



# Cybersecurity AAS Program

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New Program Proposal

State Submission

Steve Buchholz, Dean of Accreditation and Advancement  
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# **WESTERN DAKOTA TECHNICAL INSTITUTE (WDT)**

## **Cybersecurity AAS Program**

### **New Program Proposal**

#### **EXECUTIVE SUMMARY**

Western Dakota Technical Institute requests approval to create an Associate of Applied Science degree in Cybersecurity. This program would prepare students for the increasing number of career opportunities in the cybersecurity field. WDT would continue to offer its Associate of Applied Science Degree in Computer Science with a specialization in Network Administration to provide students with multiple options. The current program in Network Administration would continue to include overview coursework in computer security so those students would be familiar with the basics of the topic. The new program would dive much deeper into the cybersecurity so graduates are prepared for the growing number of cybersecurity-focused careers available.

WDT requests permission to begin offering the four-semester, two-year program in fall 2016.

Labor market information for the state indicates that the demand for workers in cybersecurity career fields is strong now and in the future. Through 2022, the number of workers in SOC Code 15-1122 (Information Security Analysts) will grow by 25 percent in South Dakota and 37 percent nationally.

Additionally, graduates of the program would be qualified for other positions in the computer science field, including careers as Network and Computer Systems Administrators and Computer Network Support Specialists.

#### **IDENTIFICATION AND DESCRIPTION OF THE PROGRAM**

The recent slew of high-profile data breaches (like the one that afflicted Target and millions of the retailer's customers) have highlighted the need for skilled cybersecurity workers.

Unfortunately, the supply is not currently meeting demand: There are currently as many as 300,000 unfilled security jobs across the country, according to a report from The Abell Foundation and CyberPoint International<sup>1</sup>.

According to the Cyber Security Jobs Report, the dramatic proliferation of computing and communications technologies across the globe has caused unprecedented growth in the cybersecurity industry. This growth has created an urgent need for qualified individuals to fill current job openings and to develop the skilled workforce necessary to address the expected dramatic job growth in the future.

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<sup>1</sup> Cyber Security Jobs Report, 2013, <http://www.ctic-baltimore.com/reports/CyberSecurityJobsReport-010813.pdf>

This program has been designed to prepare students for those opportunities. Students will complete classes in network security, network defense and countermeasures, information security, databases, computer forensics, and more.

Graduates of the program will be able to accomplish the typical duties of a cybersecurity professional, including:

- Monitoring their organization's networks for security breaches and investigate a violation when one occurs
- Installing and using software, such as firewalls and data encryption programs, to protect sensitive information
- Preparing reports that document security breaches and the extent of the damage caused by the breaches
- Conducting penetration testing, which is when analysts simulate attacks to look for vulnerabilities in their systems before they can be exploited
- Researching the latest information technology (IT) security trends
- Helping plan and carry out an organization's way of handling security
- Developing security standards and best practices for their organization
- Recommending security enhancements to management or senior IT staff
- Helping computer users when they need to install or learn about new security products and procedures

## **OBJECTIVES AND PURPOSE OF THE PROGRAM**

The primary objective of the Cybersecurity program is to prepare students with the necessary skills to be successful in the cybersecurity field. The program will articulate appropriate high school credits whenever possible, and there could be dual enrollment possibilities for high school students.

The Cybersecurity graduate will be able to:

- Organize, compile and maintain information security documentation.
- Understand how physical and logical network topologies and operation apply to information security.
- Analyze and apply ethical and legal concepts related to information assurance and cyber security.
- Analyze and understand risk management and threat awareness.
- Analyze digital evidence to determine user and intruder activity on systems.
- Research, formulate and critique security policies regarding the collection, preservation, safeguarding and disposition of log data.
- Research, formulate and critique security policies regarding the collection, preservation, safeguarding and disposition of personally identifiable information.
- Research, formulate and critique security policies regarding the security of computer systems and the services that they provide.

## **METHODS OF ATTAINING THE OBJECTIVES OF THE PROGRAM**

WDT will provide students with instruction in classroom and lab settings on the WDT campus. The classroom and lab instruction will be augmented with guest speakers and other experiences that will prepare students for the workforce.

As with all WDT programs, a variety of services and support will be available to Cybersecurity students. This includes expanded tutoring and office hours provided by full-time program faculty and at WDT's Student Success Center. Access to current technical reference materials and resources is available via WDT library services.

The Cybersecurity program will work closely with an industry advisory committee composed of representatives who are from potential employers and others in the field. The advisory committee will approve the curriculum, discuss and recommend equipment purchases, and assist in forming partnerships to help WDT with innovative curriculum, internships, and presentations.

As indicated in the letters of support that accompany this proposal, industry is supportive of this program proposal. Future employers of program graduates have stated this program is necessary because they want employees who have skills in this growing area of importance. This program will meet that need. In addition, the program's general education courses will provide students with the math, English, and communication skills employers are seeking.

## **POPULATION SERVED BY THE PROGRAM**

The Cybersecurity program will be available to all interested individuals who successfully meet the WDT admissions criteria established for the program. The program will be open to full-time and part-time students. All applicants must be high school graduates and take an admissions test to establish reading, writing, and math abilities. No restriction will be made regarding race, creed, gender or age. The program will draw students primarily from South Dakota. The opportunities for employment in the field will be primarily in western South Dakota.

The program also will appeal to people already in the workforce who have experience in cybersecurity and are seeking additional training so they can increase their skill level and become prepared for additional job opportunities in these growing career fields.

## **PROJECTED THREE-YEAR BUDGET**

This program will be staffed by a full-time instructor. Adjunct instructors with industry experience may be used to teach some courses. The projected budget is as follows:

<b>Expenses</b>	<b>Year One</b>	<b>Year Two</b>	<b>Year Three</b>
Instructors	\$10,000	\$12,500	\$15,000
Equipment	\$15,000	\$15,000	\$15,000
Supplies	\$10,000	\$10,000	\$10,000

## **PROGRAM COMPETENCIES AND ENTRY AND EXIT POINTS**

Entry point: Fall Semester

Exit point: After completion of all coursework

Job titles: See Appendix A

## **STATEMENT OF NON-DUPLICATION**

Western Dakota Tech is proposing this program to meet regional industry needs for graduates prepared for a wide variety of cybersecurity career fields. While there are related programs in South Dakota, they are not meeting the needs of business and industry in western South Dakota. Currently, Lake Area Tech offers a Security Specialist degree, and Southeast Tech offers a Computer Network Security Technician. In Fall 2014, 39 and 27 students were enrolled in those programs respectfully. The 2012-2013 placement rates for graduates from each program was 100 percent. Those placement rates show more graduates are needed. Business and industry representatives in WDT's service area (and another headquartered in North Sioux City, SD) report problems finding skilled, qualified workers for the growing number of cybersecurity positions available. This program will help fill those needs.

## **CURRICULUM DESIGN**

See Appendix B for Curriculum Sequence.

## **WAGE FACTOR**

See Appendix A

## **SUGGESTED CIP CODE**

**11.1003 Computer and Information Systems Security.** A program that prepares individuals to assess the security needs of computer and network systems, recommend safeguard solutions, and manage the implementation and maintenance of security devices, systems, and procedures. Includes instruction in computer architecture, programming, and systems analysis; networking; telecommunications; cryptography; security system design; applicable law and regulations; risk assessment and policy analysis; contingency planning; user access issues; investigation techniques; and troubleshooting.

## **APPENDIX**

- A. Wage factor and job titles
- B. Curriculum Outline
- C. Letters of Support

## APPENDIX A

### South Dakota Employment Projections 2012-2022 and Wage Data for Related Occupations

SOC Code	Occupational Title	2012 Workers	2022 Workers	Numeric Change	Percent Change	Average Annual Demand for Workers
15-1122	Information Security Analysts	120	150	30	25.0%	5
15-1142	Network and Computer Systems Administrators	1,525	1,635	110	7.2%	35
15-1152	Computer Network Support Specialists	640	665	170	3.9%	12

South Dakota Wage Estimates for SD, Rapid City, and West					Percentile				
AREA	SOC CODE	Occupation	Workers	Avg. Wage	10 <sup>th</sup>	25 <sup>th</sup>	50 <sup>th</sup>	75 <sup>th</sup>	90 <sup>th</sup>
Statewide	15-1122	Information Security Analysts	80	\$39.31	\$25.67	\$31.91	\$39.32	\$46.57	\$55.15
Rapid City MSA	15-1122	Information Security Analysts	10	\$39.83	\$29.78	\$33.37	\$39.34	\$46.82	\$53.63
West	15-1122	Information Security Analysts	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Statewide	15-1142	Network and Computer Systems Administrators	1,660	\$28.45	\$20.41	\$23.59	\$27.62	\$33.13	\$38.70
Rapid City MSA	15-1142	Network and Computer Systems Administrators	220	\$29.03	\$21.44	\$24.72	\$28.42	\$33.46	\$37.16
West	15-1142	Network and Computer Systems Administrators	100	\$27.30	\$20.55	\$22.79	\$26.29	\$29.84	\$37.74
Statewide	15-1152	Computer Network Support Specialists	760	\$23.42	\$17.65	\$20.01	\$22.56	\$26.68	\$30.25
Rapid City MSA	15-1152	Computer Network Support Specialists	130	\$23.49	\$17.24	\$20.01	\$22.51	\$27.24	\$32.60
West	15-1152	Computer Network Support Specialists	30	\$20.83	\$17.32	\$19.35	\$20.96	\$22.57	\$23.80



## United States Employment Projections 2012-2022 and Wage Data for Related Occupations

<b>SOC</b>	<b>Occupational Title</b>	<b>2012 Base Number of Jobs</b>	<b>2022 Projected Number of Jobs</b>	<b>Percent Change</b>	<b>Average Annual Demand</b>
15-1122	Information Security Analysts	75,100	102,500	37%	2,740
15-1142	Network and Computer Systems Administrators	366,400	409,400	12%	4,300
15-1152	Computer Network Support Specialists	174,600	186,800	7%	1,220

Wage Estimates for United States				Percentile				
SOC CODE	Occupation	May 2013 Workers	Avg. Wage	10 <sup>th</sup>	25 <sup>th</sup>	50 <sup>th</sup>	75 <sup>th</sup>	90 <sup>th</sup>
15-1122	Information Security Analysts	78,020	\$43.85	\$24.24	\$32.27	\$42.59	\$54.38	\$66.72
15-1142	Network and Computer Systems Administrators	362,310	\$37.46	\$21.76	\$27.67	\$35.58	\$45.17	\$56.32
15-1152	Computer Network Support Specialists	165,100	\$30.85	\$16.99	\$21.74	\$28.93	\$37.67	\$47.99

## APPENDIX B

First Semester		Credits
CIS125	A+ hardware/Software	6
CIS126	Cisco Academy/Networking Technologies I	3
CIS129	Windows Operating Systems	3
CIS105	Microcomputer Software Applications	3
MATH101 or MATH102	Intermediate Algebra or College Algebra	3
TOTAL CREDITS		18
Second Semester		Credits
CIS127	Cisco Academy/Networking Technologies II	3
CIS211	Linux Operating Systems	3
CIS213	Networking Using Windows Server	3
CIS225	Databases	3
ENGL101	Composition	3
PSYC103	Human Relations in the Workplace	3
TOTAL CREDITS		18
Third Semester		Credits
CCS 200	Programming for Security I	3
CCS 210	Pentesting	3
CCS 220	Web Security	3
CCS 230	Cryptography	3
MATH102 or MATH120	College Algebra or Trigonometry	3
TOTAL CREDITS		15
Fourth Semester		Credits
CCS 240	Programming for Security II	3
CCS 250	Cyber Security Forensics	3
CCS 260	Offensive/Defensive Security	3
CCS 270	Malware Analysis	3
CCS 280	Security Research Project	3
SOC100	Introduction to Sociology	3
TOTAL CREDITS		18

## APPENDIX C



**Kevin Klingbile**  
Corporate Security Analyst  
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November 07, 2014

Mr. Mark Wilson, President  
Western Dakota Tech  
800 Mickelson Drive  
Rapid City, SD 57703

Dear Mr. Wilson:

It is my pleasure to support the plan for a new cyber security program at Western Dakota Tech.

Cyber security is a rapidly growing field and the demand is high for qualified individuals. In a recent survey performed by the SANS Institute 88% of CIOs in Northern California Bay area are looking to expand or fill vacant positions and 35% of respondents were expecting their organization to increase cybersecurity staff. It is well known that this field is underemployed and there is a need for more qualified individuals. This field is only going to continue growing in the coming years. Recent breaches that have been seen in the headlines only confirm this as well.

As a security analyst at Black Hills Corp, I am aware of the growing demand for job applicants to have cyber security knowledge and experience. This knowledge and experience is useful not only in the energy field but also a wide range of corporate and government jobs. We look for applicants who have previous experience working with a broad range of technologies. Through an associate's degree students are often introduced to many technologies and concepts that we look for including: Networking skills, general server administration on Windows and Linux, incident handling, analytics, and security essentials. The security field requires individuals to continually update their skills and adapt to unknown and unforeseen circumstances. Understanding the basics that would be taught in this program helps to assist candidates with their professional survival and success.

I fully support the cyber security program as it will benefit not only WDT graduates, but also the security field in general. This is a rapidly growing field with high job demand and knowledge from many fields of practice.

Sincerely,

Kevin Klingbile  
Corporate Security Analyst, Black Hills Corporation



25 September 2014

Mr. Mark Wilson, President  
Western Dakota Technical Institute  
800 Mickelson Ave  
Rapid City, SD 57703

Mr. Wilson:

I write this letter to express support for the addition of a computer/network-based security track to the Computer Science Program at Western Dakota Technical Institute. As the president of a cloud recovery company, my personal and professional opinion is that the proposed Cyber Security program is timely and relevant for students seeking future careers in the IT industry.

An education in cyber security is timely when you consider the onslaught of security breaches that are casting a sharp focus over the IT industry. As a result, information technology is becoming increasingly defined by issues in computer and network security. By today's standards, a Computer Science program *without* a Cyber Security focus is lacking.

For many reasons, the proposed program is relevant to my company and the nature of the business that I run. As a service provider specializing in data protection, online security measures are indispensable components of the solution that Dakota Cloud Recovery offers. I would seriously consider any employment candidate with a tailored educational background in computer/network-based security.

I fully endorse the proposed Cyber Security program, and I look forward to leveraging its success.

Regards,

A handwritten signature in black ink, appearing to read "Casey Parker", is written over a horizontal line.

*President of Dakota Cloud Recovery*



Mark Wilson  
Western Dakota Tech  
800 Mickelson Dr.  
Rapid City, SD 57703

September 29, 2014

Dear President Wilson,

Riverside Technologies, Inc. has reviewed Western Dakota Tech's plans to add an additional Program to the Computer Science Department for Cyber Security. We are pleased to support your worthy endeavor.

Information Technology is a rapidly growing industry, and businesses in Western South Dakota are in the need of new employees as well as continuing education for current employees in the areas of cybersecurity and other information technology fields.

Riverside Technologies, Inc. is dedicated to helping you achieve the programs goals as indicated in our letter supporting the Trade Adjustment Assistance Community College and Career Training Grants Program.

The project you are undertaking is a worthy endeavor, and it has our full support. We look forward to working with you throughout this project and beyond. Please feel free to contact me if there are other ways we can assist.

Sincerely,

A handwritten signature in black ink that reads 'K Heiss'. The signature is written in a cursive, flowing style.

Kevin Heiss  
President  
Riverside Technologies, Inc.  
105 Gateway Drive  
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