dealership in Mitchell. Our company is 95-years-old. Farmers have rapidly adopted precision farming since the first tools were introduced about 15 years ago. Precision farming technologies are a large part of our business: We employ three specialists responsible for sales, installation, support, and data management of precision farming tools plus growing and maintaining our network of 10 RTK (real time kinematic) towers, which covers over 2,000,000 acres in our sales and service area with sub-inch precision farming accuracy.

The technicians we need to support our precision farming business must have an understanding of electronics and hydraulics; computer, programming, and information management skills; as well as a fundamental understanding of farm equipment and agricultural practices. It is Scott Supply Company's understanding your Precision Technology Specialist Program would provide training and exposure in these areas. Producing trained, entry-level technicians with these skills would provide us (and others in our industry) a source of precision agriculture technicians.

Precision farming is the future of agriculture! The rapid adoption has outpaced our industry's ability to train our own workforce in precision farming technologies. The program that MTI is initiating would help fill this void, and we wholeheartedly endorse your efforts.

Sincerely,

A handwritten signature in black ink that reads "Chris Scott".

Chris Scott  
Scott Supply Company

