

Program Review Report

Associate of Applied Science in Cybersecurity and Data Privacy
Educational Program at
Sitting Bull College

2022-2023

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Executive Summary

Program Description Summary

The Cybersecurity and Data Privacy program at Sitting Bull College is designed for graduates ~~that~~ who will have the skills, knowledge, and ability needed for employment in entry-level Cybersecurity positions with an Associate of Applied Science degree from SBC, or with Certificate(s). Career opportunities include employment in a wide variety of business and government areas, especially education, health care, financial services, public utilities, sales, and manufacturing. Employment in the field of Cybersecurity is expected to grow faster than average for all occupations throughout the next decade due to population growth and increased economic activity centered on North Dakota's healthcare services, financial services, and oil and gas industry (North Dakota CyberCon, 2022; (Technology Council of North Dakota, 2017).

The Cybersecurity skills attained will provide students with the skills to provide solutions to trouble shooting security networking issues, home networks, and a wide variety of other computerized devices that need support. In addition to obtaining the cybersecurity skills to work with computers, networks, and devices, students develop leadership, teamwork, and communications skills to work with employers, co-workers, and end-users. Our program consistently aims to remain up-to-date with technology trends which include technology devices being used in nearly every house hold, giving our students the best opportunity to succeed in the field of Cybersecurity and Data Privacy.

Program Self-Evaluation Summary

The Cybersecurity and Data Privacy program has one full-time faculty member, Gabriella Arellano, who is certified by the North Dakota Career and Technical Education Department to teach Information Technology at the post-secondary education level. Dr. Arellano teaches eight or more Information Technology, Cybersecurity and Data Privacy classes annually. There are also three adjunct faculty members who teach additional classes in the following areas: database use, website design, programming, and python.

Beginning in November 2022, our Cybersecurity and Data Privacy courses have all been designed to offer in-person, hybrid, and online coursework. Students are required to acquire various technology tools. Based on the 2022 program feasibility study, most Cybersecurity courses will be offered online and hybrid. The SBC library also supports students by providing a variety of media resource for student usage. The library continues to expand its holdings, with a large increase in digital resources; especially access to remote databases of articles and papers from print publications.

Every two years (in advance of the biennial publication of the SBC Bulletin) the faculty members and advisory committee will examine the Cybersecurity and Data Privacy course offerings, in relation to the programs being offered through our IMPACT

consortium consisting of Sitting Bull College, Turtle Mountain Community College and Stone Child College. Changes have been made to keep the program up-to-date and competitive; some courses have been modified at all three schools and new courses added. The number of credits required are 67 to complete the Cybersecurity and Data Privacy Applied Associate Degree plan. An applied associate degree is four semesters according to higher education standards.

Program Planning Summary

The goal of the Indigenous Mutual Partnership to Advance Cybersecurity Technology (IMPACT) is to strengthen and expand science, technology, engineering, and mathematics (STEM)/cybersecurity education and research at three Tribal Colleges, thus preparing a highly-qualified next generation workforce and increasing the flow of American Indian/Alaska Native students into cybersecurity careers throughout the Department of Energy national Nuclear Security Enterprise (NSE) workforce to meet present and future security demands.

Program planning is a part of the ongoing assessment process. Annual systematic analysis of program outcomes allows for program adjustments in any needed area. This analysis of program activities and outcomes plays a major role in program planning, with additional input coming from the advisory committee to meet the needs of the students and the changing needs of the industry. Program planning is essential to increase the effectiveness of instructors and to set priorities for the department.

The current department need is to secure additional funding for purchasing laptop computer devices equipped to sustain and download enough space to hold online Cybersecurity lab simulations. Additional funding would also assist in purchasing cameras, microphones, computer hardware and software to be used in developing departmental resources demonstrating core concepts, and for capturing lectures for online streaming and downloadable training materials.

Program Description

The AAS in Cybersecurity and Data Privacy prepares students for entry-level positions in cyber security and data privacy. Graduates will be prepared to become leaders in cybersecurity, with a solid understanding of security technology and privacy laws, preparing them to make knowledgeable and responsible decisions.

Role of the Cybersecurity and Data Privacy Education Program within SBC

We live in a computerized and networked society. Supporting the privacy and security of these computers and networks offers a wide job market with a variety of locations and environments. Technology is driving businesses and governments today, especially health care, financial services, public utilities, sales, and mining and manufacturing. Individuals own personal computers, tablets, smartphones and home networks, and a wide variety of other computerized

devices. Computer specialists will require Cybersecurity and data privacy skills to work with and secure computers, networks, and devices; and communications skills to work with employers, co-workers, and end-users. The Cybersecurity and Data Privacy students at SBC will develop a firm foundation in Cybersecurity to prepare for employment. This program will prepare students to enter into the world of work within the growing Cybersecurity and Data Privacy industry. The courses offered at SBC are standardized with the North Dakota University System's common course numbering system. (Sitting Bull College Bulletin, 2022, P. 157).

The purpose of the Cybersecurity and Data Privacy program at Sitting Bull College is to provide students with the education and skills needed to succeed in the field of Cybersecurity and Technology. Our students will acquire knowledge conducive to beginning a life-long career in our ever changing technological society, developing the skills to adjust to the fast-paced innovative field requiring security and privacy, while continuing to thrive in this evolving world. Students will use the attained critical thinking abilities to provide solutions to problems, implement ideas, and sustain our interconnected society.

The program is also designed for students who are seeking the Cybersecurity and Data privacy certification alone. With the course combination consisting of Cybersecurity, Data Privacy, hardware, software, networking, information systems, and electives complimentary to our core coursework, students will accomplish the life-long skills that will give them the advantage to prosper in our growing society and continue on to established careers, thus, accomplish their goals.

Program Outcomes For: Associate of Applied Science Degree in Cybersecurity and Data Privacy

- I. Identify risks, assess threats, and develop effective countermeasures aimed at protecting organizational assets on premise and in the cloud.
- II. Identify common security threats, including implementing firewall and VPN technologies and perimeter defenses, conducting vulnerability and penetration testing and scanning networked systems.
- III. Identify relevant laws, regulations and frameworks as they apply to data privacy and cybersecurity operations.
- IV. Describe the legal and technical aspects of a cybercrime investigation and the application of computer forensic tools.

CYBERSECURITY AND DATA PRIVACY COURSE CORE REQUIREMENTS:
CORE REQUIREMENTS

CIS 128 Microcomputer Hardware I.....	3 cr.
CIS 220 Linux Administrator I	3 cr.
CIS 223 Linux Administrator II.....	3 cr.
CIS 241 Introduction to Digital Forensics.....	3 cr.
CIS 141 Introduction to Cybersecurity.....	3 cr.
CIS 164 Networking Fundamentals I	4 cr.
CIS 165 Networking Fundamentals II	4 cr.
CIS 168 Firewalls & Network Security.....	3 cr.
CIS 212 Operating Systems Client.....	3 cr.
CIS 215 Implementing a Server Environment.....	3 cr.
CIS 297 Information Technology Internship.....	3 cr.
CIS 243 Incident Response & Disaster Recovery	3 cr.

Cybersecurity Electives (Select a Total of 6 Credit Hours)

270 Cybersecurity Infrastructure Configuration.....	3 cr.
CIS 271 Cybersecurity Prevention & Counter Measures.....	3 cr.
CIS 255 Cloud Foundations.....	3 cr.
CIS 264 Ethical Hacking & Network Defense.....	3 cr.
CIS 261 Cybersecurity Law & Ethics	3 cr.
Total Core Cybersecurity Requirements	44 credits

Degree Program

ASSOCIATE OF APPLIED SCIENCE – CYBER SECURITY & DATA PRIVACY

GENERAL EDUCATION REQUIREMENTS

ENGL 110 Composition I.....	3 cr.
COMM 110 Fundamentals of Public Speaking.....	3 cr.

MATH 101 Pre-Algebra or higher.....	4 cr.
PSYC 100 First Year Learning Experience	3 cr.
SOC 120 Transitions-Graduation & Beyond.....	2 cr.
NAS 101 Ochethi Sakowin Language I.....	3 cr.
Or NAS 103 Introduction to Ochethi Sakowin Language, Culture & History	
CSCI 101 Introduction to Computers.....	3 cr.
HEALTH/PHYSICAL EDUCATION.....	2 cr.
Any two (2) one-hour courses or any one (1) two-hour course	
Total General Education Requirements.....	23 credits

CORE REQUIREMENTS

CIS 128 Microcomputer Hardware I.....	3 cr.
CIS 220 Linux Administrator I	3 cr.
CIS 223 Linux Administrator II.....	3 cr.
CIS 241 Introduction to Digital Forensics.....	3 cr.
CIS 141 Introduction to Cybersecurity.....	3 cr.
CIS 164 Networking Fundamentals I.....	4 cr.
CIS 165 Networking Fundamentals II	4 cr.
CIS 168 Firewalls & Network Security.....	3 cr.
CIS 212 Operating Systems Client	3 cr.
CIS 215 Implementing a Server Environment.....	3 cr.
CIS 297 Information Technology Internship.....	3 cr.
CIS 243 Incident Response & Disaster Recovery	3 cr.

Cybersecurity Electives (Select a Total of 6 Credit Hours)

270 Cybersecurity Infrastructure Configuration.....	3 cr.
CIS 271 Cybersecurity Prevention & Counter Measures.....	3 cr.
CIS 255 Cloud Foundations.....	3 cr.
CIS 264 Ethical Hacking & Network Defense.....	3 cr.

CIS 261 Cybersecurity Law & Ethics	3 cr.
Total Core Cybersecurity Requirements.....	44 credits
TOTAL DEGREE REQUIREMENTS.....	67 CREDITS

Program Outcomes For: Preparation intended for Certificate in Cybersecurity and Data Privacy

- I. Analyze, design, install, configure, and troubleshoot network & system hardware and operating systems.
- II. Identify risks, assess threats, and develop effective countermeasures aimed at protecting organizational assets on premise and in the cloud.
- III. Describe the legal and technical aspects of a cybercrime investigation and the application of computer forensic tools.

CERTIFICATE IN CYBERSECURITY

The 9-month certificate in cybersecurity prepares individuals for demanding positions in public and private sectors overseeing, operating, or protecting critical computer systems, information, networks, infrastructures and communications networks.

CORE REQUIREMENTS

CIS 141 Introduction to Cybersecurity.....	3 cr.
CIS 212 Operating Systems Client	3 cr.
CIS 164 Networking Fundamentals I.....	4 cr.
CIS 165 Networking Fundamentals II	4 cr.
CIS 215 Implementing a Server Environment.....	3 cr.
CIS 128 Microcomputer Hardware I.....	3 cr.

CIS 220 Linux Administrator I	3
cr.	
CIS 168 Firewalls & Network Security.....	3
cr.	
CIS 241 Introduction to Digital Forensics.....	3
cr.	
Soc 120 Graduation & Beyond.....	2 cr.
CSCI 101 Introduction to Computers.....	3 cr.
TOTAL DEGREE REQUIREMENTS.....	34 CREDITS

Program Personnel

The IT and Cybersecurity Instructor and IT Program Advisor Gabriella Arellano has a life-long interest in technology, leadership, and innovation. Gabriella has her doctorate ~~degree~~ in Educational Leadership from Concordia University, St. Paul Minnesota. She graduated from the University of Mary, in Bismarck North Dakota, with a Master’s in Education; Curriculum, Assessment, and Instruction. Prior to completing her master’s degree, Gabriella graduated from Mihaylo College of Business at California State University, Fullerton with a Bachelors in Business Administration and a concentration in Marketing. She began her current position as Sitting Bull College in the summer of 2019. She has completed seminars, and clinical practices offered by North Dakota Career and Technical Education, and she became certified in June 2019 as a Post-Secondary Information Technology Instructor. Dr. Arellano has spent two summers taking Information Technology classes offered by NDCTE. These classes enabled her to offer the IT and Cybersecurity and Data Privacy curriculum at SBC consisting of the following: Cisco networking courses; IT Essentials courses; GIS/GPS; Microsoft Operating Systems and Server; Java Programming; Website Design; and Visual Basic Programming class. Dr. Arellano renewed her teaching credential in 2021.

In addition, the adjunct instructors for the Cybersecurity and Data Privacy and IT program and the classes they teach respectively include the following: Lisa McLaughlin, SBC Data Coordinator teaches SQL Database; Mafany Mongoh, Ag/Science instructor, teaches GIS/GPS; and Jodi Thunder Hawk, SBC Python instructor teaches Python Programming. Jodi Thunder Hawk has one year of teaching experience at SBC in Information Technology. Jodi has an associate’s degree in Information Technology, a Bachelors in Business Administration, and a Master’s degree in business administration. The adjuncts experience is the following: Lisa McLaughlin, Bachelor of Science Business Administration, 25 years at SBC; Mafany Mongoh, Ph.D. Natural Resource Management, 15 years at SBC; and Jodi Thunder Hawk 11 years at SBC.

The Turtle Mountain Community College Instructors, their qualifications, and the years teaching at TMCC are the following: Chad Davis, Christian Davis, Marlin Allery, and Ananth

Ramaseri. Chad Davis, Master of Science, Management Information Systems, 13 years at TMCC; Christian Davis, Master of Digital Forensic Science, 7 years at TMCC; Marlin Allery, Bachelors Business Information Technology, 10 years at TMCC; Anath Ramaseri, Doctorate in Scientific Computing, 2 years at TMCC.

Sitting Bull College is actively seeking a full-time Cybersecurity faculty responsible for providing instruction and supervision of work experience activities of students enrolled in the Associate of Applied Science in Cybersecurity. The faculty will provide post-secondary, learner-centered instruction in Cybersecurity in accordance with the Sitting Bull College Mission Statement. The faculty will encourage a culture of learning that values mutual responsibility, life-long learning, as well as personal and professional development. The duties and responsibilities are listed in APPENDIX A.

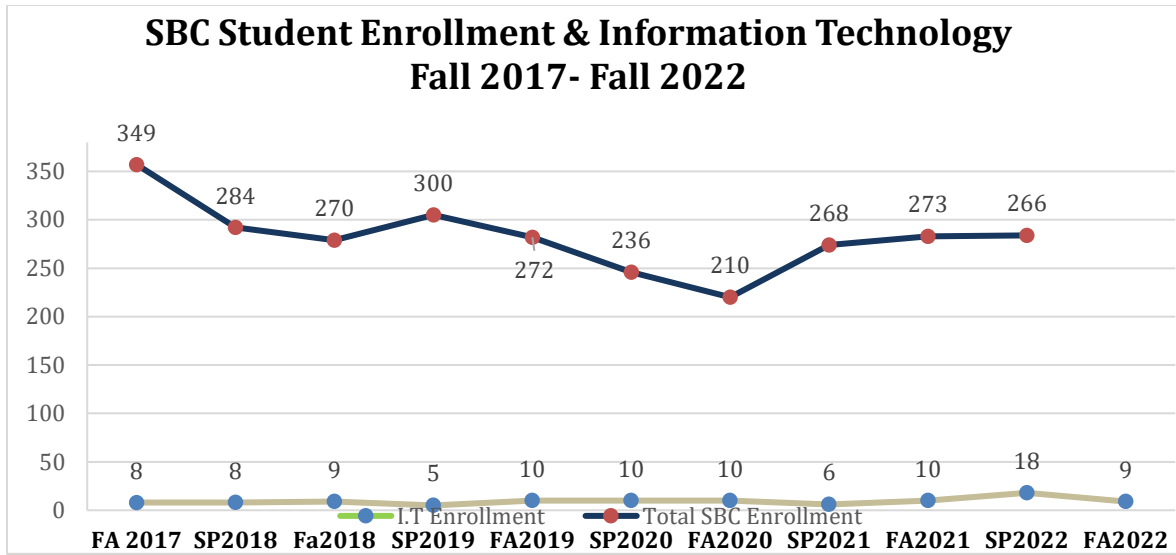
The qualifications for this position are the following:

1. Master's Degree in Cybersecurity, Computer Science or related area preferred, Bachelor's required.
2. Minimum of five years of experience in Cybersecurity or related field.
3. Teaching experience preferred.
4. Have knowledge and experience working with federal and tribal programs.

Program Productivity

The Associate of Applied Science Cybersecurity and Data Privacy program is new to SBC and we currently only have a feasibility study conducted on projected program productivity. However, there is a comparable Information Technology program that has a history of variable enrollment. Student enrollment has generally been nearly equal by gender and almost fifty percent of the IT graduates have been women. This gender equality is not consistent with industry trends as women enrollment and employment in IT has not been equivalent to men elsewhere in North Dakota and in the US (Andrade, 2014). The IT enrollment and Sitting Bull College enrollment is displayed below (SBC Shared Data, 2022):

Table 1: IT and SBC Enrollment 2017-2022



¹ Findings: enrollment excel spreadsheets years 2017-2022

Sitting Bull College student enrollment during the 2017-2022 fall and spring semesters has remained consistent with several variations in the five-year span. IT student enrollment did not seem to be affected by the COVID 19 pandemic, which rapidly required a shift to online education halfway through the spring 2020 semester. This may be a good predictable indicator for upcoming and future enrollment for Cybersecurity and Data Privacy students.

Future enrollment in the Cybersecurity program may be dependent upon whether the IMPACT grant continues to be funded, in Cybersecurity, and whether the program continues to provide and enhance partnerships with the consortium of tribal college and local businesses for employment opportunities. The department’s goal will be to increase enrollment, particularly, the Cybersecurity and Data Privacy student enrollment as a percentage of total SBC enrollment. Therefore, as Sitting Bull College student enrollment continues to rise, the Cybersecurity and Data Privacy enrollment will incrementally mirror the change in enrollment size.

Student persistence and retention have long been a nationwide issue among colleges including Sitting Bull College. Student persistence is defined as being enrolled during the fall semester and returning for the spring semester at the same institution, while student retention is defined as continuing from one year to the next; that is, measured from fall semester of one year to fall semester of the next year (Tight, 2020). While the goal remains that of achieving a degree within a reasonable length of time, many factors influence a student’s persistence and retention; whether the student completes a degree program, drops out, or “stops out” may be influenced by both SBC and Cybersecurity and Data Privacy program personnel, but is ultimately determined by each student. The following tables/graphs show the retention and persistence rates for SBC overall (SBC Shared Data, 2022):

¹ (SBC Shared Data, 2022)

Table 2 Sitting Bull College Persistence 2017-2022

SBC Full-Time Student Persistence				
First Semester	Second Semester	Total First Semester	Returning	% Percent Returning
Fall 2016	Spring 2017	218	130	59.6%
Fall 2017	Spring 2018	248	175	70.6%
Fall 2018	Spring 2019	226	154	68.1%
Fall 2019	Spring 2020	232	158	68.1%
Fall 2020	Spring 2021	182	118	64.8%
Fall 2021	Spring 2022	191	143	74.9%
Fall 2022	Spring 2023	TBD	TBD	TBD

²Findings can all be found in the shared folder and the SBC public websites.

Table 3 Sitting Bull College Retention 2017-2022

SBC Full-Time Student Retention				
First Semester	Second Semester	Total First Semester	Returning	% Percent Returning
Fall 2016	Spring 2017	218	114	52.3%
Fall 2017	Spring 2018	248	121	48.8%
Fall 2018	Spring 2019	232	134	57.8%
Fall 2019	Spring 2020	229	132	57.6%
Fall 2020	Spring 2021	183	54	29.5%
Fall 2021	Spring 2022	186	120	64.5%
Fall 2022	Spring 2023	TBD	TBD	TBD

³Findings can all be found in the shared folder and the SBC public websites

Program Graduates

Given that the program is-new, an annual excel tracking process will be implemented by the Program Director. The formal process will begin to track Cybersecurity and Data Privacy with the first program graduates this process will aim to connect both students and alumni to elicit career and networking opportunities. Currently, the available positions in Cybersecurity and related

² (SBC Shared Data, 2022) & S. (n.d.). SBC Persistence and Retention. Retrieved 2020, from <https://sittingbull.edu/wp-content/uploads/2020/10/Persistence-and-Retention-Fall-2020.pdf>

³ (SBC Shared Data, 2022) & S. (n.d.). SBC Persistence and Retention. Retrieved 2020, from <https://sittingbull.edu/wp-content/uploads/2020/10/Persistence-and-Retention-Fall-2020.pdf>

technology fields in North Dakota have salaries that range from \$40,000-\$180,000 per year (Indeed, 2022). However, no comprehensive survey has been conducted by SBC. Future students who graduate will have the opportunity to acquire the TestOut Certified Operating Systems Client Pro certification and the Networking Fundamentals Cisco Certification, Cisco Cybersecurity Essentials, and Cisco Introduction to Cybersecurity, as well as a certificate in Cybersecurity and Data Privacy⁴. The Sitting Bull College IT Specialist, Gabriella Arellano will track the data until a full-time program director is hired.

The Cybersecurity Department will ensure that building lasting relationships is set at the forefront of strategic goals for job placements. Building strong relationships with local businesses and large corporations will be a priority in order to grow internship opportunities for our students to work with local, tribal, statewide, and national businesses. Our goal is set a 100% employment rate for any Cybersecurity student who graduates from our program and ensure that those individuals are given the resources to continue their education and pursue a degree in higher education.

Program Revenue

The SBC Cybersecurity program revenue

The books, equipment, and supplies will all vary and the amounts to fund them differ based on the needs at the time of investment. Projected data itemizing tuition and Indian Student Count (ISC) revenue for the Cybersecurity education program, academic years 2023 through 2027, is itemized below:

Table 4 Sitting Bull College Cybersecurity & Data Privacy Program Revenue 2023-2027

Cybersecurity & Data Privacy Program Revenue								
Academic Year	Fall ISC	Spring ISC	Tuition	Cybersecurity Total	Projected SBC ISC Total	Projected SBC Tuition	Projected SBC Total (ISC + Tuition)	Cyber % of SBC Total
2023-2024	\$40,000	\$40,000	\$36,000	\$116,000	1,060,000	954,000	2,014,000	5.76%
2024-2025	\$40,000	\$40,000	\$36,000	\$116,000	1,060,000	954,000	2,014,000	5.76%
2025-2026	\$40,000	\$40,000	\$36,000	\$116,000	1,060,000	954,000	2,014,000	5.76%
2026-2027	\$48,000	\$48,000	\$43,200	\$139,200	1,270,000	1,144,800	2,414,800	5.76%
2027-2028	\$60,000	\$60,000	\$54,000	\$174,000	1,592,000	1,432,800	3,024,800	5.75%
Total 2023-2027	\$228,000	\$228,000	\$205,200	\$661,200	6,042,000	5,439,600	11,481,600	6.00%

⁴ <https://www.indeed.com/jobs?q=Cyber+Security&l=North+Dakota&start=10&pp=gQAPAAABg2YpDhMAAAAB7j7neQAOAQAIeMXkE-kPFOuaOelAAA&vjk=1de97f9626468770>

Average Revenue 2023-2027	\$45,600	\$45,600	\$41,040	\$132,240	1,208,400	1,087,920		
							2,296,320	

⁵The projected enrolment numbers for the cybersecurity program began as: 2023-2024 (10 students); 2024-2025 (10 students); 2025-2026 (10 students); 2026-2027 (12 students); 2027-2028 (15 students). The projected SBC enrollment total was 2023-2024 (265 students); 2024-2025 (265 students); 2025-2026 (265 students); 2026-2027 (318 students); 2027-2028 (398 students). These calculations were equivalent to the cybersecurity estimated percentage increase and can be changed and projected with additional data and statistics collected overtime. This is why the cybersecurity % of SBC total is in a range from 5.76%-6.00%.

Program Budget

The expenditures of the budget include the salary and fringe benefits of the department head, the instructor, and Cybersecurity Interns. The program is financially supported through: The Impact Grant. The budget factors in professional development ~~and~~ (the instructor has traveled to receive the required training which is factored into the budget). The supplies that will be needed for the program are always evolving based on innovative technology needs and this is factored into the budget various as well. Currently, funding through the IMPACT Grant allows for this. The following tables show the amounts expended from IMPACT grant (SBC Shared Data, 2022):

Table 5 Sitting Bull College Cybersecurity & Data Privacy Five Year Budget (IMPACT Grant) 2022-2027

IMPACT Grant			
Description	Approved Budget	Total Expenditures	Amount Remaining
Salary	\$122,400	\$9,264.58	\$113,135.42
Fringe Benefits	\$152,490	\$1415.69	\$151,074.31
FICA Taxes	9,365.00	707.82	8,657.18

⁵ (SBC Shared Data, 2022) & S. (n.d.). SBC Information Technology Program Revenue. Retrieved 2020, from <https://sittingbull.edu/wp-content/uploads/2020/10/Persistence-and-Retention-Fall-2020.pdf>

IMPACT Grant			
Description	Approved Budget	Total Expenditures	Amount Remaining
Salary-Exempt	\$122,400	\$9,264	\$113,135.42
Life & Disability	\$500	\$37.07	\$462.93
Retirement Contribution	\$6,120	\$463.25	\$5,656.75
Health Insurance	\$10,853	\$915.37	\$9,937.63
SUTA Taxes	\$1000	\$0.82	\$999.18
Worker's Compensation	\$1000	\$0	\$1,000.00
FICA Taxes	\$9,365	\$707.82	\$8,657.18
Travel Costs	\$6030	\$3,304.26	\$2,725.74
Supplies	\$36,200	\$177.10	\$36,022.90
Computer Equipment	\$0	\$0	\$0
Indirect Costs	\$41,983	\$0	\$41,983.00
Totals	\$235,451	\$14,870.27	\$220,580.73
Supplies	\$36,200	\$177.10	\$36,022.90
Travel	\$6,030	\$3,304.26	\$2,725.74
Total Five year	\$326,485	\$14,869.45	\$311,615.55

Table 6 Sitting Bull College IMPACT GRANT Projected Dates July 1, 2022- June 30, 2023

Advisory Committee

An advisory committee comprising of members associated with the Technology community and SBC personnel supports the Cybersecurity program. The committee assists with suggestions designed to improve specific content areas; industry standards, the updating of curriculum, purchase of new instructional materials or equipment to modernize the classroom and adopting safety policies for faculty and students. The committee currently is comprised of the following members:

Advisory Fall 2022

Chad Davis	IT Director, TMCC
Marlin Allery	Cybersecurity Faculty, TMCC
Deborah Mantz	IT Faculty, BSC
Herb Kraft	IT Director, Prairie Knights Casino
Todd Belgarde	IMACT Grant Director, TMCC
Jennifer Duncan	IT Faculty, SCC
Mathew Odermann	Cybersecurity Faculty, TMCC
Clydene Stangvik	Business Development Manager, Cisco
Josh Hammonds	Technical Leader, Cisco
Loren White Temple	System Engineer, Standing Rock Tribe
Amy Moser	People Center of Excellence (COE) Leader
Dave Mueller	IT /Finance Director, SBC
Fred McLaughlin	General Manager Standing Rock Telecom

Summary of Advisory Meetings

Cybersecurity and Data Privacy advisory meetings are held at the end of each fall and spring semester. The fall meeting will meet the week before the Thanksgiving holiday break and the spring meeting will take place in April after finals week.

Moreover, there will be spring meetings held in addition to the two formal advisory meetings. These meetings consist of conferences based on various vocation programs at Sitting Bull College who present a short description of their program and activities that they conducted over a certain period. The presentations also consist of upcoming plans and goals for each

individual program. This allows for other advisory committee members to provide recommendations, suggestions, and feedback, which is typically positive.

Sitting Bull College will examine the Cybersecurity course offerings, in relation to similar programs at other tribal and state colleges. The review is to be administered every two years, prior to the publication of the Sitting Bull College Bulletin. The Bulletin displays the Cybersecurity and Data Privacy course offerings and changes are made to keep the program up to date and competitive; some courses have been eliminated, others modified, and new courses added. The committee also may suggest future classes and areas to consider for expansion. Likewise, this program provides various curriculum for the additional industry certifications, which also overlap across several courses

In addition, the possibility of a bachelor's degree program in Computer Science or a related field has been discussed with the master's level faculty salary and benefits included in the 2015-2016 budget; however, there have not been any applicants. When a faculty is hired to teach and administer the bachelor's degree program, additional evaluations will be completed to establish the program design and courses needed. The current faculty and the advisory committee have looked at a various IT, Cybersecurity and Computer science programs at other tribal and state colleges. The present consensus is that a Bachelor of Applied Science in Information Technology might best meet the needs of SBC students and their employers. Similar programs exist at Minot State University and Dickinson State University, which require that incoming students have completed the Associate of Applied Science Degree, or Associate of Applied Science Degree, in IT or a related field.

Program Self-Evaluation

Faculty

The Cybersecurity program is comprised of one faculty member, Gabriella Arellano, the IT Specialist, IT Advisor, and CEU Coordinator. Dr. Arellano teaches various courses at Sitting Bull College including: Hardware I, Hardware II, Introduction to Networking I, Routing and Switching Networking II, Introduction to Cybersecurity, Operating Systems Client, and the IT internship. Within the past year, Dr. Arellano has completed several training courses through Test Out and Cisco Networking Academy, in addition to completing educational leadership courses through the doctoral program at Concordia University, St. Paul. Gabriella Arellano earned the Career and Technical Credential after completing the Netacad instructor trainings, packet tracer certification, CCNA Routing & Switching I & CCNA Routing & Switching II, IT Essentials Cisco Certification, NDG Linux Unhatched, Introduction to Cybersecurity certificate, Desktop Pro, and the Acue best teaching practices, In August 2021, she received a Career & Technical Post-Secondary Credential for instructing Information Technology classes.

In addition, there are also several adjunct instructors, faculty, and staff members that teach supplementary Cybersecurity courses. To begin with, Lisa McLaughlin teaches SQL Database and Web Design, Jodi Thunder hawk teaches Python, and Mafany Mongoh teaches GIS/GPS. These

instructors are outstanding in their fields and currently are sufficient in number to handle the required electives. The faculty at the TMCC and SCC will teach the additional cybersecurity courses through their perspective colleges to our SBC students.

Mike Selburg at Turtle Mountain Community College will teach the following courses: Introduction to Cybersecurity, Networking I & II, Operating System Client, Implementing a Server Environment, and the Internship course. Marlin Allery at Turtle Mountain Community College teaches the following: Firewalls & Network Security, Internship course, Incident Response & Disaster Recovery, Cybersecurity Infrastructure Configuration, Cybersecurity Prevention & Counter Measures, Cloud Foundations, and Ethical Hacking & Network Defense. Christian Davis at Turtle Mountain Community College teaches Cybersecurity Law and Ethics,

Several of the instructors are also on the assessment committee, curriculum committee, and advisory committee and offer insight to the needs of the program. The instructors experience and degrees have qualified them to teach the additional Cybersecurity coursework with the approval of the college administration. Furthermore, the program partners meet on a monthly basis, share a MOU agreement following specific procedures followed by each college to maintain proper organizational channels for curriculum design, content, professional development, and ensuring effective instruction.

Student Relations

The Cybersecurity and Data Privacy program is designed to meet the needs of our students. Our focus is to build collaborative relationships between peers, faculty, employers, and the local community. The class sizes may range from two to ten students the first semester and grow from this starting point. Our computer labs have a capacity of more than 30 students combined.

Given the nature of the courses provided, our mentoring and collaboration has a solid foundation and continues to grow. Due to the ongoing Covid19 pandemic we understand the importance of safety and flexibility, therefore, we will allow our students to participate and engage in coursework on their own time. We will also provide exceptional support via Zoom, Microsoft teams, the big blue button, phone, email, chat, and face-to-face (social distancing). This includes tutoring and help with navigating and utilizing the online platforms. The IT Specialist will assist any student and instructor with implementing and benefiting from online resources.

With the shift to online and hybrid education, all assessments, both formative and summative, will be administered both online and in-person. To begin with, student presentations will be online and in-person and consist of recorded media, slideshows, and virtual group collaboration, to limit large in-person group meetings. Educational resources will be offered online, including textbooks, videos, article links, software, and manuals. Students can utilize these resources in addition to their hard copy textbooks purchased from the school bookstore. All of our course assessments are offered through the following: SBC online, Cengage, TestOut, and Cisco Networking Academy. The only exception is the Hardware I class. These required students can

pick up computers and record the assembly and disassembly of the devices as a midterm and final assessment.

Sitting Bull College provides laptops to students who do not have access to computer devices at home. Dr. Arellano manages and tracks the laptops that are checked out using Prey tracking Software. Students who check out a laptop have the Prey software installed allowing the laptop to be tracked and notifying students when the laptop is due every two weeks. Given safety concerns, students are allowed to complete and sign a Laptop checkout contract online to re-checkout the laptop. Students that do not need to re-checkout the laptop return it to Dr. Arellano's office the day that it is due. Students also receive email reminders on the due date and the day prior to returning the laptop. The IT contract also states that if laptops that are not returned on time they must be returned within a week or Dave Mueller, the IT Director at Sitting Bull College is contacted, and further measures are taken. These include posting a \$1,000 fee onto the student account until the laptop is safely returned and in working condition, as well as the locking of the device via Prey software.

All of the laptops checked out include a Microsoft subscription to use Word, Excel, PowerPoint, and Access. Moreover, all current students, staff, and faculty are included in the college's software subscription for Microsoft Office 365/2016 ProPlus, which includes Word, PowerPoint, Excel, Outlook, Access, OneNote, and more. Students are able to install versions of Office on five personal devices, including home desktop and laptop computers, tablets, and phones. In addition, Cybersecurity students in particular, will have unlimited subscription to Cisco Networking Academy and are registered by Dr. Arellano.

Curriculum Content, Design, and Delivery

The students' achievement of the learning outcomes of the Cybersecurity education program are collected and reviewed throughout the academic year. These findings assist in recommending any changes to the curriculum content, design and delivery. Additional input is garnered from assessment committee members when these findings are presented annually to the committee.

Other collaborative opportunities are provided as Dr. Arellano consults with other faculty members to ensure that quality of instructional delivery is exceptional. Dr. Arellano will update the curriculum and assessment content and design, given the recommendations of the following: The curriculum committee, assessment committee, advisory committee, and the Geek Oyate committee. The learning outcomes in this guidance represent core competencies that a Cybersecurity student will be expected to demonstrate. Several Cybersecurity programs across the state of North Dakota were cross referenced in determining the essential program outcomes implemented and foundations built upon. They are useful in mapping program and course outcomes to industry certifications and for course and program assessments.

Each learning outcome has an associated 3-tiered assessment rubric which provides further clarity and a meaningful evaluation of the outcome. Take note of their three levels of performance; Emerging, Developed, and Highly Developed (CCECC, 2020, pp. 1-12). In order to standardize with other SBC programs, instructor Arellano has expanded her own rubrics by adding two levels; Underdeveloped and Non-emergent, and the necessary criteria for the learning outcome.

Additionally, incorporating Native American culture into Cybersecurity classes will be assessed informally. Students will be asked to introduce themselves in Lakota/Dakota prior to presenting projects and slideshow presentations. Students will be asked to create outlook signatures with their Lakota/Dakota names to include in emails. In addition, as the CEU Coordinator, Dr. Arellano encourages students to attend workshops consisting of Native American culture, which is informally assessed but is still relevant in that it exposes students to Native American culture. Many of the workshops foster collaboration amongst students as well as put emphasis on combining culture with technology. Several Cybersecurity students will benefit from the integration of the Lakota Language online dictionary that together they have built for the Sioux Tribe on Standing Rock Reservation.

Institutional Support

The main campus located at Fort Yates is the best example of Sitting Bull College's institutional support for the Cybersecurity and Data Privacy education program. The adjacent building houses the Student Center, Writing Lab, SBC Library, and support staff so these student resources are readily available. There are also faculty training opportunities to ensure that the Cybersecurity Faculty member and adjuncts are up-to-date on current Cybersecurity trends. The library provides a number of online resources with the library personnel helping as needed. Given the corona virus pandemic, many of these institutional resources have moved online. Students can access Wi-Fi on campus conveniently from their vehicles, as well as mobile hotspots. The computer lab is limited in student capacity; therefore, students are allowed to checkout laptops, to complete course work from the comfort of their home, reducing exposure to the corona virus. Students also have access to the online library database where they can access all of the online library resources using their student log in information.

Academic assistance in the form of tutoring is available to students individually and group settings online via zoom. Tutoring is currently available to all students. Faculty has extended their office hours to online availability to accommodate student needs, as well as safety procedures due to the current pandemic. Timely feedback is given on assignments, some class time is spent reviewing corrected work, and allowing students to redo assignments are some examples of strategies that have been implemented to assist the students. This has become more flexible, given that some students cannot make online times because they may have someone else in the home occupying the computer, such as a child.

The Covid pandemic has resulted in more lenience and flexibility with online course work to best meet students' current needs (Shpolianskaya & Seredkina, 2020, pp. 29-35). The institution

continues to explore other online opportunities to meet the student tutoring needs for courses within the degree core requirements and classes within the general education requirements.

The Geek Oyate club is also a great support system for Cybersecurity and Data Privacy students, as well as students interested in the technology field. The SBC Geek Oyate is a technology club focused on building leadership skills, exploring innovative ideas, and providing students with the opportunity to learn about various technology fields (SBC Shared Data, 2022). Students network with peers, employers, and community members to acquire additional skills in the field. The SBC Geek Oyate also serves as a social purpose. Club members meet every two weeks in-person and build life-long networks through team building. Student Leadership and innovation is developed through technology workshops, fieldtrips, fundraisers, and club activities provided throughout the school year. Club members also meet peers that share their same interests and have the opportunity to establish their personal expansion in becoming a better leader. Club members learn the value of participation and collaboration, ultimately leading to a positive college experience with community involvement (SBC Shared Data, 2022).

The Geek Oyate was established in the fall of 2019. Geek Oyate students developed the club name and enrollment began. The Geek Oyate club enrolled five active members in the fall of 2019. Currently, in the fall of 2020 semester, enrolled Geek Oyate members consist of 16. However, there are only 12 members who attend every week, the additional four members attend once a semester to maintain enrollment. Student enrollment in the club has increased substantially and outlines in Table 11. We are continually recruiting new members, which in turn, has the potential to increase the Cybersecurity student enrollment. Below is a table highlighting enrollment per semester:

Table 7 Geek Oyate Enrollment 2019-2022

Geek Oyate Enrollment 2019-Present		
	Students Actively Enrolled	Total Geek Students Enrolled
Fall 2019	5	5
Spring 2020	9	7
Fall 2020	12	16
Spring 2021	8	17
Fall 2021	9	15
Spring 2022	9	12
Fall 2022	9	12

In addition to the Geek Oyate club, Cybersecurity students can participate in Student Government, American Indian Business Leaders, SBC's Culture Club or the annual American Indian Higher Education Consortium competition.

Importance to the College and other Programs

The Cybersecurity and Data Privacy education program helps to fill important computer support roles within the community. Future Cybersecurity and Data Privacy graduates have the opportunity to be employed Nationwide or at local jobs located on Standing Rock Reservation: at Sitting Bull College, in schools, in Indian Health Service clinics and hospitals, in two casinos, in tribal government, at Standing Rock Telecom and West River Telecom, and at private businesses. Others have the opportunity to work on the reservation in non-IT areas as well. Students may accept positions off of the reservation as well, in IHS hospitals, USDA offices, and school districts. Internships provide the student opportunities to gain supervised, practical experience working in a Cybersecurity profession. Most of the local cybersecurity internships and related internships are minimum wage to no cost to the employer. The Cybersecurity internship is a core class and will be supervised by the IT instructor and advisor, Gabriella Arellano.

Opportunities and Obstacles

The community of Standing Rock and the surrounding area is rich with opportunity. It is the mission of Sitting Bull College (SBC) to build the intellectual capital of the Standing Rock people and community. To realize this mission it is necessary to further educate the people of Standing Rock through the implementation of a degree offering. The area is highly agricultural and residents of the local community have expressed the need for increased economic development. An Associate degree in Cybersecurity will provide an avenue for increased intellectual thought as it pertains to current nationwide technology trends and will spur the potential for more economic growth within the Standing Rock Reservation. This growth will help retain and develop the area's workforce. This proposal presents the need for an Associate of Cyber Security and outlines the degrees key points that address the community's needs. The intent of this study is to allow the college to move forward with accreditation requirements of the program of study.

The Cybersecurity and Data Privacy program has many opportunities looking ahead into the future. With the increase in Geek Oyate club enrollment numbers and internships, the Cybersecurity and Data Privacy program is nurturing relationships amongst peers, staff, and employers, growing the number of partnerships overall. Our weekly speakers and workshop presenters are also a key in continuing to build relationships, allowing our students to network and leading to endless opportunities.

⁶ (SBC Shared Data, 2022) & S. (n.d.). SBC "Geek Oyate 2019-Present" folder. Retrieved 2020, from Sitting Bull College shared folder.

With online learning, individual course enrollment is increasing and allowing for working individuals to complete courses on their own time as compared to prior years where courses were held during work hours. The increase in faculty training (including the competition of the ACUE faculty online training that took place in the summer of 2019), has allowed individuals to polish their online education skills to better provide online resources and meet the current needs of our students.

The corona virus resulted in programs receiving additional funds to address the lack of resources for online education and safety with regards to the pandemic. As online education begins to advance and new resources are needed, the need for funding will also increase overtime, to stay current with technology equipment and current Cybersecurity trends.

Most of our Lenovo laptops are checkout out to students which have a life span of 3-5 years, funding will be essential to replace the laptops that we are currently checking out to students once the device is no longer salvageable (Lenovo , 2020). Previously, students would use the desktop computers in the computer lab, but there is no telling when this will begin to occur in the future.

Another department need is to secure additional funding for purchasing the full version of Cisco's networking lab equipment bundle, which is currently about \$ 5,000. This would assist the instructor with the two current networking classes and is required if the SBC Cybersecurity and Data Privacy education program wants to offer more advanced networking classes in the future. Laboratory workbenches and storage cabinets, at least, must be added to the classroom; this might necessitate the removal of several computers that are currently used by non-IT students.

Another focus is the retention of students in the Cybersecurity program. American Indian and Alaska Native students experience the lowest rates of college retention and graduation at four-year institutions in the United States (Keith, J. F., Stastny, S., Agnew, W., & Brunt, A., 2017) SBC has formulated a retention management plan, which include activities such as the Student Summit and other student support activities.

The Cybersecurity and Data Privacy program has developed a number of suggested course sequences through the Cybersecurity Program, designed to take either four or five semesters, depending on the student schedule and how individual students plan to complete their coursework at their own pace. The Cybersecurity and Data Privacy courses are also coursework intensive and students can choose which other general courses to complete while they complete the required Cybersecurity classes.

Suggested Sequence for Student Progression Through The Associate of Applied Science in Cybersecurity & Data Privacy

A suggested sequence through the Cybersecurity and Data Privacy Program, incorporating all prerequisites, is shown below. This sequence allows the student to complete the program in **four semesters**.

Fall Term 1

PSYC	100	First Year Learning Experience.....	3 credit hours
ENG	110	Composition I.....	3 credit hours
_____	_____	Health/ Physical Education.....	2 credit hours
MATH	101	Pre-Algebra or higher.....	4 credit hours
CIS	212	Operating Systems Client.....	3 credit hours
CSCI	101	Introduction to Computers.....	3 credit hours

Total Credits..... 18 credit hours

Spring Term 2

COMM	110	Fundamentals of Public Speaking.....	3 credit hours
CIS	128	Microcomputer Hardware I.....	3 credit hours
CIS	215	Implementing a Server Environment.....	3 credit hours
CIS	220	Linux Administrator I.....	3 credit
hours CIS	141	Introduction to Cybersecurity.....	3
credit hours			

Total Credits.....15 credit hours

Fall Term 3

CIS	164	Networking Fundamentals I.....	4 credit hours
_____	_____	Cybersecurity Elective.....	3 credit hours
NAS	101	Lakota/Dakota Language I.....	3 credit hours
CIS	223	Linux Administrator II.....	3 credit hours
CIS	241	Introduction to Digital Forensics.....	3 credit
hours			

Total Credits.....16 credit hours

Spring Term 4

CIS	165	Networking Fundamentals II.....	4 credit hours
CIS	297	Cybersecurity Internship.....	3 credit hours
SOC	120	Transitions-Graduation & beyond.....	2 credit hours
CIS	243	Incident Response & Disaster Recovery.....	3
credit hours			

CIS	168	Firewalls & Network Security.....	3 credit
hours			

_____	_____	Cybersecurity Elective.....	3 credit hours
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Total Credits.....18 credit hours

Total Degree Requirements67 credits

***Suggested Sequence for Student Progression Through
The Associate of Applied Science in Cybersecurity & Data Privacy***

A suggested sequence through the Cybersecurity and Data Privacy Program, incorporating all prerequisites, is shown below. This sequence allows the student to complete the program in **five semesters**.

Fall Term 1

PSYC	100	First Year Learning Experience.....	3 credit hours
ENG	110	Composition I.....	3 credit hours
MATH	101	Pre-Algebra or higher.....	4 credit hours
CSCI	101	Introduction to Computers.....	3 credit hours
Total Credits.....			13 credit hours

Spring Term 2

CIS	128	Microcomputer Hardware I.....	3 credit hours	
CIS	215	Implementing a Server Environment.....	3 credit hours	
CIS	220	Linux Administrator I.....	3 credit	
hours	CIS	141	Introduction to Cybersecurity.....	3 credit hours
Total Credits.....			12 credit hours	

Fall Term 3

CIS	164	Networking Fundamentals I.....	4 credit hours	
_____	_____	Cybersecurity Elective.....	3 credit hours	
hours	CIS	223	Linux Administrator II.....	3 credit
hours	CIS	241	Introduction to Digital Forensics.....	3 credit
Total Credits.....			13 credit hours	

Spring Term 4

CIS	165	Networking Fundamentals II.....	4 credit hours	
CIS	297	Cybersecurity Internship.....	3 credit hours	
SOC	120	Transitions-Graduation & beyond.....	2 credit hours	
hours	CIS	243	Incident Response & Disaster Recovery.....	3 credit
_____	_____	Cybersecurity Elective.....	3 credit hours	
Total Credits.....			15 credit hours	

Fall Term 5

CIS	212	Operating Systems Client.....	3 credit hours
NAS	101	Lakota/Dakota Language I.....	3 credit hours

_____	_____	Health/ Physical Education.....	2 credit hours
COMM	110	Fundamentals of Public Speaking.....	3 credit hours
CIS	168	Firewalls & Network Security.....	3 credit
hours			

Total Credits.....14 credit hours

Total Degree Requirements67 credits

Suggested Sequence for Student Progression Through The Associate of Applied Science in Cybersecurity & Data Privacy

A suggested sequence through the Cybersecurity and Data Privacy Program, incorporating all prerequisites, is shown below. This sequence allows the student to complete the program in **five semesters** starting in the **spring**.

Spring Term 1

PSYC	100	First Year Learning Experience.....	3 credit hours
ENG	110	Composition I.....	3 credit hours
CSCI	101	Introduction to Computers.....	3 credit hours
CIS	141	Introduction to Cybersecurity.....	3 credit
hours			

Total Credits..... 12 credit hours

Fall Term 2

CIS	220	Linux Administrator I.....	3 credit
hours			
CIS	164	Networking Fundamentals I.....	4 credit hours
MATH	101	Pre-Algebra or higher.....	4 credit hours
NAS	101	Lakota/Dakota Language I.....	3 credit hours

Total Credits..... 14 credit hours

Spring Term 3

CIS	165	Networking Fundamentals II.....	4 credit hours
CIS	223	Linux Administrator II.....	3 credit
hours			
SOC	120	Transitions-Graduation & beyond.....	2 credit hours
CIS	243	Incident Response & Disaster Recovery.....	3 credit
hours			

Total Credits..... 12 credit hours

Fall Term 4

CIS	212	Operating Systems Client.....	3 credit hours
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_____	_____	Health/ Physical Education.....	2 credit hours
COMM	110	Fundamentals of Public Speaking.....	3 credit hours
CIS	168	Firewalls & Network Security.....	3 credit
hours			

CIS 128 Microcomputer Hardware I 3 credit hours

Total Credits.....14 credit hours

Spring Term 5

CIS	215	Implementing a Server Environment	3 credit hours
_____	_____	Cybersecurity Elective.....	3 credit hours

CIS 297 Cybersecurity Internship..... 3 credit hours

CIS 241 Introduction to Digital Forensics.....3 credit

hours

_____ Cybersecurity Elective 3 credit hours

Total Credits.....15 credit hours

Total Degree Requirements67 credits

Courses and Descriptors

CIS 128 Microcomputer Hardware I

Students learn the functionality of hardware and software components as well as suggested best practices in maintenance and safety issues. The students, through hands-on activities and labs, will learn to assemble and configure a computer, install operating systems and software, and troubleshoot hardware and software problems. In addition, an introduction to networking is included with this course. This course helps students prepare for CompTIA's A+ certification.

CIS 220 Linux Administrator I

Red Hat System Administration I is designed as the first part of the Red Hat® Certified System Administrator (RHCSA®) training track for IT professionals. The course discusses core Linux system administration skills, including storage configuration, security feature management, task control, and installation and deployment of Red Hat Enterprise Linux.

Prerequisite: Introduction to Computers or Permission of Instructor & Must be an Information Technology AS major or Cybersecurity AAS major.

CIS 223 Linux Administrator II

Red Hat System Administration II is designed as the second part of the Red Hat® Certified System Administrator (RHCSA®) training track for IT professionals who have taken Red Hat System Administration I. The course goes deeper into core Linux system administration skills,

including storage configuration, security feature management, task control, and installation and deployment of Red Hat Enterprise Linux.

Prerequisite: Introduction to Computers or Permission of Instructor & Must be an Information Technology AS major or Cybersecurity AAS major.

CIS 241 Introduction to Digital Forensics

This course introduces the principles that are essential to the management of digital investigations, providing a framework that includes technical, legal, and managerial issues.

Prerequisite: Introduction to Computers or Permission of Instructor & Must be an Information Technology AS major or Cybersecurity AAS major.

CIS 141 Introduction to Cybersecurity

This course will provide an introduction to concepts related to Cybersecurity. Students will gain an understanding of different tools which can be used to defend attacks on computer systems.

CIS 164 Networking Fundamentals I

This course focuses on the following: network terminology and protocols, Local Area Networks (LANs), Wide Area Networks (WANs), Open System Interconnection, (OSI) models, cabling, cabling tools, routers, router programming, Ethernet, Internet Protocol (IP) addressing, network standards. This is the first of four courses leading to the Cisco Certified Network Associate (CCNA) certifications.

CIS 165 Networking Fundamentals II

This course focuses on the following: initial router configuration, Cisco IOS software management, routing protocol configuration, TCP/IP, and access control lists (ACLs). Students will develop skills in configuring a router, managing Cisco IOS Software, configuring routing protocols, and creating access lists that control access to a router. The second of four courses leading to the Cisco Certified Network Associate CCNA Certification. Prerequisite: CIS 164 Networking Fundamentals I.

CIS 168 Firewalls & Network Security

Identify elements of firewall design, security threats, and responses to security attacks. Use best practices to design, implement, and monitor a network security plan. Examine security incident postmortem reporting and ongoing network security activities.

Prerequisite: Introduction to Computers or Permission of Instructor & Must be an Information Technology AS major or Cybersecurity AAS major.

CIS 212 Operating Systems Client

The course helps learners to gain the knowledge and skills to install, configure, customize, optimize, and troubleshoot a desktop operating system in a stand-alone and network

environment. Windows 10 and Linux and Mac OS are the current focus of the class. The purpose of this course is to offer all the critical information students need to successfully move into a role as an IT professional, and support client computers in a business environment. Many hands-on exercises are included which allow students to practice skills as they are learned.

CIS 215 Implementing a Server Environment

This course introduces the learner to the Microsoft Windows Server and the networking technologies it supports. The learner will become familiar with networking and operating system concepts and the common tasks required to administer and support the Microsoft Windows operating system in a network environment.

CIS 297 Information Technology Internship

This provides the student with the opportunity to experience the world of work in conjunction with their program of study. One semester hour of credit is equivalent to forty-five (45) contact hours. Prerequisite: Students through advisor approval will only be allowed to complete internship within the last two semesters of the degree plan.

CIS 243 Incident Response & Disaster Recovery

This course focuses on the planning processes for all three areas of contingency planning, incident response, disaster recovery and business continuity, and the execution of response to human and non-human incidents in compliance with these policies.

Prerequisite: Introduction to Computers or Permission of Instructor & Must be an Information Technology AS major or Cybersecurity AAS major.

Cybersecurity Electives

CIS 270 Cybersecurity Infrastructure Configuration

This course provides the student with a general understanding of how to install, configure, and manage firewalls for defense of enterprise network architecture. Students will learn the theory and configuration steps for setting up the security, networking, threat prevention, logging, and reporting features of next generation firewall technologies.

Prerequisite: Introduction to Computers or Permission of Instructor & Must be an Information Technology AS major or Cybersecurity AAS major.

CIS 271 Cybersecurity Prevention & Counter Measures

This course provides the student with a general understanding of how to install, configure, and manage firewalls for defense of enterprise network architecture. Students will learn the theory and configuration steps for setting up the security, networking, threat prevention, logging, and reporting features of next generation firewall technologies.

Prerequisite: Intro to Computers or Permission of Instructor & Must be an Information Technology AS major or Cybersecurity AAS major.

CIS 255 Cloud Foundations

Cloud Foundations is intended for students who seek an overall understanding of cloud computing concepts, independent of specific technical roles. It provides a detailed overview of cloud concepts, Amazon Web Services (AWS) core services, security, architecture, pricing, and support.

Prerequisite: Introduction to Computers or Permission of Instructor & Must be an Information Technology AS major or Cybersecurity AAS major.

CIS 264 Ethical Hacking & Network Defense

This course provides experience securing computer network resources. The tools and methodologies attackers use will be examined, as well as defenses against them.

Prerequisite: Intro to Computers or Permission of Instructor & Must be an Information Technology AS major or Cybersecurity AAS major.

CIS 261 Cybersecurity Law & Ethics

Data Privacy is an aspect of information technology (IT) that deals with the ability an organization or individual has to determine what data in a computer system can be shared with third parties. This course will explore the laws governing security issues involving Foreign, Federal, State, and Tribal case law and statutes governing the Internet.

Prerequisite: Introduction to Computers or Permission of Instructor & Must be an Information Technology AS major or Cybersecurity AAS major.

Program Planning

Every two years (in advance of the publication of the SBC Bulletin) the faculty members and advisory committee will examine the Cybersecurity and Data Privacy course offerings, in relation to similar programs at other tribal and North Dakota state vocational colleges. Changes have been made to keep the program up to date and competitive; new courses have been added, others modified, and new courses updated. The number of credits required has been reduced overall, increasing the likelihood that students will complete the program without using up their eligibility for Pell Grant funding.

It is apparent that there are numerous Cybersecurity and Data Privacy employment opportunities available in the region served by Sitting Bull College, and across the state of North Dakota, there are likely to be even more openings in the near future. The challenge is making certain that interested students will consider SBC for their higher education choice.

Trends

As of December 2022, according to the Job Service of North Dakota, there are currently 200 Technology/ Computer related positions available across the state of North Dakota requiring an Associate Degree or less (Job Service North Dakota, 2022). These positions consists of 200 Cybersecurity related positions based on the keyword “cybersecurity”, currently available across North Dakota under the cybersecurity occupation group category requiring an associate degree or less (Job Service North Dakota, 2022). In addition, there are technology positions closely related to Cybersecurity, that are available statewide, requiring a bachelor’s degree (Job Service North Dakota, 2022). Lastly, there are currently five Cybersecurity related jobs available locally at on and near Standing Rock Reservation (Standing Rock Sioux Tribe, 2022). The following positions are available locally: MIS Technician, Prairie Knights Casino; IT Technician, Prairie Knights Casino; Information Technology Technician, Linton Hospital; Wireless Communications Technician, Standing Rock Telecom; Solutions Engineer, Plains Mobile.

The average annual wage for all technology occupations in the state of North Dakota is \$50,313 (Technology Council of North Dakota, 2017). According to the council, the state of North Dakota is estimated to need 6,500 technology positions through 2026 (Technology Council of North Dakota, 2017). Growth in the industry will create the need for 1,340 employees to fill new positions (Technology Council of North Dakota, 2017). The state’s computer and mathematical industry currently employs 6,780 statewide and new projected positions will equal 82% of the state’s current technology workforce (Bureau of Labor Statistics, 2022) Computer science teachers have the highest percentage of projected growth (30%) (Technology Council of North Dakota, 2017).

Given that Sitting Bull College serves both North Dakota and South Dakota, job trends in South Dakota will also be included in this review. According to the Department of Labor and Regulation, there are currently 13 Cybersecurity associated positions as of December 2022 (South Dakota Department of Labor and Regulation, 2022). According to the U.S Bureau of Labor statistics, there are currently 8,680 Technology and Mathematical positions currently occupied in the State of South Dakota (Bureau of Labor Statistics, 2022). The median hourly wage for these technology positions is \$33.34 per hour and the annual mean wage is \$77,210.

Table 8 North Dakota& South Dakota Cybersecurity & Data Privacy Related Positions Projected Growth

ND & SD Technology Positions Projected Growth 2026

IT Position	Projected Growth
Computer Science Teacher, ND	30%
Information Security Analyst , ND	3.5%
Software Developers , ND	2.9%
Computer Numerically Controlled Machine Tool Programmers, Metal and Plastic, SD	27.78%
Information Security Analyst, SD	27.35%
Software Developers, Applications, SD	29.07%

⁷ Projected growth was estimated by the IT North Dakota Council.⁸

According to North Dakota job seekers (2022) the top three occupations in North Dakota in high demand are the following:

- Computer and Information Systems Managers
- Computer Network Support Specialists
- Computer Programmers
- Computer Systems Analysts
- Computer User Support Specialists
- Intelligence Analysts
- Information Security Analysts
- Software Developers
- Software Quality Assurance Analysts
- Testers
- Telecommunications Equipment Installers
- Repairers
- Except Line Installers
- Web Developers and Digital Interface Designers

In Sioux County, ND at present, there are two technology positions available, but they are not currently being advertised online. Below is a table outlining the current availability in Sioux county.

Table 9 Available Cybersecurity & Data Privacy Positions in Sioux County November 2020

Entity	Total Positions by Title	IT Job Openings

⁷ (Technology Council of North Dakota, 2017)

⁸ <https://dlr.sd.gov/lmic/lb/2018/september2018laborbulletin.pdf>

Grand River Casino	1 IT Director, 1 IT Technician	None
Prairie Knights Casino	1 IT Director, 2 IT Technician	Two
Sitting Bull College	1 IT Director, 1 IT Technician	One
IHS Hospital and Clinics	1 IT Director, 1 IT Technician	None
Standing Rock Schools, Ft. Yates	1 IT Director, 3 IT Technician	none
Standing Rock Sioux Tribe	1 IT Director, 4 IT Technician	Two
Standing Rock Telecom	1 IT Director, 2 IT Technician	One

⁹ Findings were taken from three websites (each company website was also visited)

Given the current local job availability, Dr. Arellano is striving to build networks in the surrounding larger cities with greater Cybersecurity position openings, as well as focusing on remote job ability locally and nationwide. Given the Covid19 trends, there are many new online cybersecurity positions available in the United States. (Indeed, 2022). As of November 2022, there are currently 6,382 Cybersecurity remote jobs available across the United States (Indeed, 2022). Python is required for 1,444 of these positions; Java, 890; PowerShell, 682; and C++, 426 (Indeed, 2022). Of these cybersecurity positions, 446 only require an Associate’s degree in Cybersecurity or a related field (Indeed, 2022).

Below is a table outlining the current remote job openings, in alignments with the certificates that our Cybersecurity program currently prepares our Cybersecurity students to take online.

Table 10 Current Available Positions Requiring Industry Developer Skill November 2022

Remote Positions Available November 2022 Requiring Developer Skills		
Certifications	Remote Positions Available	Type
Python	1,444	Remote Position
Java	890	Remote Position
PowerShell	684	Remote Position
C++	426	Remote Position

¹⁰ Findings were taken from indeed.com, link below. The Positions are all remote. Our curriculum prepares all of our Cybersecurity students to complete and pass the above certifications.

⁹ (Standing Rock Sioux Tribe, 2022) (Indeed, 2022)
¹⁰ (Indeed, 2022)

Program Review Participants

Associate of Applied Science in Cybersecurity and Data Privacy Program, 2022

Gabriella Arellano: IT Specialist (Instructor, and Program Advisor)

November 22, 2022

Date of Submission

December 1, 2022

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APPENDIX A

DUTIES AND RESPONSIBILITIES

1. Provide instruction with the Cybersecurity curriculum.
2. Serve as advisor and mentor for the Cybersecurity students enrolled in the Associate degree in Cybersecurity.
3. Maintain advisee file for each student.
4. Promote and recruit students for the Cybersecurity and information technology programs.
5. Participate in student assessment activities.
6. Establish and monitor a work-based/practical learning plan for each student enrolled in the program. This would include the following: a) set up objectives for the work experience; b) locate the job site and supervisor; c) relate objectives to the work site supervisor and student; d) verification of hours completed by student.
7. Update and maintain curriculum in Cybersecurity to meet industry standards.
8. Complete program reviews per established five year schedule.
9. Complete yearly program assessment for Associates degree in Cybersecurity.
10. Update and maintain course syllabi as needed.
11. Maintain inventory of department equipment.
12. Establish and hold program advisory committee meetings.
13. Must communicate effectively with others.
14. Other duties as assigned by the Dean of Academics.
15. Provide friendly, helpful customer service to students, clients and visitors.
16. Attend all scheduled college functions and meetings as required.
17. Serve on college committees as appointed.
18. Promote and participate in student and community activities. (I.e. clubs, Geek Oyate, AIHEC, cultural events, and volunteerism).
19. Promote and recruit students for Sitting Bull College.
20. Complete quarterly IMPACT grant program report.
21. Complete IMPACT Grant tasks essential to meet the requirements of maintaining grant funding.