Farm and Ranch Management

Associate of Applied Science

New Program Proposal

February 2018

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FARM AND RANCH MANAGEMENT PROGRAM

EXECUTIVE SUMMARY

Western Dakota Tech requests approval to offer a Farm and Ranch Management AAS degree program. The farming and ranching industries are changing, and this proposed program would prepare students for new challenges and opportunities. For example:

- Technological changes have resulted in apps that allow a farmer or rancher to take records in the field, see current and future weather conditions instantly from the seat of a tractor, and follow the markets up to the minute to know when to buy and sell.
- Computer software allows cattlemen to calculate when all of their main herd health events should occur based on the first day of calving or bull turnout.
- Electronic identification (EID) tags are starting to become more common for animal identification.
- Software programs are available to help farmers and ranchers decide how much of each ingredient to feed livestock, making it easier to properly balance diets. Samples of each ingredient are analyzed in a lab to determine the energy, protein, and mineral content. The values are plugged into the program, where a cattleman works with adding the right amounts of each ingredient to obtain that ideal balance.
- Drones are being used to monitor cattle herds to increase efficiency.
- Farm and ranch equipment are more high-tech than ever, requiring knowledge of GPS and GIS equipment.
- More competition from large producers has tightened markets and forced farmers and ranchers to increase efficiency and find ways to add value to their operations.
- Environmental changes that impact farm and range conditions require consideration of stocking rates, rotation grazing, and other methods that keep land and livestock productive.

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IDENTIFICATION AND DESCRIPTION OF THE PROGRAM

This four-semester Associate of Applied Science degree program will prepare students who plan to run family farms and ranches and those who wish to enter industries that support agriculture, including equipment sales and others. This program includes classroom theory and hands-on experience that allows students to practice what they learn in the classroom. Students will visit farm and ranch operations and support businesses to apply what they learn.

PURPOSE AND OBJECTIVES OF THE PROGRAM

The purpose of this program is to prepare students with the necessary knowledge, skills, and behaviors to be successful in the agriculture industry. This will be met by providing a solid curriculum that includes classroom and real-world experience.

The objectives of this program include:

- Develop a resource use plan, which integrates the functions and activities of management in the organization and control of farm and ranch resources
- Generate a production plan for one economic crop produced in the central United States
- Determine plant nutrient management strategies in agronomic systems for economic response and environmental protection applicable in the central United States region
- Evaluate production techniques that will promote positive stewardship of natural resources
- Incorporate technology in solving problems on farms and ranches, including global positioning systems, genetically modified organisms, and other scientific solutions
- Identify and implement a livestock breeding program using genetic improvement principles, artificial insemination, and pregnancy testing.
- Develop a feeding program for a specific species of livestock, satisfying nutrition requirements for appropriate growth phase.
- Select and implement an appropriate record keeping system that satisfies state and federal requirements.

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PROGRAM LEARNING OUTCOMES

WDT Core Ability	***Program Learning Outcomes***
Life Skills	Students will be able to: • Demonstrate the personal responsibility and professional behaviors expected in the farm and ranch management field.
Analytical Skills	Students will be able to: • Identify issues related to the agricultural sector, natural resource policies, and rural community development. • Identify economic concepts, business decision-making, and agricultural and natural resource concepts.
Communication Skills	Students will be able to: • Engage in professional dialogue with others to accurately convey and receive technical information using visual, written, and verbal methods.
Technology Skills	Students will be able to: • Demonstrate the ability to analyze, calculate and determine various materials and methods of farm and ranch management. • Demonstrate the ability to utilize technological aspects of agricultural practices.
Teamwork Techniques	Students will be able to: • Collaborate with other industry professionals, working cooperatively and equitably to solve problems and meet goals.
Social Values	Students will be able to: • Demonstrate respect toward, and the ability to work with, industry professionals from a diverse range of backgrounds and cultures.
Employability	Students will be able to: • Demonstrate the ability and willingness to produce quality work that complies with a broad range of industry expectations.

METHODS OF OBTAINING THE OBJECTIVES OF THE PROGRAM

Upon receipt of the South Dakota Board of Technical Education approval, Western Dakota Tech will begin developing marketing and recruitment strategies to fill the initial Fall 2018 cohort of 20 students. A marketing campaign to recruit students will include a comprehensive media mix. Western Dakota Tech will hire new faculty who will develop curriculum, develop course schedules, secure internship sites, and establish an advisory board.

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Industry is supportive of this program and will be instrumental in the initial development phase as well as its continued success. The letters of support acknowledge the need for a farm and ranch management program in South Dakota and industry's commitment of ongoing support.

Western Dakota Tech provides assurance that it possesses the resources and staff necessary to:

- Develop marketing materials and recruit students
- Recruit and retain qualified staff and instructors
- Develop and administer budgets
- Make available textbooks and instructional resources
- Provide career counseling to students
- Evaluate programs and staff
- Assist students with job placement
- Provide services to non-traditional students
- Provide classrooms, equipment, and supplies

PROGRAM COMPETENCIES

The curriculum will be reviewed and approved by a program advisory committee. Additionally, Western Dakota Tech will be cognizant of, and adhere as necessary to, any future guidelines or certifications set by the industry.

The curriculum is designed to help participants develop the knowledge, skills, and behaviors necessary to be successful upon completion of the program. Competencies are developed through a program that emphasizes hands-on experience, and class lecture/discussions. Program competencies include:

- Discuss the characteristics and current trends of the livestock industry
- Define the role of Agriculture within today's economic system
- Explain broad problem areas that face agriculture as a whole
- Discuss the importance of soils and crop plants to the environment and economy
- Explain the technological aspects of agricultural practices

ENTRY AND EXIT POINTS

The entry and exit points are for that of a traditional two-year AAS Degree. Students will be accepted each fall semester with graduation occurring in May each year.

Entry Point: Fall 2018

Exit Point: Spring 2020; Students will graduate with a two-year degree

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CURRICULUM DESIGN

Western Dakota Tech designed a tentative curriculum after an extensive review consisting of curriculum searches, academic review of competencies, and discussion with industry professionals. See Appendix A for Curriculum Sequence.

DESCRIPTION OF THE NEEDS BASED ON LABOR MARKET DEMANDS IN THE UNITED STATES AND SOUTH DAKOTA

See Appendix B for Wage / Labor Statistics.

POPULATION SERVED BY THE PROGRAM

This program is available to any applicant who successfully completes the Western Dakota Tech admissions requirements, including Dual Enrollment students. Western Dakota Tech 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 the same geographical area.

PROGRAM CAPACITY

Starting Semester	Delivery Format	Cohort Capacity
Fall 2018	Traditional Day / Online	20

STATEMENT OF NON-DUPLICATION

Western Dakota Tech is proposing this program to meet regional industry needs for skilled and trained farm and ranch workers. While there are Ag Business / Management programs at two other technical schools, they are not meeting the needs of industry in western South Dakota.

CIP CODE: 01.0104Farm and Ranch Management.

A program that prepares individuals to manage farms, ranches, and similar enterprises. It includes instruction in applicable agricultural specialization, business management, accounting, taxation,

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capitalization, purchasing, government programs and regulations, operational planning and budgeting, contracts and negotiation, and estate planning.

PROGRAM COST

NEW PROGRAM START-UP STUDENT EXPENSES (DIRECT EXPENSES)

TUITION	FEES	RESOURCE	BOOKS	LAPTOP	TOOLS	TOTAL
6,840.00	6,960.00	500.00	2,800.00	800.00	0	17,900.00

NEW PROGRAM START-UP STUDENT EXPENSES (INDIRECT EXPENSES)

ROOM/BOARD	TRANSPORTATION	MISC	FIRST YEAR TOTAL
10,500.00	900.00	900.00	12,300.00

PROJECTED THREE-YEAR BUDGET

1 EE	First Year			
Year	**2018-2019**	**2019-2020**	**2020-2021**	**2021-2022**
Salaries	55,435	55,435	55,435	55,435
Benefits	16,815	17,000	17,200	17,400
Staff Travel	1,000	1,000	1,000	1,000
Instructional Materials-software	12,000	12,000	12,000	12,000
Equipment Purchases	50,000	20,000	20,000	20,000
Lease Expense (Equipment or Land)	20,000	20,000	20,000	20,000
Building Renovation (unknown)	-	-	-	-
Software/Books/Fees	4,000	4,000	4,000	4,000
Accreditation	-	-	-	-
Totals	159,250	129,435	129,635	129,835

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FACILITY / SPACE REQUIREMENTS

No facility change will be required. The majority of academic coursework will be offered online with use of local or student ranch operations for field trip activities.

LETTERS OF SUPPORT

See Appendix C for Letters of Support

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APPENDIX A – FARM AND RANCH MANAGEMENT PROGRAM CURRICULUM

A.A.S. Degree Course Sequence

FIRST SEMESTER		
AG 108	**Agriculture Industry** Overview of world agriculture, nature of the industry, resource conservation, and the American agricultural system, including production, distribution, and marketing	**3**
ENGL 101 or ENGL 201	**Composition** This course instructs students in reading critically and writing clearly, correctly, and persuasively. Students will study principles of grammar, rhetoric, and logic in order to analyze and compose text effectively. This includes work on personal, expository, and research essays. or **Technical Writing** This course presents the basic principles and forms of written communication in the workplace. Instruction leads students through the planning tasks, identifying audiences, and gathering information. More emphasis is on reports.	**3**
CIS 105	**Microcomputer Software Applications I** This course is an introductory course in software applications, which includes basic technical concepts, as well as hands-on experience. The utility of the computer is demonstrated by introducing Windows, word processing, spreadsheet, database and presentation software to the student.	**3**
AG 120	**Agronomy** Principles and practices in the development, production, and management of field crops, including plant breeding, plant diseases, soils, insect control, and weed control.	**3**
AG 122	**Agricultural Economics** Fundamental economic principles and their applications to the problems of the industry of agriculture.	**3**
		15
SECOND SEMESTER		
MATH 100	**Elementary Algebra** This course prepares students for college-level mathematics. Topics generally include: basic properties of real numbers, exponents and radicals, rectangular coordinate geometry, solutions to linear and quadratic equations, inequalities, polynomials and factoring. Students may also be introduced to functions and systems of equations.	**3**
PSYC 101 or PSYC 103	**General Psychology** This course is an introduction sur vey of the field of psychology with consideration of the biological bases of behavior, sensory and perceptual processes, learning and memory, human growth and development, social behavior, and normal and abnormal behavior. or **Human Relations in the Workplace** Success in the world of work requires not only the ability to perform according to the requirements of the position, but also the ability to adjust and get along with others. The purpose of this course is to help students grasp the importance of human relations skills in both their personal and career lives. It will introduce students to the skills necessary to create and maintain positive relationships and interactions in the workplace.	**3**
AG 130	**Introduction to Animal Science**	**3**

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	Scientific animal agriculture. Importance of livestock and meat industries. Selection, reproduction, nutrition, management, and marketing of livestock.	
AG 132	**Farm and Ranch Management** Basic concepts for successfully managing a farm and ranch, including management records, their analysis and use in making decisions and farm management concepts dealing with credit, land, machinery, capital, crops and livestock enterprises and labor. Instruction in contracts, leases, laws and regulations, estate planning, and applications of personnel and management principles.	**3**
AG 134	**Computers in Agriculture** Use of computers in agricultural applications. Introduction to programming languages, word processing, electronic spreadsheets, agricultural software, GPS and GIS.	**3**
		15
	THIRD SEMESTER	
AG 208	**Agricultural Construction** Selection, use, and maintenance of hand and power tools; arc and oxy-acetylene welding; and construction materials and principles.	**3**
AG 220	**Beef Cattle Production** An overview of the beef cattle industry. Topics include the organization and operation of beef cattle enterprises, selection breeding, reproduction, health, nutrition, management, and marketing.	**3**
AG 222	**Cattle Reproduction** This is a training course in the reproductive management and artificial insemination of cattle. Students will become familiar with and learn the anatomy of the cow reproductive tract. This course is designed to acquaint students with the techniques of artificial insemination and pregnancy diagnosis in the cow, and to familiarize students with the collection, evaluation, processing, and handling of semen. The class will also participate in a mock embryo transfer in order to acquaint students with estrus synchronization, drug protocols, and the mechanics of uterine flushing.	**3**
ECON 202	**Principles of Macroeconomics** The course is designed to provide students with a better understanding of macroeconomic issues that affect their daily lives. Economics is about making choices, i.e., how we use our limited "means" to satisfy our unlimited wants. Macroeconomics considers how the economy as a whole makes those decisions, both domestically and on the global scene.	**3**
AG 228	**Agricultural Power Units** Fundamentals of internal combustion engines: gasoline, diesel, and liquefied petroleum. Maintenance and adjustments of the electrical, ignition, fuel, lubricating, and cooling systems of agricultural power machinery.	**3**
		15
	FOURTH SEMESTER	
AG 230	**Entomology** Study of the morphology, physiology, and classification of the common insect orders and related arthropods with emphasis on species of economic or biological importance. Emphasis on integrated pest management concepts and proper use of pesticides.	**3**
AG 232	**Forage and Pasture Management** Study of the production and management of forage crops and pastures including establishment, fertilization, weed control, grazing systems, hay, seed production, and harvesting.	**3**
AG 234	**Principles of Feeds and Feeding**	**3**

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	Study of the role and application of feed nutrients and additives. Topics include comparative aspects of digestion, absorption, and metabolism of nutrients. Emphasis on identification of nutrient requirements and formulation of dietary feeding regiment.	
AG 299	**Internship** This course is designed to provide the student an opportunity to apply the skills and knowledge acquired in the classroom through active participation in their field of study.	**6**
		15
	TOTAL CREDITS	**60**

Semester Breakdown

First Semester		CR	Second Semester		CR
AG 108	Agriculture Industry	3	AG 130	Introduction to Animal Science	3
AG 120	Agronomy	3	AG 132	Farm and Ranch Management	3
AG 122	Agricultural Economics	3	AG 134	Computers in Agriculture	3
CIS 105	Microcomputer Software Applications I	3	MATH100	Elementary Algebra	3
ENGL101 or ENGL201	Composition or Technical Writing	3	PSYC 101 or PSYC 103	General Psychology or Human Relations in the Workplace	3
	Total Credit Hours	**15**		**Total Credit Hours**	**15**

Third Semester		CR	Fourth Semester		CR
AG 208	Agricultural Construction	3	AG 230	Entomology	3
AG 220	Beef Cattle Production	3	AG 232	Forage and Pasture Management	3
AG 222	Cattle Reproduction	3	AG 234	Principles of Feeds and Feeding	3
AG 228	Agricultural Power Units	3	AG 299	Internship	6
SOC 100	Introduction to Sociology	3			
	Total Credit Hours	**15**		**Total Credit Hours**	**15**

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APPENDIX B - WAGE / LABOR STATISTICS

National Wage Factor

The median annual wage for farmers, ranchers, and other agricultural managers as reported in May 2016 was $66,360. The lowest 10 percent earned less than $35,020, and the highest 10 percent earned more than $126,070[1].

SOC Code	Occupation Title	Workers	25th Percentile	Annual Median Wage	75th Percentile
11.9013.02	Farm and Ranch Managers	4560*	$22.67	$31.91	$43.68

*Does not include self-employed workers.

South Dakota Wage Factor

Currently, there are an estimated 21,896 people employed in South Dakota as Farmers, Ranchers, and Other Agricultural Managers. Wage data for South Dakota is not available for this occupation.

EMPLOYMENT OUTLOOK

(National information retrieved from the Occupational Outlook Handbook).

Most farmers, ranchers, and other agricultural managers work full time. Farm work can be seasonal, and the number of hours worked may change according to the season. Farmers and farm managers on crop farms usually work from sunrise to sunset during the planting and harvesting seasons. During the rest of the year, they plan the next season's crops, market their output, and repair and maintain machinery. About 1 in 3 worked more than 40 hours per week in 2016.

On livestock-producing farms and ranches, work goes on throughout the year. Animals must be fed and cared for every day.

On large farms, farmers and farm managers spend time meeting with farm supervisors. Managers who oversee several farms may divide their time between traveling to meet farmers and landowners and staying in their offices to plan farm operations.

Employment of farmers, ranchers, and other agricultural managers is projected to grow 7 percent from 2016 to 2026, about as fast as the average for all occupations. Owners of large tracts of land, who often do not live on the property they own, increasingly will seek the expertise of agricultural managers to run their farms and ranches as businesses.

Despite a projected decline in the number of acres being used for farming, output is expected to remain steady due to increasing crop yields. In addition, the demand for meats and dairy products should remain strong and result in higher livestock production.

[1] https://www.bls.gov/OOH/management/farmers-ranchers-and-other-agricultural-managers.htm#tab-5

Job prospects should be favorable. Some job opportunities will arise from retirements of older farmers, ranchers, and agricultural managers.

Some small-scale farmers may improve their job prospects by developing successful market niches that involve personalized, direct contact with their customers. Many are finding opportunities in organic food production. Others sell their output at farmers' markets that cater directly to urban and suburban consumers, allowing the farmers to capture a greater share of consumers' food dollars.

APPENDIX C – LETTERS OF SUPPORT

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