DAKOTA STATE UNIVERSITY
COLLEGE OF BUSINESS AND INFORMATION SYSTEMS

INFORMATION SYSTEMS PROGRAMS AT DSU

(AS WebDev, BS CIS, MSIS, & PhD IS)
SELF-STUDY DOCUMENT

SPRING 2019

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PART 1: INSTITUTIONAL HISTORY

Heritage: 1881 to 1982

Dakota State University was established in 1881 as the first teacher education institution in Dakota Territory. Teacher education remained the primary mission of the institution through the 1950s. However, in response to the changing needs of South Dakota in the 1960s, the university began to expand its role to include degree programs in the liberal arts and business.

In 1980, South Dakota welcomed a major new industry into the state: the banking and credit card industry. The success and growth of this new industry, as well as the success of other information-oriented, computer-based industries in the state, prompted the state's leadership to carefully examine the degree programs being offered at the public institutions of higher education within the state. After lengthy discussions, leaders in state government, the banking and information services industries, and the Board of Regents agreed to develop new degree programs at one institution and then to use the experience and knowledge from this development to expand programs throughout the state's public higher education system.

Mission Change: 1983 to 1984

In 1984, the Legislature of the State of South Dakota (South Dakota Codified Law 13-59- 2.2) assigned Dakota State University the role and mission of developing technology- based degree programs in information systems, business, teacher education, and allied health care services at both the undergraduate and graduate levels.

The Legislature provided $2.6 million in additional operating funds to support a three- year mission change at DSU. During the initial phase of the transition, the academic programs of the institution were reviewed. Degree programs were phased out if they were duplicated at the other five regental institutions or if graduates would enter an over- supplied marketplace. New information systems programs, computer equipment, and facilities were approved for DSU. During the transition, special attention was given to ensure that all students in programs slated for phase-out received a full opportunity to complete those programs. To ensure the continuation of education quality, when the number of students continuing in a program became very small, a special faculty- mentoring program was developed.

The second phase of the transition began in August 1984, with the development of degree programs that integrated computers and information technologies into traditional academic subjects and added coursework specific to the computer and information systems areas. Existing faculty were retrained, and new faculty were hired. Programs to implement the research and service aspects of the new role and mission were started. This was a period of stress for the campus, but it was also a period of great exhilaration with faculty and staff invigorated and renewed by the need for innovation, adaptation, and change. Some faculty and staff were unable to adapt to the changing conditions and left the university, but those who stayed on for the ride were justly proud of their accomplishments.

Realizing that the innovative programs being developed at DSU were expensive, private industry and state government provided the university with additional financial resources. Consultants from state agencies and from national corporations also provided assistance and guidance that contributed greatly to the success of the mission change.

Amplifying the Mission Change: 1984 to Present

In 2015, as part of the launch of DSU's 2020 Strategic Plan, "Excellence through Innovation", DSU leadership and employees reaffirmed the Institutional Mission, Vision, and Values.

Mission

> *DSU provides learning that integrates technology and innovation to develop graduates ready to contribute to local, national, and global prosperity.*

Vision

> Building upon its distinctive mission, DSU will become:

1. The university of choice for those seeking a student-centered institution that offers innovative programs grounded in teaching, research, technology, scholarship, and service excellence.
2. An academic community that serves as an economic engine in local, national, and global markets.
3. A campus recognized for its achievements in continuous quality improvement.

Values

- Student success.
- University-wide Excellence.
- Distinction in Teaching, Scholarship, and Service.
- Academic Freedom and Integrity.
- Diversity, Respect, and Inclusion.
- Continuous Improvement.
- Community, Collaboration, and Communication.
- Technology and Innovation inside and outside the classroom.

As the institution endeavors to articulate its mission in the fullest way, our degree programs are scrutinized each year to ensure they remain on the cutting edge relative to technology to enhance and support instruction and address work force demands. When new degree programs are proposed by the colleges, they must clearly satisfy the "Is it compatible with our mission?" question before any additional planning is done.

To date, those curriculum development efforts have resulted in 28 bachelor's degrees, seven associate's degrees, and 16 certificate programs. These programs range from Cyber Security to Elementary Education to Respiratory Care to Business Administration.

In the delivery of graduate education, the institution also offers seven master's degrees, certificates, and two doctoral degrees.

DSU Rising Initiative

In 2017, Dakota State University began a transformational five-year capital investment initiative called DSU Rising.

The initiative is the result of a $30M donation from philanthropists Miles and Lisa Beacom and Denny Sanford. The donation will allow for the construction of an $18M, 40,000-square-foot research and development building for the Madison Cyber Labs (MadLabs). The funds also provide for additional scholarships, new program development, hiring of more faculty and staff, and support the university's intent to bring 5G network capabilities to Madison, the region, state, and eventually the nation. In addition, South Dakota Governor Dennis Daugaard pledged $10M to Dakota State, monies from the research and development Future Fund. U.S. Senator Mike Rounds(R-SD) has pledged to help Dakota State earn $20M in federal funds to advance DSU's cyber mission.

Madison Cyber Labs

On Jan. 31, 2018 Governor Dennis Daugaard signed House Bill 1057 into legislation which permitted the demolition of DSU's Lowry Hall and construction of the Madison Cyber Labs, or MadLabs. The Madison Cyber Labs will build on DSU's expanding capabilities and strengths to establish a hub of cybersecurity and cyber operations expertise, research, and economic development in South Dakota.

The MadLabs will include resources (labs, networking, hardware, software), partners (government, business and industry, nonprofits), people (undergraduate, graduate, professional, teachers, researchers, interns and collaborators), programs (certificates, A.S., B.S., M.S. and Ph.D.) and innovation (interdisciplinary and multidisciplinary groups and projects, forensics and security). Construction of the MadLabs building began in 2018, with full occupancy expected in Fall 2019.

Already known as a national leader for cyber security and having a mission focusing on technology and information technology, DSU earned a 2012 National Security Agency designation as a Center for Academic Excellence in Cyber Operations. The NSA designation comes with levels of responsibility to the Agency regarding Knowledge Units and student success. DSU's We Are Rising initiative intends to put South Dakota on the leading edge of cybersecurity with new economic development clusters creating high paying jobs and giving former students the ability to 'come home' to cutting-edge companies and a growing regional economy.

Student Demographics

Prior to the mission change in 1984, the majority of DSU students lived within a 50-mile radius of the campus. Most were traditional students coming to the institution directly from high school. Since the mission change, the DSU audience and student population has changed markedly. Immediately after the mission change, enrollment plunged a frightening 27.6 percent the first year, followed by another 12.6 percent decline the second year. But the new curriculum changes, combined with new institutional vigor, provided the institution with unprecedented enrollment growth and stability. **Figure 1** shows the undergraduate, graduate, and total enrollment at DSU since Fall 2014.
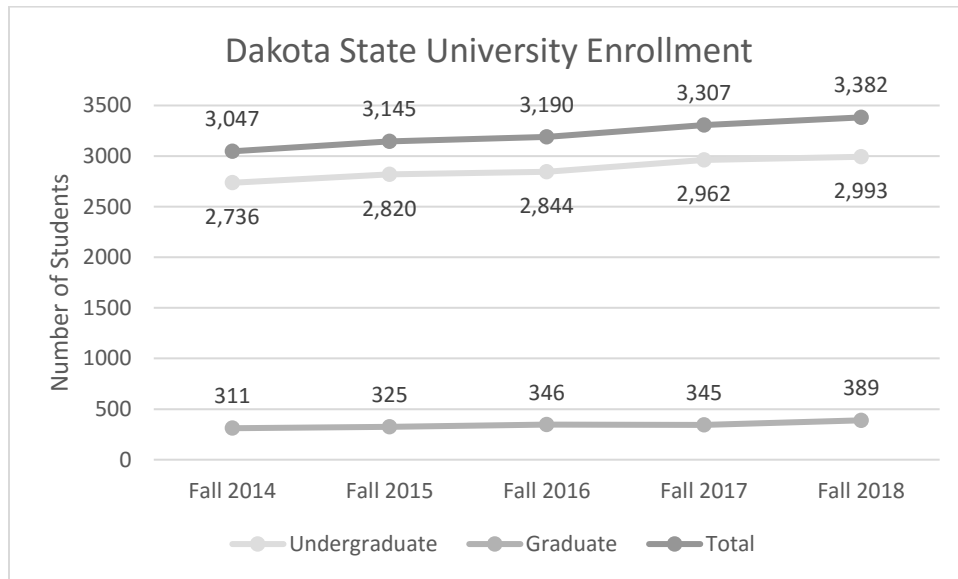
Figure 1. DSU Enrollment by Academic Level, Fall 2014 to Fall 2018

Computing Environment

Dakota State University students at DSU enjoy unique access to technology. DSU was not only the first institution in the region to provide 1:1 portable computing and a campus wide wireless network overlay, but one of the first in the nation to do so. In 2005 all students were provided fully-functional portable computers (tablets) that included digital inking capabilities and voice to text translation. Since Fall, 2007 students have had the option to use Fujitsu LifeBooks or Apple MacBooks. Similar computing tools allows for common computer imaging and software licenses used in classes. However, students may join the ubiquitous computing environment with devices of their own. Computing omnipresence builds on a long tradition of supporting data communication and networking innovations. For degree programs emphasizing information assurance and security issues as well as digital design, additional lab facilities featuring computers with high-end functions have been added to the campus technology infrastructure. DSU's leadership in using technology to support student learning also extends to the online environment when Liberal Arts Dean Eric Johnson delivered the first Internet-enabled course in 1989.

Throughout its 137 years, Dakota State University has had a proud heritage of preparing graduates to meet the needs of a changing society. Since 1881, the university has provided challenging academic programs in one of the best educational environments in the state. The continuation of this tradition of service is of prime importance to the faculty, students, staff, and administration of Dakota State University.

Accreditation History

Dakota State University was granted accreditation by the Higher Learning Commission for a period of ten years in 1961 and accreditation has been continued after each comprehensive visit. The institution's most recent comprehensive visit, in October 2018, resulted in a positive review without any requirement for monitoring reports. Currently, DSU is participating in the Higher Learning Commissions' Academic Quality Improvement Program (AQIP). Six AQIP Categories provide a framework for examination. The AQIP Categories are:

- Helping Students Learn
- Meeting Student and Other Key Stakeholder Needs
- Valuing Employees
- Knowledge Management and Resource Stewardship
- Planning and Leading
- Quality Overview

Each AQIP Category deals with a related group of key processes and encourages an organization to analyze, understand, and explore opportunities for improving these processes and the interrelationships among them.

The AQIP process works in tandem with our existing strategic planning and project review processes. It provides a framework that focuses on data analysis and the achievement of its published goals and objectives. The alternate accreditation review process is every ten years. With AQIP, our accreditation is reviewed yearly in cycles and culminates in a Reaffirmation of Accreditation at the end of a seven-year cycle.

About DSU's Information Systems Programs

Associate of Science Degree Program in Web Development (AS WebDev)

The AS in Web Development program is new to DSU, started in Fall 2017. It was created to address the industry demand for entry-level web programmers, create a 2-year degree that serves as a foundation for the 4-year BS CIS degree, and to allow students in other technical degree programs at DSU to add an AS degree while completing a BS in Computer Science, Computer Game Design, Cyber Operations, or Network and Security Administration. As more students learn of the new degree, enrollment is expected to increase.

Bachelor of Science Degree Program in Computer Information Systems (BS CIS)

In 1984, the South Dakota Legislature and the South Dakota Board of Regents established Dakota State University as the institution specializing in programs in computer management, computer information systems, and other related undergraduate and graduate programs. In response, DSU developed leading-edge computer/information systems degree programs.

The BS in CIS degree program has been revised several times since 2010 for two primary reasons: to attempt to increase enrollment and to better meet the needs of students and companies that hire graduates. In 2010, the name was changed from Computer Information Systems to Information Systems. Because of the perception that potential students and parents did not understand what Information Systems was, the name of the degree was reverted back to Computer Information Systems in 2016 to emphasize that the program involved the use of computers and technology for business processes.

The 2010 revision of CIS also included five specializations: Business Analysis, Change Management, Infrastructure Analysis, Software Development, and Web Development. With the significant revision of the program in 2016, the specializations were all modified, removed, or merged as detailed below:

- Business Analysis → renamed to Data Sciences, but was again renamed in 2018 to Business Analytics due to input from the BS CIS Advisory Board. The name change was to emphasize analytics, with the hope that this specialization will be a feeder to DSU's thriving Master of Science Analytics (MSA) program.
- Change Management → renamed and modified to be the current Project Management specialization.
- Infrastructure Analysis → removed with the creation of the Network and Security Administration (NetSec) degree, which is currently in the Beacom College of Computer and Cyber Sciences (BCCCS) at DSU. This action has been detrimental to CIS enrollment, as students who were interested in network administration no longer become part of the CIS program. Enrollment in CIS would be significantly larger if network administration had not become its own degree program as enrollment in NetSec was approximately 150 students in Fall 2018.
- Software Development → merged into a Software and Web Development specialization in Fall 2016. This specialization did require two semesters of COBOL programming and a class on mainframe programming with job control language (JCL), but these outdated classes have been removed.
- Web Development → merged into the Software and Web Development specialization in Fall 2016.

Many of the recent curriculum changes in the BS CIS degree program were triggered by the BS CIS Advisory Board that was created in 2016. The board meets annually in the fall in conjunction with the DSU Career Fair, allowing members to both give input on curriculum and recruit interns and graduates for full-time positions within their companies. The board consists of 12 industry members with various titles within their companies, including IT Managers, Technology

Directors, Software Engineers, Directors of Development, and Mangers of Analytics. The creation and utilization of this board has helped to ensure that curriculum is current and relevant for CIS graduates.

Master of Science Degree Program in Information Systems (MSIS)

The MSIS degree program was the first graduate program at Dakota State University. Approved in 1999 by the Higher Learning Commission, the program was designed to combine theoretical knowledge and practical applications to meet real needs in the state and region—a world that is constantly shaped by rapidly changing technology.

Prior to its inception, the original master's proposal underwent a rigorous, external review by consultant Dr. John Gorgone. Perhaps the most significant of his findings suggested the reorganization of the course curriculum to align with the newly emerging national standards (MSIS 2000). This change resulted in a revised curriculum that recognized the varying educational and professional backgrounds of potential students.

This concept has opened the doors to students with diverse backgrounds and has allowed them to focus their time and efforts on specific areas. The prerequisite "foundation" offerings are waived for students with appropriate professional backgrounds.

In 2013, the MSIS program underwent a program review and has made some significant improvements since then.

- In 2016, the knowledge courses were changed from three courses to two by combining two Information Systems concept courses.
- In 2017, the General Specialization course requirement was changed to provide students with more flexibility.
- In 2018, Information Assurance specialization was added to the program.
- Since 2013, three new faculty members have been hired into the program.

Enrollment in the program peaked in Fall 2014 with 89 students. Since then, the number has been declining every year until Fall 2018 with 41 students. The main reason for this decline was due to the introduction of a new program named Master of Science in Analytics (MSA) in Fall 2014. This program was created to meet the rapidly growing needs in this field and caused MSIS and MSA to compete for students.

Doctor of Philosophy Degree Program in Information Systems (PhD IS)

In December 2005, the South Dakota Board of Regents authorized DSU to offer its first doctoral degree, a D.Sc. in Information Systems. The first doctoral students were admitted in the Fall of 2006. The doctoral degree program transitioned from a D.Sc. to a PhD degree in Fall 2018. The first recruitment of students into the PhD program will be for Fall 2019. It appears the change has inspired significant growth in applications.

As a discipline, Information Systems focuses on theory and practices related to gathering, manipulating, and classifying, storing, retrieving and analyzing recorded data. In business and industry, information systems are used to improve the efficiency and effectiveness of the organization and its strategic decisions. As a discipline, Information Systems is relatively new. Growth and interest in information systems theory and practice is directly linked to the growth in and proliferation of computing capabilities in business and industry.

The PhD program in Information Systems emphasizes applied scholarship, focusing on multi-disciplinary research projects with a strong emphasis on the productive application of information systems and information technology to organizations and their management.

PART 2: TRENDS IN THE DISCIPLINE

National and Regional Trends

According to the AIS-Temple IS Job Index, Information systems professionals "*apply and develop information technology (IT) on organizations and comprise a significant portion of the IT labor market*". These professionals tend to assume roles such as systems and business analysts, application and software developers, data analysts, and chief information and technology officers[1]. According to the Bureau of Labor Statistics, employment of computer and information technology occupations is projected to grow 13% from 2016 to 2026. Demand is expected to result from the emphasis on specific areas such as big data, information security, and cloud computing[2]. **Table 1** lists examples of IS related roles as identified by the IS Job Index and their projected growth from 2016 to 2026. It is worth noting that software developers and information security occupations are among the 20 fastest growing occupations between 2016 and 2026.

Table 1. Projected growth from 2016 to 2026 for representative IS-related occupations

Occupation	Job outlook (2016 to 2026)	Base (# of jobs in 2016)
Computer systems analysts	9% (As fast as average)	600,500
Database administrators	11% (Faster than average)	119,500
Information Security Analysts	28% (Much faster than average)	100,000
Software developers	24% (Much faster than average)	1,256,200

The placement rate in information systems is very high. From 2013 to 2017, the undergraduate placement rate for the universities included in the AIS-Temple IS Job Index survey ranged from 74-80%, and 80-89% for placement rates at graduation, and six months after graduation,

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[1] http://isjobindex.com/what-is-information-systems/
[2] https://www.bls.gov/ooh/computer-and-information-technology/home.htm

respectively. For the 34 universities participating in the survey, information systems was the highest paying major in their respective business schools[1].

Regional and state projections reflect the national trend. For example, application and software developers, and information security analysts are among the 10 fastest growing occupations in South Dakota with an expected growth between 2016 and 2026 of 29% and 27%, respectively[3]. While these (and other IS-related) occupations are expected to serve a number of industries, the healthcare and financial industries in the state (and region) continue to grow. Organizations in these industries have traditionally served as major employer of IS graduates and are expected to continue to demand high quality IS graduates to serve their growing information systems and technology needs.

In summary, national and regional trends demonstrate the value and potential for information systems programs. Further, the AIS-Temple IS Job Index identifies a number of insights with program implications. Most notably are:

1. Jobs in Data / Analytics are the most popular.
2. The importance of improving cyber-security curricula as graduates continue to rate themselves low in securing data and infrastructure.
3. An internship almost doubles the likelihood of getting a job offer.
4. Placement rates are better when departments offer specific student development resources such as a student organization, relationships with firms, and career fairs.

Curriculum Implications

While DSU's IS program is aligned to the ACM-AIS 2010 Curriculum Guidelines[4], the program is cognizant to identify and leverage opportunities that proactively respond to national and regional trends. At the undergraduate level, examples include:

1. Developing an emphasis on data analytics reflected in the business analytics specialization.
2. Strengthening the application and software emphasis via a dedicated software and web development specialization.
3. Introducing a required foundational information security program (CIS 145 Information Security Fundamentals) and including a software security course as an elective.

Given the rapid changes in the discipline, the program continues to assess its curriculum with respect to the relevance of the existing specialization and opportunities for new ones, the balance between business and technology courses, and the relative emphasis on breadth (core)

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[3] https://dlr.sd.gov/lmic/lb/2018/september2018laborbulletin.pdf
[4] https://www.acm.org/binaries/content/assets/education/curricula-recommendations/is-2010-acm-final.pdf

– depth (specialization) as well as the role of electives. There is also ongoing effort to expand and support internship opportunities for information systems students.

PART 3: ACADEMIC PROGRAMS AND CURRICULUM

AS in WebDev Academic Program and Curriculum

Mission

The AS in Web Development degree will prepare students in a wide range of career opportunities in business and industry including applications developer, IT consultant, information systems manager, systems analyst, systems developer, database administrator, network engineer, systems support and others. Web Development is an academic discipline that teaches graduates to, develop, modify and maintain general software applications or specialized software for use on computers, handheld and mobile devices based on analysis of user needs, design specifications, development, testing, deployment, management and maintenance.

Objectives

Graduates of the AS in Web Development will be able to:

- Demonstrate the ability to write code using sequence, selection and repetition.
- Understand and effectively manage the process of developing designing, testing, and delivering a program or web page.
- Manipulate data efficiently to make optimal use of computing resources.
- Identify, analyze, and take user needs into account in the programming process.
- Write, test, and maintain computer programs and/or web applications in at least three languages.

Program Description and Requirements

The Web Development degree will prepare students in a wide range of career opportunities in business and industry including applications developer, IT consultant, information systems manager, systems analyst, systems developer, database administrator, network engineer, systems support and others. Web Development is an academic discipline that teaches graduates to, develop, modify and maintain general software applications or specialized software for use on computers, handheld and mobile devices based on analysis of user needs, design specifications, development, testing, deployment, management and maintenance.

The curriculum for this degree has been designed to allow students who complete the 60 credits of coursework to seek immediate employment in the field or to use the degree towards completion of the baccalaureate degree in Computer Information Systems. All students earning an AS in Web Development must complete 24 credits to satisfy the System-wide General Education Requirements, and the remaining 36 credits that are required are shown in **Table 2**.

Table 2. Courses required for the AS in Web Development

Course Prefix	Course #	Course Title	Credits
ACCT	210	Principles of Accounting I	3
BADM	220	Business Statistics	3
CIS	251	Business Applications Programming	3
CIS	275	Web Application Programming I	3
CIS	332	Structured Systems Analysis and Design	3
CIS	375	Web Application Programming II	3
CIS	484	Database Management Systems	3
CSC	105	Introduction to Computers	3
CSC	145	Information Security Fundamentals	3
CSC	150	Computer Science I	3
CSC	363	Hardware, Virtualization, and Data Communication	3
		Choose 3 credits from the courses below:	
CIS	206	Advanced Applications: Applications	1
CIS	207	Advanced Applications: Spreadsheets	1
CIS	208	Advanced Applications: Database	1
CIS	210	QuickBooks I	1

Program Delivery

Courses in the AS in Web Development degree program are offered using a variety of instructional delivery methods:

- Face to face on site in Madison, SD in a traditional classroom setting.
- Face to face at University Center in Sioux Falls, SD in a traditional classroom setting.
- Online, using a combination of streaming videos of classes, recorded video tutorials, interactive course web boards, course web sites, and email.

Curriculum Management

The curriculum is overseen by working groups made up of faculty who teach classes in the degree program. Curriculum modifications are first proposed by faculty members at Information Systems department meetings, which include both undergraduate and graduate faculty in Information Systems. If new or modified curriculum is approved, it moves on for subsequent approvals before being implemented. For a curriculum proposal to be implemented, it needs to be approved in order by the committees listed below:

1. Information Systems department
2. College of Business and Information Systems

3. Academic Council
4. University Curriculum Committee
5. South Dakota Board of Regents

BS in CIS Academic Program and Curriculum

Mission

The mission of the College of Business and Information Systems is to educate and prepare students to be life-long learners and professionals in business, information systems, business and computer education, and health information management. Inherent in the educational process is challenging individuals to develop information management skills, to think logically, and to make sound decisions. Information technology is integrated throughout the curriculum. This emphasis on information technology and faculty expertise provides the foundation for Dakota State University's Center of Excellence.

Graduates of the program will be knowledgeable in the use of technology as a problem-solving tool and will be prepared for entry-level positions in business, government, and other organizations. Potential positions include but are not limited to: application developer, data analyst, database administrator, information systems manager, IT consultant, IT engineer, project manager, system analyst, and web developer.

Objectives

Computer Information Systems graduates will:

1. Be prepared for entry-level positions in business, government, and other organizations.
    a. Students will be well-prepared academically for their first position in the career field.
    b. Graduates will find ready employment in the field.
2. Be knowledgeable and competent users of computer technology.
    a. Graduates will be competent and knowledgeable users of applications software programs.
    b. Graduates will be competent and knowledgeable computer programmers.

The BS CIS degree program includes the Student Learning Outcomes listed below:

- Demonstrate the ability to analyze, identify, and define the technology requirements needed to address business problems and opportunities.
- Be able to design and develop applications for businesses using programming tools, techniques, and frameworks.
- Demonstrate proficiency in structuring, collecting, and analyzing data to support business operations and strategic decision making.
- The ability to understand and analyze a business need and identify and define the computing requirements appropriate to its solution.

- Demonstrate a working knowledge of computer hardware, programming, and database management systems.
- Demonstrate knowledge of business disciplines, especially areas that can be optimized using technology.

Program Description and Requirements

Graduates with a Bachelor of Science in Computer Information Systems have a strong background in both computing and business. Each graduate will have the ability to analyze, identify, and define the technology requirements needed to address business problems and opportunities. CIS students gain a working knowledge of programming, computer hardware, and database management systems. All students earning a BS in Computer Information Systems degree must complete 30 credits for the System-wide General Education Requirements, 60 credits for the core BS CIS courses, 18 credits for a specialization, and 12 credits of free electives. **Figure 2** shows the composition of 120 credits needed for the BS CIS degree program
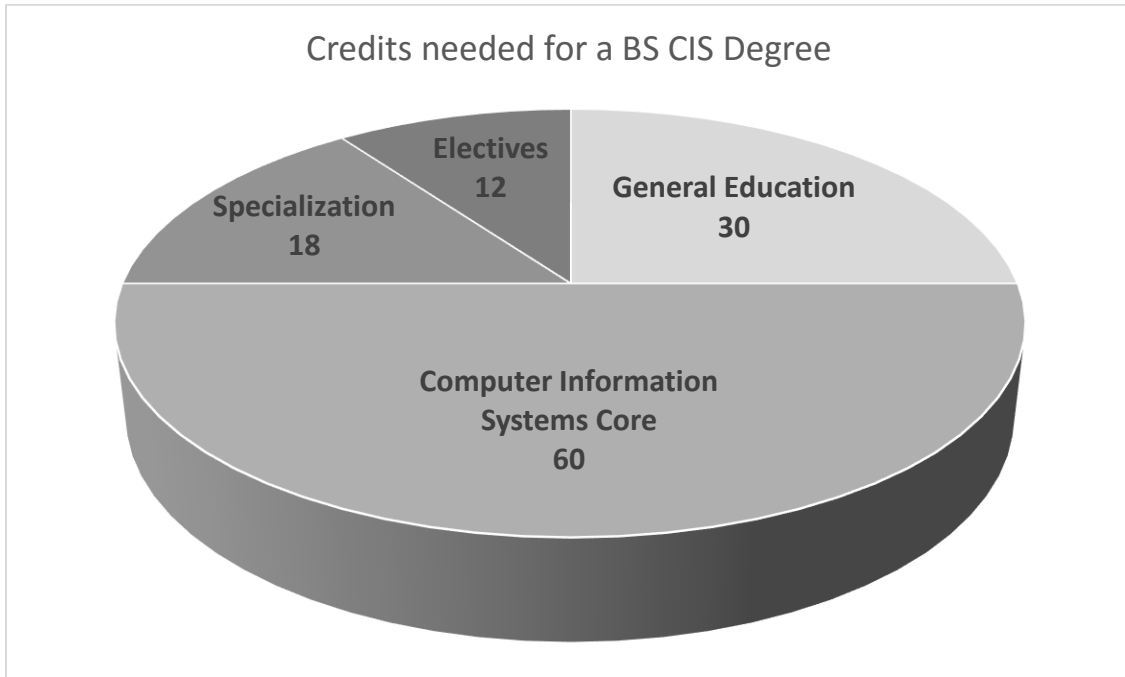
Figure 2. Breakdown of Credits needed for a BS CIS degree

The 60 credits needed for the core classes in the BS CIS degree are shown in **Table 3**.

Table 3. Core Courses Required for BS CIS Students

Course Prefix	Course #	Course Title	Credits
ACCT	210	Principles of Accounting I	3
BADM	220	Business Statistics	3
BADM	344	Managerial Communications	3
BADM	350	Legal Environment of Business	3

Course Prefix	Course #	Course Title	Credits
BADM	360	Organization and Management	3
BADM	370	Marketing	3
CIS	251	Business Applications Programming	3
CIS	325	Management Information Systems	3
CIS	332	Structured Systems Analysis and Design	3
CIS	338	Project Management	3
CIS	427	Information Systems Planning and Management	3
CIS	484	Database Management Systems	3
CSC	105	Introduction to Computers	3
CSC	145	Information Security Fundamentals	3
CSC	150	Computer Science I	3
CSC	363	Hardware, Virtualization, and Data Communication	3
ECON	201	Principles of Microeconomics	3
		Choose 9 credits from the courses below:	
ACCT	211	Principles of Accounting II	3
BADM	310	Business Finance	3
BADM	472	Marketing Technology	3
CIS	330	COBOL I	3
CIS	340	Java Programming	3
CIS	494	Internship	3
CIS	498	Undergraduate Research/Scholarship	3
CSC	234	Software Security	3
CSC	250	Computer Science II	3
CSC	260	Object Oriented Design	3
CSC	328	Operating Environments	3
CSC	383	Networking I	3
CSC	385	Networking II	3
CSC	388	Computer Forensics Fundamentals	3
CSC	451	Mobile Development Environments	3

The three tables that follow show the courses required for each of the 18-credit specializations within the BS CIS degree program. Students are required to choose at least one of three specializations: Business Analytics, Project Management, or Software and Web Development. **Table 4** shows the courses required for the Business Analytics specialization, **Table 5** shows the courses required for the Project Management specialization, and **Table 6** shows the courses required for the Software and Web Development specialization.

Table 4. Courses Required for the Business Analytics Specialization in BS CIS

Course Prefix	Course #	Course Title	Credits
BADM	321	Business Statistics II	3

Course Prefix	Course #	Course Title	Credits
BADM	425	Production and Operations Management	3
CIS	368	Predictive Analytics	3
CIS	372	Programming for Analytics	3
CIS	474	Business Intelligence and Big Data	3
CIS	487	Database Programming	3

Table 5. Courses Required for the Project Management Specialization in BS CIS

Course Prefix	Course #	Course Title	Credits
BADM	460	Human Resource Management	3
CIS	384	Decision Support Systems	3
CIS	424	Software Development with Agile Methodologies	3
CIS	438	Advanced Project Management	3
ECON	202	Principles of Macroeconomics	3
		Choose 3 credits from the courses below:	
SOC	285	Society and Technology	3
BADM	435	Management Technology and Innovation	3

Table 6. Courses Required for the Software and Web Development Specialization in BS CIS

Course Prefix	Course #	Course Title	Credits
CIS	275	Web Application Programming I	3
CIS	375	Web Application Programming II	3
CIS	424	Software Development with Agile Methodologies	3
CIS	476	Web Development Environments	3
CIS	487	Database Programming	3
MATH	201	Introduction to Discrete Mathematics	3

Program Delivery

Courses in the BS in CIS degree program are offered using a variety of instructional delivery methods:

- Face to face on site in Madison, SD in a traditional classroom setting.
- Face to face at University Center in Sioux Falls, SD in a traditional classroom setting.

- Online, using a combination of streaming videos of classes, recorded video tutorials, interactive course web boards, course web sites, and email.

Curriculum Management

The curriculum is overseen by working groups made up of faculty who teach classes in the degree program and the BS CIS Advisory Board. Curriculum modifications are first proposed by faculty members at Information Systems department meetings, which include both undergraduate and graduate faculty in Information Systems. If new or modified curriculum is approved, it moves on for subsequent approvals before being implemented. For a curriculum proposal to be implemented, it needs to be approved in order by the committees listed below:

1. Information Systems department
2. College of Business and Information Systems
3. Academic Council
4. University Curriculum Committee
5. South Dakota Board of Regents

BS CIS Program Accreditation Review (results of last IS review)

In the last program review in 2013, the reviewer emphasized that the undergraduate BS CIS enrollment needed to be dramatically increased. While enrollment is still not as high as desired, recruiting efforts have increased enrollment 34.8% from Fall 2016 to Fall 2018. Faculty and college staff have increased and emphasized recruiting in order to increase enrollments. Losing the networking specialization in CIS to the Network and Security administration degree program and competing with other popular Computer Science and Cyber Operations programs at DSU have been factors detrimental to CIS enrollment. Additionally, the BS CIS Advisory Board was formed in 2016 not only to help guide curriculum, but also to find strategies to increase enrollment and exposure of the program.

MS in IS Academic Program and Curriculum

Mission

The Masters of Science in Information Systems (MSIS) program at DSU prepares students to provide leadership in the information system field by providing high-quality state-of the-art education experience.

Objectives

The MSIS program at DSU will accommodate a wide diversity of student backgrounds and learning environments. Specifically, the program is appropriate for:

- New graduates with degrees in a variety of fields from business students with an IS concentration, computer science, general business degrees, and bachelor's degrees

in a range of fields including the humanities, social science, engineering, and physical science.

- New graduates with a BS degree in IS.
- Experienced information systems professionals seeking to upgrade skills and to understand management issues.
- Professionals from many fields seeking a change in careers.
- International students.

The MSIS program will meet the needs of those individuals who are seeking to enhance their computer-specific knowledge by learning advanced technical and managerial concepts to facilitate professional enhancement. It will also meet the needs of those individuals who seek professional cross training to take advantage of new opportunities in the growing computer information systems field. Students graduating from the program will have the following skills, knowledge, and values:

- A core of IS knowledge
- Integration of IS and business foundations
- Broad business and real-world perspective
- Communication, interpersonal, and team skills
- Analytical and critical thinking skills
- Specific skills leading to a career in IS

Specifically, the MSIS will prepare individuals who will:

- Translate user requirements into effective computer-based systems and networks
- Effectively manage existing information systems projects
- Demonstrate knowledge of information systems, telecommunication protocols, and computer network theory, hardware and practice
- Understand and apply current and emerging computer software technologies including CASE (Computer-Aided Software Engineering), DSS (Decision Support Systems), database management, web applications, and network operating environments
- Implement managerial techniques to measure and improve information systems efficiency and effectiveness
- Provide leadership in the organizational efforts to adopt new technologies

Program Description and Requirements

The program requires 30 hours beyond the baccalaureate. All students must take the following:

1. Six core courses - (18 credit hours), including a capstone policy & strategy course
2. An information integration project (MSIS Project) or a coursework only option, both equivalent to 3 credit hours
3. A three-course sequence (9 credit hours) in a Career Track specialization. Specializations include: Application Development, Data Management, Information

Assurance, Network Administration & Security, and Healthcare Information Systems. Students may also opt for a General Specialization which entails taking the first course from the Data Management, Application Development, and the Network Administration and Security specializations.

Students who do not meet the business and information systems knowledge requirements as specified for admission may have up to 6 additional hours of coursework added to their program of study. These MSIS Knowledge Support Courses shown in **Table 7** are also recommended for students wishing to refresh their knowledge or reinforce what they have gained through experience.

Table 7. Knowledge Support Courses for the MSIS Program

Course Prefix	Course #	Course Title	Credits
INFS	601	Information Systems	3
INFS	605	Foundations of Programming	3

The six core classes that are required by all students who are admitted to the MSIS program are shown in **Table 8**.

Table 8. Core Courses of the MSIS Program

Course Prefix	Course #	Course Title	Credits
INFS	720	System Analysis and Design Using Case Tools	3
INFS	724	Project and Change Management	3
INFS	730	Web Application Development	3
INFS	750	IT Infrastructure, Technology & Network Management	3
INFS	760	Enterprise Modeling and Data Management	3
INFS	780	Information Technology Strategy and Policy	3

The specialization courses build upon the core courses and should be taken after the majority of core courses have been completed. Students must select a specialization of three courses (9 credit hours). Career tracks include Application Development, Data Management, Information Assurance, Network Administration & Security, Healthcare Information Systems, or General. The general specialization is comprised of taking one course from the Application Development specialization, one course from the Network Administration & Security specialization and one course from the Data Management specialization. Students may choose to take additional electives and more than one specialization. The courses required for the Application Development specialization are shown in **Table 9**, the courses required for the Data Management specialization are shown in **Table 10**, the courses required for the Information Assurance specialization are shown in **Table 11**, the courses required for the Network Administration & Security specialization are shown in **Table 12**, the courses required for the

Healthcare Information Systems specialization are shown in **Table 13**, and the courses required for the General specialization are shown in **Table 14**.

Table 9. Courses in the Application Development specialization of the MSIS Program

Course Prefix	Course #	Course Title	Credits
INFS	732	Emerging Technologies and Issues	3
INFS	734	Multi-tiered and Service-Oriented Architectures	3
INFS	736	Technology for Mobile Devices	3

Table 10. Courses in the Data Management specialization of the MSIS Program

Course Prefix	Course #	Course Title	Credits
INFS	762	Data Warehousing and Data Mining	3
INFS	764	Information Retrieval	3
INFS	766	Advanced Database	3

Table 11. Courses in the Information Assurance specialization of the MSIS Program

Course Prefix	Course #	Course Title	Credits
INFA	701	Principles of Information Assurance	3
INFA	713	Managing Security Risks	3
		Choose 3 credits from the courses below:	
INFA	715	Data Privacy	3
INFA	742	Ethics and Information Technology	3
INFA	745	Compliance and Audit	3

Table 12. Courses in the Network Admin & Security specialization of the MSIS Program

Course Prefix	Course #	Course Title	Credits
INFS	752	Advanced Network Technology and Management	3
INFS	754	Network Security/Intrusion Detection	3
INFS	756	Cloud Computing and Network Services	3

Table 13. Courses in the Healthcare Information Systems specialization of the MSIS Program

Course Prefix	Course #	Course Title	Credits
HIMS	701	Foundations in Healthcare Information	3
HIMS	742	Healthcare Informatics, Info Systems & Technology	3

Course Prefix	Course #	Course Title	Credits
		Choose 3 credits from the courses below:	
HIMS	744	Data Analytics in Healthcare	3
HIMS	746	Health Information Lifecycle Governance	3
HIMS	747	Leadership and Management for Health Informatics	3
HIMS	758	Workflow and Usability Optimization in Health Informatics	3

Table 14. Courses in the General specialization of the MSIS Program

Course Prefix	Course #	Course Title	Credits
		Choose 3 credits from the courses below:	
INFS	732	Emerging Technologies and Issues	3
INFS	734	Multi-tiered and Service-Oriented Architectures	3
INFS	736	Technology for Mobile Devices	3
		Choose 3 credits from the courses below:	
INFS	752	Advanced Network Technology and Management	3
INFS	754	Network Security/Intrusion Detection	3
INFS	756	Cloud Computing and Network Services	3
		Choose 3 credits from the courses below:	
INFS	762	Data Warehousing and Data Mining	3
INFS	764	Information Retrieval	3
INFS	766	Advanced Database	3

Program Delivery

Courses in the MSIS degree program are offered using a variety of instructional delivery methods:

- Face to face on site in Madison, SD in a traditional classroom setting.
- Online, using a combination of streaming videos of classes, recorded video tutorials, interactive course web boards, course web sites, and email.

All courses are web-enhanced. In addition, certain courses may require class presentations. These may be made on campus or from a distance using a live audio-video connection.

Curriculum Management

The curriculum is overseen by working groups made up of faculty who teach classes in the degree program. Curriculum modifications are first proposed by faculty members at Information Systems department meetings, which include both undergraduate and graduate faculty in Information Systems. If new or modified curriculum is approved, it moves on for subsequent approvals before being implemented. For a curriculum proposal to be implemented, it needs to be approved in order by the committees listed below:

1. Information Systems department
2. College of Business and Information Systems
3. Graduate Council
4. Academic Council
5. University Curriculum Committee
6. South Dakota Board of Regents

MSIS Program Accreditation Review (result of last IS review)

In 2013, the IS program underwent a program review. The recommendations of the reviewer, college structure changes, and faculty input have inspired changes to improve the program and address reviewer comments. Overall, the review highlighted the program's strengths and its faculty in support of the MSIS program. Below is a summary of the key points from the review:

1. About the MSIS program:
   - The MSIS program has served as a solid program for the university.
   - The program primarily caters to a mix of international graduate students and domestic working professionals, especially through its enhanced online MS program.
   - The program is closely aligned with competencies of IS faculty research, and the faculty takes pride in developing and advancing the MS IS curriculum.
   - The program has great opportunity to grow.
   - The program is very successful and placement numbers are excellent.
   - The online aspect of the program will serve working professionals and increase the reach of the program.
   - The program should be marketed as a STEM program.
2. About the MSIS faculty:
   - Overall, the IS faculty is highly productive with respect to teaching but should not be regarded as research faculty.
   - Both tenure and non-tenure track faculty are highly dedicated to the IS program. Both groups teach effectively in various programs.
   - The IS faculty provides good connection with the managerial and economic streams of IS research, connecting the program to more mainstream IS research and providing a better balance and connection with the finance and banking community.

- The IS program has not hired any faculty due to budget considerations.
- The program faculty members are dedicated to and often go beyond the call of duty.
- Some areas of improvement for faculty that should be addressed:
  - The categorical salary figures indicated salaries lagging well behind those of IS faculty at peer or better institutions.
  - The department needs more tenure and non-tenure track faculty to meet its growing teaching needs and to deliver on opportunities that exist to expand its programs.

Since the 2013 program review, the College of Business and Information Systems (BIS) went through a structure change. While IS programs continue to stay in BIS, Computer Science and Cyber Security related programs formed a new college—the Beacom College of Computer and Cyber Sciences. The MSIS program added a specialization Information Assurance to take advantage of the new college's expertise and newly developed Cyber Security curriculum. Additionally, several new faculty members have been hired to bring additional support to the program. All MSIS courses are now taught by tenured or tenure-track faculty.

PhD in IS Academic Program and Curriculum

Mission

The Doctor of Philosophy (Ph.D.) in Information Systems is designed to prepare individuals for careers in research, teaching and corporate employment. This program emphasizes applied scholarship, focusing on multi-disciplinary research projects with a strong emphasis on the productive application of information systems and information technology to organizations and their management. The program supports a thriving and sustained applied research program that meets the research needs of the State of South Dakota, the university, and its graduate students. The degree program is intended to produce graduates with a commanding knowledge of information systems and of applications and research in information systems.

Objectives

Graduates of the program will be qualified to pursue careers in:

- teaching and research within an academic setting
- applied research within a corporate setting or government agency
- industry, particularly in data-intensive industries such as the banking and finance industry in the state, or within other data-intensive corporations

Program Description and Requirements

The program can be completed on a full-time or part-time basis, with classes offered in three academic terms: fall, spring, and summer. Overall, the program requirements for the PhD in Information Systems include a total of 88 semester credit hours:

- 63 credit hours of graduate coursework:
  - 27 credit hours of master's level information systems which may be waived for students with an MSIS degree
  - 9 credit hours of research methods
  - 27 credit hours of research specialization including research seminars, and core and electives courses
- Comprehensive examination
- Qualifying portfolio
- 25 credit hours of dissertation

The doctoral curriculum assumes that a student enters the program with a master's degree in information systems or a related field. Students who enter the program without a master's degree in information systems (MSIS) or a related field will be required to complete up to 27 credits at the master's degree level: 18 credits in information systems core courses and 9 credits of elective coursework in one of the five specializations currently offered by DSU. Students who enter the program with graduate coursework in related disciplines may have to complete some of these requirements. **Table 15** shows the Knowledge Courses that are required for students without prior coursework in the respective areas.

Table 15. Knowledge Support Courses for the PhD IS Program

Course Prefix	Course #	Course Title	Credits
INFS	601	Information Systems	3
INFS	605	Foundations of Programming	3
INFS	608	Applied Statistics	3
INFS	614	Introduction to Research	3

The 18 credits of courses in the Information Systems core are listed previously in **Table 8**, and the courses for each of the specializations are listed in **Table 9**, **Table 10**, **Table 11, Table 12,** and **Table 13**.

The curriculum includes three research specializations. The specializations each include 27 credit hours:

- 3 required courses (9 credits)
- 6 seminar courses (6 credits total at 1 credit each, taken each semester in which the student is enrolled)
- 4 elective courses (12 credits)

The required and elective courses within each specialization are intended to provide a coherent body of knowledge in support of the student's research agenda/career plans. The research seminars are intended to acquaint students with contemporary information systems research issues. The courses needed for the Analytics and Decision Support research specialization are shown in **Table 16**, the courses needed for the Healthcare Information research specialization

are shown in **Table 17**, and the courses needed for the Information Assurance and Computer Security research specialization are shown in **Table 18**.

Table 16. Courses in the Analytics and Decision Support PhD research specialization

Course Prefix	Course #	Course Title	Credits
INFS	830	Decision Support Systems	3
INFS	834	Knowledge Management	3
INFS	838	Decision Support/Knowledge Management Research	3
INFS	890	Seminar	6
		Specialization electives	12

Table 17. Courses in the Healthcare Information Systems PhD research specialization

Course Prefix	Course #	Course Title	Credits
HIMS	744	Data Analytics in Healthcare	3
INFS	820	Current Issues Health Informatics	3
INFS	868	Health Informatics Research	3
INFS	890	Seminar	6
		Specialization electives	12

Table 18. Courses in the Info Assurance & Computer Security PhD research specialization

Course Prefix	Course #	Course Title	Credits
INFA	701	Principles of Information Assurance	3
INFA	713	Managing Security Risks	3
INFS	848	Information Assurance/Computer Security Research	3
INFS	890	Seminar	6
		Specialization electives	12

Students complete a total of six credit hours of the research seminar topics course (INFS 890) for one credit, each time they register until all six credits are successfully completed. The seminar is to allow students in the PhD IS program to report, present and discuss research articles on specific topics in their areas of specialization as well as their own research, and thus provide a solid foundation for their dissertation. Students are encouraged to enroll in INFS 890 sections immediately at the beginning of the program and continue enrolling for one seminar course in the subsequent semesters (including summer) until all the six seminar course requirements are completed. This will enable them to get a broader perspective on different research topics, while also improving their presentation abilities and completing the requirements of the PhD program in a timely manner.

Students must select four courses (12 credits) from the specialized list of electives based on students selected specialization. **Table 19** shows the specialization electives for Analytics and Decision Support, **Table 20** shows the specialization electives for Healthcare Information Systems, and **Table 21** shows the specialization electives for Information Assurance and Computer Security.

Table 19. Courses in the Analytics and Decision Support PhD specialization electives

Course Prefix	Course #	Course Title	Credits
INFA	713	Managing Security Risks	3
INFS	762	Data Warehousing and Data Mining	3
INFS	764	Information Retrieval	3
INFS	766	Advanced Database	3
INFS	768	Predictive Analytics for Decision Making	3
INFS	770	Advanced Data Mining Applications	3

Table 20. Courses in the Health Information Systems PhD specialization electives

Course Prefix	Course #	Course Title	Credits
HIMS	746	Health Information Lifecycle Governance	3
HIMS	747	Leadership and Management for Health Informatics	3
HIMS	748	Research Design in Health Informatics	3
INFA	713	Managing Security Risks	3
INFA	715	Data Privacy	3
INFS	762	Data Warehousing and Data Mining	3
INFS	764	Information Retrieval	3
INFS	766	Advanced Database	3
INFS	830	Decision Support Systems	3
INFS	834	Knowledge Management	3

Table 21. Courses in the Info Assurance & Computer Security PhD specialization electives

Course Prefix	Course #	Course Title	Credits
INFA	715	Data Privacy	3
INFA	721	Computer Forensics	3
INFS	723	Cryptography	3
INFS	745	Compliance and Audit	3
INFS	751	Wireless Security	3
INFS	830	Decision Support Systems	3
INFS	834	Knowledge Management	3

The research methods courses are designed to provide students with a basic background in information systems research as well as a strong foundation in information systems research methodology, including quantitative, qualitative and design research methods. The research methods courses are shown in **Table 22**.

Table 22. Research Methods Courses for the PhD IS Program

Course Prefix	Course #	Course Title	Credits
INFS	805	Design Research Methods	3
INFS	810	Qualitative Research Methods	3
INFS	815	Quantitative Research Methods	3

Program Delivery

Courses in the PhD IS degree program are offered using a variety of instructional delivery methods:

- Face to face on site in Madison, SD in a traditional classroom setting.
- Online, using a combination of D2L, virtual lab, streaming videos of classes, recorded video tutorials, interactive course web boards, course web sites and email.

All courses are web-enhanced. In addition, certain courses may require class presentations. These may be made on campus or from a distance using a live audio-video connection.

Curriculum Management

The curriculum is overseen by working groups made up of faculty who teach classes in the degree program. Curriculum modifications are first proposed by faculty members at Information Systems department meetings, which include both undergraduate and graduate faculty in Information Systems. If new or modified curriculum is approved, it moves on for subsequent approvals before being implemented. For a curriculum proposal to be implemented, it needs to be approved in order by the committees listed below:

1. Information Systems department
2. College of Business and Information Systems
3. Academic Council
4. University Curriculum Committee
5. South Dakota Board of Regents

PhD IS Program Accreditation Review (result of last IS review)

In the last program review in 2013, the reviewer recognized the dedication of the faculty and indicated high productivity. However, the reviewer indicated there was a significant opportunity

for improving research productivity by changing the incentive structure and shifting the culture to balance research and teaching. The research culture has improved with the additional focus on undergraduate research and the Madlabs initiatives. The research culture is improving. However, we do suffer from the competitive IS faculty market demand and have suffered attrition of faculty with active research agendas.

The recommendation for additional technical courses to prepare students for their technical research suggested by the 2013 reviewer. To address this issue, we have incorporated additional analytics focused electives. The opportunity enables us to position our graduates with the industry trends.

PART 4: PROGRAM ENROLLMENTS AND STUDENT PLACEMENT

AS in Web Development

Enrollments

Since the AS in Web Development is a new degree program that started in Fall 2017, enrollment in the program is low. There were 4 students enrolled as of Fall 2018. **Figure 3** shows the enrollment in Web Development since its inception.
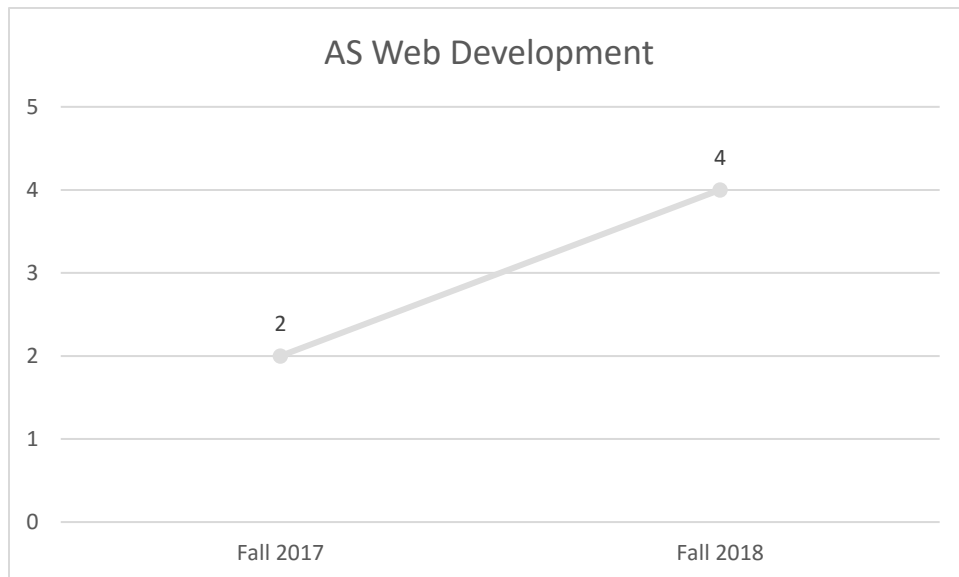
Figure 3. AS WebDev program enrollments

BS in Computer Information Systems

Enrollments

In Fall 2018, there were 62 students enrolled in the undergraduate CIS program. **Figure 4** shows the enrollment trends in CIS since Fall 2012.

Figure 4. BS CIS program enrollments

There are currently three specializations in CIS: Business Analytics, Project Management, and Software and Web Development. **Figure 5** shows the breakdown of enrollment in the current specializations. Of the 62 students enrolled in Fall 2018, 12 students were in the Business Analytics specialization, 25 students were in the Project Management specialization, and 25 students were in the Software and Web Development specialization.
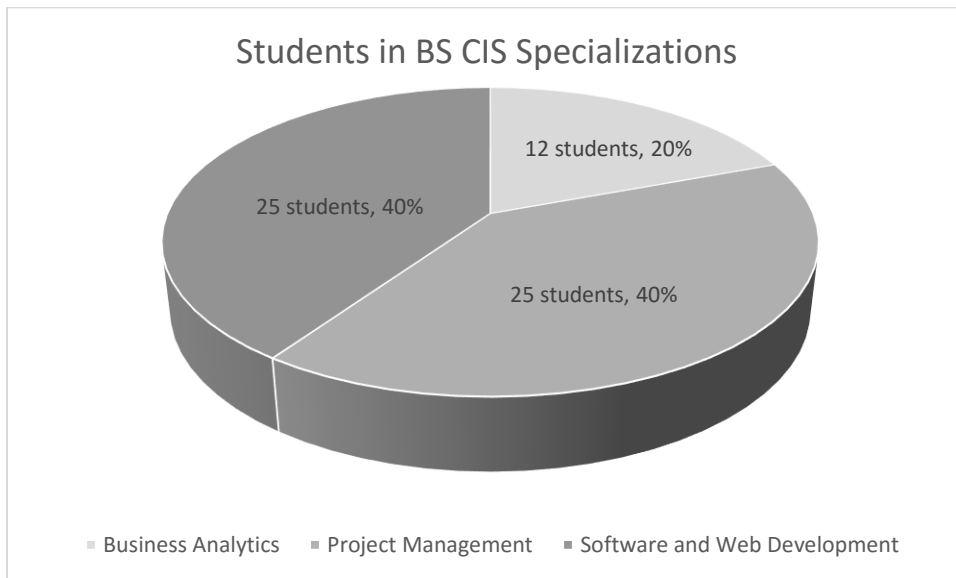
Figure 5. Students in BS CIS specializations

Placements

Due to the small number of students and graduates in the BS CIS program, placement data is limited. In 2018, there were 8 graduates who reported 100% placement. 50% of these placements were in South Dakota, and graduates who indicated salary information reported an average entry salary of $48,296. This is a significant increase from the $40,460 average entry salary from 2013.

The following is a list of some employers and positions:

- Avera – Revenue Recovery Specialist, Sioux Falls, SD
- CNA Surety – Underwriter, Sioux Falls, SD
- Daktronics – Software Technician – QA, Brookings, SD
- Love Groomers – Co-CEO, Charlotte, NC
- Sanford Health – Business Performance Specialist, Sioux Falls, SD
- Schwan's – Business Systems Analyst, Marshall, MN
- Acuity Insurance – Manager Business Systems, Sheboygan, WI

MS in Information Systems Program

Enrollments

In Fall 2018, there were 41 students enrolled in the MSIS program. **Figure 6** shows the enrollment trends in the MSIS program since Fall 2012. Enrollments have declined due to several new technical graduate programs at DSU.
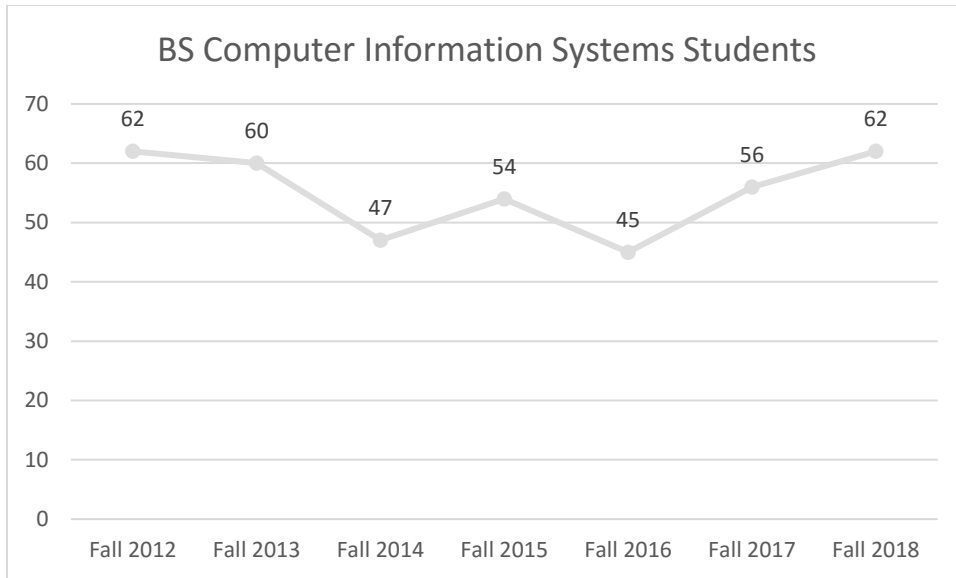

Figure 6. MSIS program enrollments

Table 23 shows the number of students enrolled in the MSIS specializations since Fall 2012.

Table 23. Students in MSIS specializations

	Fall 2012	Fall 2013	Fall 2014	Fall 2015	Fall 2016	Fall 2017	Fall 2018
Information Systems	64	72	89	58	21	5	1
Application Development	0	0	0	3	3	7	4
Data Management	0	0	0	9	12	6	12
General	0	0	0	1	13	12	13
Healthcare Info Systems	0	0	0	0	1	2	1
Information Assurance	0	0	0	0	0	0	1
Networking/Admin/Security	0	0	0	3	3	3	9

Placements

The MSIS program has 100% placement rate. One in five graduates continue their education. The average entry salary for those employed is $76,864.29. 40% of the graduates are placed in South Dakota, 60% of them out of state.

The following is a list of some employers and positions:

- Black Hills Energy – Web Application Manager, Rapid City, SD
- C.H. Robinson – Data Engineer, Eden Prairie, MN
- California Polytechnic State University – Systems Administrator, San Luis Obispo, CA
- CastleBranch – Developer, Wilmington, NC
- CNSI – Business Analyst, Salt Lake City, UT
- Dakota State University – Instructor of Information Systems, Madison, SD
- Daktronics – IT Business Analyst, Brookings, SD
- Kairos Technologies, Developer, Dallas, TX
- New York State Education Department – Business Intelligence, Albany, NY
- Oglala Lakota College – Director Community Continuing Education/GED, Kyle, SD
- POET – IT Business Analyst, Sioux Falls, SD
- Sanford – IT Training & QA Testing, Sioux Falls, SD
- SDSU – Communications Network Analyst, Brookings, SD
- Showtime Pictures Shedd – IT Support Specialist, Chicago, IL

PhD in Information Systems Program

Enrollments

In Fall 2018, there were 65 doctoral students enrolled in DSU's PhD in Information Systems. The program began as a DSc degree in Fall 2006 and was converted to a PhD in Fall 2018. **Figure 7** shows the enrollment in the PhD IS program.

DSc* Information Systems Students
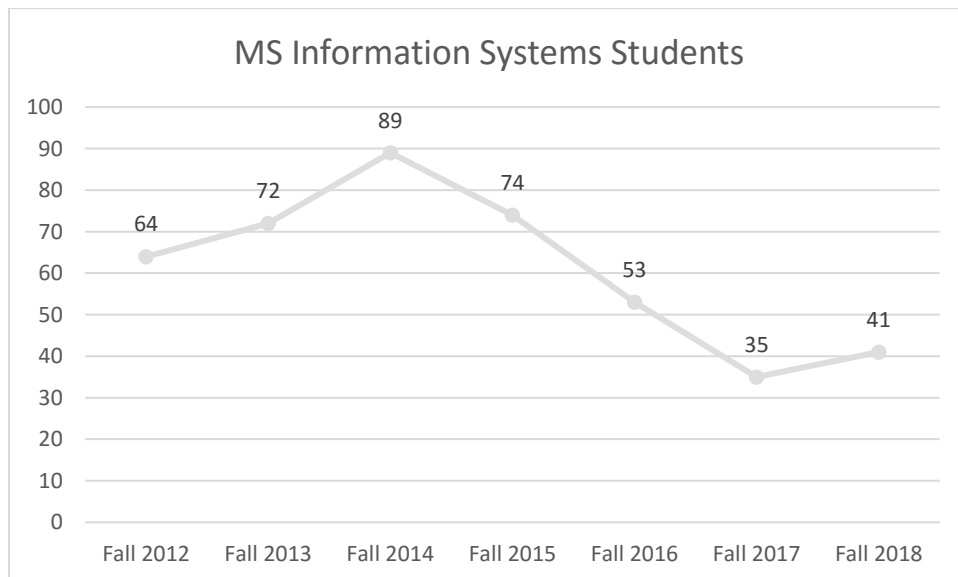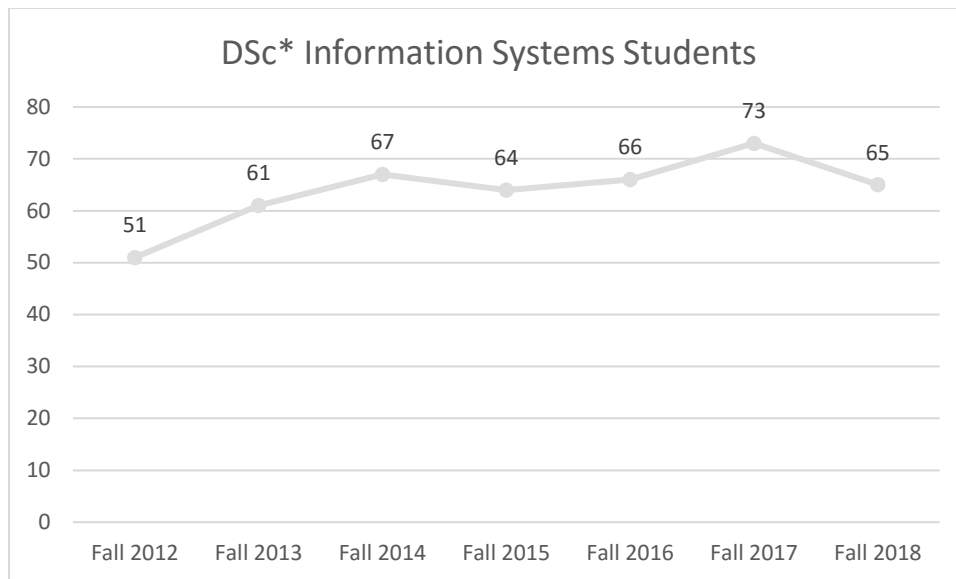
converted to PhD in Fall 2018

Figure 7. PhD IS program enrollments

Table 24 shows the number of students enrolled in the PhD IS specializations since Fall 2012.

Table 24. Students in PhD IS specializations

	Fall 2012	Fall 2013	Fall 2014	Fall 2015	Fall 2016	Fall 2017	Fall 2018
Information Systems	51	61	67	48	42	32	20
Analytics/Decision Support	0	0	0	15	23	36	33
Healthcare Info Systems	0	0	0	0	0	1	1
Info Assurance/Comp Security	0	0	0	1	1	4	11

Placements

The PhD IS program had 100% placement rate for 2018 graduates. The average entry salary for the 7 graduates was $128,250. Only 14.29%% of the graduates are placed in South Dakota with the others out of state.

The following is a list of some employers and positions:

- Bank of New York Mellon – VP/Sr. Program Manager, Wilmington, DE
- CDISC – VP, Data Science, State College, PA
- Dakota State University – Assistant Professor, Madison, SD

- I-Data Inc. – President, Norwood, MA
- Johns Hopkins University – Principal Staff, Laurel, MD
- The University of Tampa – Assistant Professor, Tampa, FL
- University of Findlay – Adjunct Professor, Findlay, OH

PART 5: FACULTY CREDENTIALS

A list of the faculty who teach in the undergraduate and graduate Information Systems programs at DSU and their credentials are included in **Table 25**. Current vitae for the faculty listed in **Table 25** are included on the program review web site.

Table 25. DSU Faculty Teaching Courses in the IS Programs

Faculty Member	Rank	Academic Credentials	Level of Teaching (UG, GR, or Both)
Behrens, Andrew	Instructor	MS	Undergraduate
Sulabh Bhattarai	Instructor	DSc	Graduate
Bishop, David	Associate Professor	DSc	Both
Chang, Yen-Ling	Associate Professor	PhD	Both
Cosgun, Ozlem	Assistant Professor	PhD	Both
El-Gayar, Omar	Professor	PhD	Graduate
Girtz, Robert	Assistant Professor	PhD	Undergraduate
Harkless, Randall	Adjunct Instructor	EdD	Undergraduate
Honomichl, Rob	Instructor	MS	Undergraduate
Jenkins, Jason	Instructor	MS	Undergraduate
Johnson, Tara	Adjunct Instructor	MS	Undergraduate
Krebsbach, Stephen	Professor	PhD	Both
Liu, Jun	Associate Professor	PhD	Graduate
McKeown, Jim	Lecturer	PhD	Undergraduate
Myers, Barb	Lecturer	EdD	Undergraduate
Noteboom, Cherie	Associate Professor	PhD	Both
Olson, Chris	Associate Professor	PhD	Both
Park, Insu	Assistant Professor	PhD	Graduate
Parks, Linda	Associate Professor	MA	Graduate
Rowland, Pam	Assistant Professor	DSc	Both
Shan, Ronghua	Associate Professor	PhD	Both
Shen, Zixing	Associate Professor	PhD	Both
Simmermon, Wendy	Instructor	EdD	Undergraduate
Spohn, Renae	Program Director	MBA	Graduate
Streff, Kevin	Professor	PhD	Both

Faculty Member	Rank	Academic Credentials	Level of Teaching (UG, GR, or Both)
Talley, Daniel	Professor	PhD	Both
Tech, Deb	Associate Professor	PhD	Both
Threadgold, Lee	Adjunct Instructor	MS	Undergraduate
Waldner, Michael	Adjunct Instructor	MS	Undergraduate
Walters, Jack	Professor	PhD	Both
Wulf Plimpton, Julie	Assistant Professor	MS	Graduate
Zeng, David	Assistant Professor	PhD	Graduate

Undergraduate Faculty-Student Research

In 2018, Dakota State University increased their focus on high impact learning environments for students. A new Undergraduate Research Coordinator was appointed to coordinate and assist with the coordination and growth of undergraduate research.

Undergraduate research showcased 14 projects at the Spring 2019 DSU Symposium including research from each of the four colleges at Dakota State University. Four research teams were able to travel and present their research at local and regional conferences including the SD Legislature Poster session in Pierre and the Undergraduate Research on the Hill poster session in Washington DC. Dakota State University's Undergraduate Research goal is to support and promote high-quality undergraduate student-faculty collaborative research and scholarship. Dakota State University is proud to have two Goldwater Scholarship Award recipients, Hope Juntunen and Vaille Swenson.

Graduate Faculty-Student Research

The expectation at DSU is to provide leadership in the areas of computer science, information systems, and cyber security. Understanding the needs of the growing computing environment is critical to developing progressive computing strategies and tools, and professionals who can use them. All DSU graduate students receive a strong introduction to research methodology and some MS programs require up to 12 credits in research and statistical competence (MS Analytics). Our doctoral students are especially immersed in faculty-mentored empirical research on a scale ranging from course level to dissertation. Guest lectures, university forums, and research symposia are designed to help our students see the interdisciplinary nature of research. The Graduate Office funds nearly half of its on-campus graduate student population at regional and national conferences. Both online and on campus students can compete for Graduate Research Initiative (GRI) funding to support their research projects. No statement of our rising research expertise is more compelling than those of Chief Architect of Amazon Web Services, Mark Ryland who declared that research efforts at DSU will help to "provide the core research in the cyber sector and help develop its' students' transferrable skills." *(Beacom College Inauguration, 2017)*

Faculty Workload

The DSU Faculty Workload Policy was last updated in 2013, but is currently being evaluated for further revision to account for enrollment growth and additional demands on faculty. The areas of the policy that are specific to information systems programs are the sections that target faculty holding professorial rank (assistant professor, associate professor, or professor) and faculty holding lecturer rank (instructor, lecturer, or senior lecturer).

Workload for Faculty Unit Members Holding Professorial Rank

While the standard workload is 30 workload units per academic year, reasonable release time is granted to faculty unit members who hold professorial rank and who actively engage in research, scholarship, or creative artistic activity or who actively pursue professional service activities related to their disciplines. Ordinarily, reasonable release time is the equivalent of six credit hours of undergraduate instruction, or its equivalent, per academic year. The institution may adjust this workload requirement to ensure that faculty unit members have adequate time for research and scholarship or service or as deemed necessary by the institution.

The normal full-time teaching load is 24 semester credit hours for each academic year (fall and spring). Faculty whose teaching load exceeds that requirement (and who are actively engaged in research, scholarship, or creative artistic activity and who actively pursue professional service activities related to their disciplines) may qualify for overload pay when their teaching load exceeds the 24-credit requirement in any given academic year.

Workload for Faculty Unit Members Holding Lecturer Rank

The standard two-term workload for faculty unit members who hold lecturer rank will be based solely on undergraduate instruction, although up to 3 credits of release time per academic year may be assigned for service functions, Faculty whose teaching load exceeds 30 credits (or 27 credits if they have been given 3 credits of release time for service obligations) may qualify for overload pay when their teaching load exceeds that limit in any given academic year.

Faculty unit members who hold lecturer rank are exempt from shared governance and other university service obligations, although three credits of release time for service obligations may be provided as compensation for service obligations. Faculty unit members with lecturer rank may be assigned graduate teaching responsibilities when approval is received from the college dean, the Graduate Council and the Vice President for Academic Affairs.

Workload Expectations for Academic Advising

Academic advising is recognized as part of a faculty unit member's teaching workload and generally will not exceed an assignment of 50 students for faculty unit members with professorial rank and 30 students for faculty unit members with lecturer rank. An unusually heavy advising load can be offset by a reduction in the faculty unit member's committee or

other college assignments and/or a reduction in teaching load for faculty unit members holding lecturer rank.

Faculty Development

In July 2018 Dakota State University established Center for Teaching and Learning (CTL) to serve as the university hub of teaching support and innovation. Prior to the establishment of the CTL, a single university committee was charged with identifying instructional development topics and implementing faculty workshops/events. That committee is now an advisory group to the CTL, which is directed by a senior faculty (1/4 time) and includes an instructional design and technology specialist (full-time) and clerical support. The CTL is also assisted by four faculty associates (one from each college) who are among the university's most accomplished instructors with strengths in course development, learner engagement, and assessment. The CTL faculty associates provide mentoring and consultation with individual faculty as their time permits.

This Center for Teaching and Learning identifies, coordinates, and provides professional and academic development activities for faculty and staff. The CTL works with academic administrators and faculty to identify instructional priorities and develop programming to address those priorities. Faculty are also sampled to understand development emergent interests and needs. The CTL also joins with these and other institutional stakeholders to encourage an institutional culture that values and rewards teaching excellence.

The CTL not only supports teaching and learning traditional classroom environments but is especially interested in providing pedagogical and technology development in online environments. This support has included the creation of instructional aids, materials, and media that are accessible online to assist faculty in improving their teaching and student interaction skills. The CTL has also initiated peer-review of all online courses using the state-mandated *Quality Assurance* rubric.

For graduate students, the CTL provides expertise to support the goals of the university, including assisting in the production of quality thesis, dissertations, presentation, grant writing, and understanding of compliance issues. For undergraduates, engagement objectives include topics on mentored research, integrity (plagiarism, and copyright), and student service/government.

In the Fall 2018, the following CTL faculty development events were offered (by title):

- Undergraduate Research: Getting Started and Leveraging Resources
- Using D2L Tools for Formative Assessment in Your Online Class
- Crimson Hexagon: A Tool for Social Media Analytics
- Funding Your Research: How the Sponsored Programs Office Can Help You Get Started
- Making Sense of the World of Research Compliance
- Promoting Student Interaction in Online Courses

- Empowering Students to Achieve Their Goals in Research, Scholarship, and Creative Activity

This selection of events not only show topical variety, but demonstrates how closely events are tied to faculty support and interest. Future CTL programming includes similarly formatted episodic events, along with themed series including the re-imagining of new faculty orientation, tenure and promotion preparation, and a "future professoriate" program for graduate students. The CTL also continues to help coordinate other university seminars and academic endeavors that add to the intellectual initiatives of DSU.

DSU also routinely sets aside significant funding for instructional and professional travel and for faculty training. Individual faculty can qualify for up to $1,200 for travel and training at qualifying events.

PART 6: ACADEMIC AND FINANCIAL SUPPORT

Undergraduate Programs Support Services

The College of Business and Information Systems office is the central point of support for undergraduate students with majors within this college. The central office is located in the Dean's office, which is located in the college building. The office is also provided with several work-study positions that are tasked with helping faculty whenever help is requested. **Table 26** lists the office staff of the College of Business and Information Systems.

Table 26. The College of Business and Information Systems office staff

Name	Title
Dorine Bennett	Dean of College of Business and Information Systems
Shannon Vostad	Program Assistant I
Brenda Warren	Senior Secretary

Graduate Programs and Research Support Services

The Office of Graduate Studies was established to promote and support graduate education at DSU. The Dean of Graduate Studies collaborates with and supports the functions and responsibilities of the Graduate Council and the graduate program committees within each college and serves as the advocate for graduate education and graduate student support at DSU. The Office of Graduate Studies and Research staff is included in **Table 27** below.

The day-to-day operations and services provided by the Office of Graduate Studies and Research are client-centered. The office offers guidance and help to students from the first inquiry to graduation. This includes providing accurate and timely program information and maintaining the graduate programs website with current information for degree-seeking students (URL: http://www.dsu.edu/gradoffice/). The office also facilitates the recruitment of

prospective students, the application process, assisting in setting up interactive audio-video for remote sites in South Dakota and online for distance students. Other services provided by the Office of Graduate Studies include assisting with course scheduling and course rotations; making students aware of changes in schedules, rotations, and graduate policies; assisting with registration; supporting the assistantship committees; monitoring student progress toward graduation; and serving as a liaison among other support staff, faculty, and administrators.

As of July 1, 2018, Dr. Josh Pauli was appointed to the new role of Vice President of Research and Economic Development. This position was created to address unprecedented growth in student numbers, employee numbers, academic programs, and research activity, which created the need for additional guidance and coordination at the executive level. The university's awarded grant monies have more than doubled in the last two years, from $6.2 million in FY2017 to $12.8 million in 2018. With the new Madison Cyber Labs research and development facility set to open on campus in Fall 2019, these numbers will likely continue to grow. Pauli will formalize the research processes campus-wide, coordinating efforts between faculty and campus departments for increased efficiency.

Table 27. The Office of Graduate Studies and Research staff

Name	Title
Josh Pauli	VP Research and Economic Development
Mark Hawkes	Dean, Office of Graduate Studies
Jennifer Mees	Program Assistant II
Erin Blankespoor	Senior Secretary
Jayne Valnes	Research Compliance Manager
Peter Hoesing	Sponsored Programs Director
Sarah Olson	Program Assistant I

Library Resources and Services

The mission of the Karl E. Mundt Library is to support the curriculum of Dakota State University. Mundt Library provides a wide range of library services as well as a diverse collection of reference and informational materials for the use of the faculty and staff of Dakota State University. The Library exists to serve as an archive of accumulated knowledge, a gateway to scholarship, and a catalyst for the discovery and advancement of new ideas. In fulfilling its obligation to provide knowledge to the University and the scholarly community at large, the Library collects, organizes, and provides access to recorded knowledge in all formats. The Library faculty initiates discussions and proposes creative solutions to the information challenges facing the University and the scholarly community. The Library's faculty and staff actively participate in providing quality service, access, instruction, and management of scholarly information.

Since Dakota State University received its current focused mission in the 1980's, the Mundt Library's mission has been to expand its collection of materials on computers, technology, and information systems. To that end, the Library has subscribed to an ever-widening number of databases and eBooks that support this emphasis. The physical and electronic collections continue to be built through faculty recommendations and requests, as well as from librarian selection based upon their knowledge of the curriculum and its needs. The journal collection is also based on faculty requests and is fine-tuned by means of an annual analysis of journal use. This analysis helps the Library focus its expenditures (and finite budget) on those journals that are regularly needed and used by the institution's students. The collections have been enriched with digital information. The Library subscribes to numerous online databases including the Association for Computing Machinery (ACM) Digital Library, ProQuest Research Library, ABI-Inform, IEEE, Lexis-Nexis and over 100 others. Most of the material indexed in these databases includes direct access to the full text of the articles indexed. For those articles not available in full-text, the Library provides speedy interlibrary loan service at no extra cost to all DSU students, faculty, and staff.

The Library holds an extensive collection of electronic books on computer security and information assurance, which are discoverable via the library catalog. In addition, the Library subscribes to Safari Tech Books Online, which provides access to 150 titles that provide hands-on training in many areas of technology. The Library also provides access to LyndaCampus.com, which provides digital tutorials in almost every area of technology, marketing, education, and career planning.

The Karl E. Mundt Library is a member of several library consortiums, and maintain borrowing and lending agreements with academic libraries across the country and around the world. As such, the Library can attain materials in digital and/or physical formats for any scholarly need.

In addition to the collections, systems and services offered, Library staff also provide assistance and instruction to faculty and students through workshops, classroom instruction, online tutorials, and one-to-one assistance and training. Library faculty collaborates with course faculty to ensure students have the research background necessary to complete course assignments.

Library faculty develops tutorials, subject guides, and other instructional materials to support classroom learning on campus and online. It is also the Library's goal to graduate students who are able to find, evaluate, and use information to solve problems and to make decisions effectively. Graduates should have the knowledge and skills to function successfully as continuous learners in a continuously changing information world. To successfully meet its goals, the Library provides excellent collections, information systems, services, instruction, and staff. The professional library staff is included in **Table 28** below.

Table 28. Professional Library Staff

Name	Title
Ryan Burdge	Archivist
Jan Enright	Director of the Karl E. Mundt Library

Name	Title
Mary Francis	Associate Professor / Reference & Instruction Librarian
Vaughn Hennen	Digital Design / Access Librarian

Online@DSU Support Services

The Office of Online Education is responsible for program planning, marketing, program implementation and overall management of courses and programs offered by alternative delivery at Dakota State University. Working in partnership with the colleges and the institution's academic support areas, the Office of Online Education works to design and develop active and collaborative degree programs at a distance.

The Office of Online Education is staffed with the Director of Online Education, the State Authorization Coordinator, and an Instructional Design Specialist, and a Program Assistant I shown **Table 29** below. This team serves the needs of students who are enrolled in the online and videoconferencing courses at DSU. The office is the mainstay of distance services to students, working with the administrative offices of DSU to provide these services. The staff also serves the Web needs of faculty, staff and students at DSU. The office staff assists faculty in the design and implementation of courses delivered by various forms of technology.

Table 29. Office of Online Education staff

Name	Title
Paige Metzinger	Program Assistant I
Annette Miller	State Authorization Coordinator
Sarah Rasmussen	Director of Online Education
Ming-Ming Shao	Instructional Design Specialist

Information Technology Services Staff

DSU has a comprehensive technology infrastructure supporting universal (on and off campus) access to computing resources. The Information Technology Services staff listed in **Table 30** below provides technology support to faculty, staff, and students.

Table 30. Lead Information Technology Services support staff

Name	Title
Stephanie Baatz	Director of Support Services
Lora Ersland	Director of Administrative Services
David Overby	Vice President for Technology & CIO
Brent Van Aartsen	Director of Technical Operations & Development

Name	Title
Haomin Wang	Manager of Instructional Technology

Administrative Support Staff

Current administrative staff will provide the academic support services to deliver undergraduate and graduate programs at DSU. The administrative support personnel who are particularly critical to the delivery of the graduate programs are included in **Table 31** below.

Table 31. Administrative Support Staff

Name	Title
Corey Braskamp	Director of Facilities Management
Kathy Callies	Registrar
Amy Crissinger	Associate VP for Enrollment Management/Marketing
Jeff Dittman	Athletic Director
Amy Dockendorf	Controller
Denise Grayson	Director of Financial Aid
Sara Hare	Director of Budget & Grants Administration
Peter Hoesing	Director of Sponsored Programs
James Jacobsen	Interim Vice President for Student Affairs
Angi Kappenman	Vice President for Human Resources
Javier Lopez	Food Service Manager
Jeanette McGreevy	Director of Institutional Effectiveness and Assessment
Laura Osborn	Interim Director of Institutional Research
David Overby	Vice President for Technology & CIO
Mandy Parpart	Director of Student Activities
Deb Roach	Director of Career Services
Michelle Ruesink	Director of Student Development / ADA Coordinator
Patti Weber	Bookstore Director

Academic Advising

Undergraduate students are assigned advisors in the College of BIS and all BIS faculty are expected to contribute to academic advising. Advisees are assigned based on majors and students can request a change in advisor at any time. Some faculty elect to participate in the Freshman Seminar activities while others focus more on graduate and upper level advising duties. The retention efforts on campus have led to increased analysis of the advising process,

and the College of BIS hired a Professional Advising Coach that is funded through a Federal Title III grant.

Graduate students in the MSIS and PhD programs are required to work with their advisors to complete a Plan of Study within their first semester in the program. Information regarding advising, program rules and requirements, rotations, knowledge courses, and expected milestones are provided through the online materials posted on the Graduate Office website and in the Graduate Catalog. Program faculty members are assigned as the advisors for students in the MSIS and PhD programs.

Financial Support to the Students

Financial aid opportunities are expected to come from institutional and private sources. Information Systems faculty have created scholarships specifically designated for IS students. Financial aid policies and procedures for application, award, and distribution have already been developed to support the graduate programs at DSU. DSU has also certified alternative loan eligibility for enrolled graduate students (based on their educational costs) to regional and national lenders.

PART 7: FACILITIES AND EQUIPMENT

With DSU's 1:1 portable computing environment requiring students to have a Windows or Mac laptop and its expansive secure wireless network, the need for dedicated computer labs is not as prevalent as it has been in the past. Classroom space on campus was significantly increased with the Fall 2017 opening of the Beacom Institute of Technology, the first LEED version 4 building in South Dakota. Dedicated research facilities will become available in Fall 2019 with the opening of the MadLabs.

Students at DSU are given access to industry-standard software and a virtual IA Lab to meet all of their computing needs. **Table 32** shows the software that is utilized in undergraduate and graduate Information Systems programs at DSU.

Table 32. Software Used in IS Classes at DSU

Course	Instructor(s)	Software	Version	Notes
CIS 123	Andrew Behrens	WebStorm	2018.3.3	Free with an academic license from JetBrains
CIS 130	Jim McKeown	Visual Studio	2017	Free to students through agreement with Microsoft
CIS 206	Andrew Behrens	Microsoft Word	2016	Free through the ITS Office 365 subscription
CIS 206	Andrew Behrens	Microsoft PowerPoint	2016	Free through the ITS Office 365 subscription
CIS 207	Andrew Behrens	Microsoft Excel	2016	Free through the ITS Office 365 subscription

Course	Instructor(s)	Software	Version	Notes
CIS 208	Andrew Behrens	Microsoft Access	2016	Free through the ITS Office 365 subscription
CIS 251	Jim McKeown	Visual Studio	2017	Free to students through agreement with Microsoft
CIS 275	Chris Olson	PhpStorm	2018.3.3	Free with an academic license from JetBrains
CIS 325	David Bishop	Microsoft Office	2016	Free through the ITS Office 365 subscription
CIS 332	Andrew Behrens David Bishop	Microsoft Visio Lucid Chart	2016	Available through Microsoft Imagine, trial version
CIS 368	Ozlem Cosgun	SAS JMP R, RStudio	14.0.0 x64 3.5.1	Microsoft Imagine - $30 Free
CIS 372	Ozlem Cosgun	R, RStudio	x64 3.5.1	Free
CIS 375	Chris Olson	PhpStorm	2018.3.3	Free with an academic license from JetBrains
CIS 484	Ronghua Shan	Oracle	12c	Free through Oracle Academy Membership
CIS 487	David Bishop	SQL Server	2017	Community Edition
INFS 605	David Bishop	Visual Studio	2017	Community Edition
INFS 720	David Bishop	Lucid Chart		Free trial version
INFS 730	Chris Olson	PhpStorm	2018.3.3	Free with an academic license from JetBrains
INFS 734	David Bishop	Visual Studio SQL Server	2017 2017	Community Editions
INFS 736	Chris Olson	Android Studio	3.3	Free with an academic license from JetBrains
INFS 760	Ronghua Shan	Oracle	12c	Free through Oracle Academy Membership
INFS 762	Jun Liu	SAS IBM Cognos Tableau	SAS 9.3 10	SAS license, Cognos provided by IBM, free student version
INFS 764	Ronghua Shan	Oracle	12c	Free through Oracle Academy Membership
INFS 770	Jun Liu	Python	3	Open source
INFS 774	Jun Liu	Cloudera Hadoop	2	Free from Cloudera
INFS 815	Ozlem Cosgun	SAS JMP R, RStudio	14.0.0 x64 3.5.1	Microsoft Imagine - $30 Free
INFS 830	Jun Liu	R, Weka	V3, 3	Open source

PART 8: ASSESSMENT AND STRATEGIC PLANS

Program Assessment

AS in Web Development Assessment

Since the AS in Web Development is a new program, the exit exam was developed in Fall 2017. It is 10 multiple choice questions from each of the following core classes for a total of 80 questions: Introduction to Computers, Computer Science I, Accounting, Business Statistics, Web Application Programming I, Systems Analysis and Design, Database Management Systems, and Hardware. The test is administered through Desire2Learn (D2L) and students must complete the exam with a proctor with a 100-minute time limit.

Since students have not yet graduated from the program, no assessment data is available.

BS in CIS Assessment

All students with a BS CIS major must complete the CIS Major Field assessment Exam in the last semester of their program. To keep current with curriculum changes, the exam was revised in Fall 2017. It contains 120 multiple choice questions from 10 core courses in the BS CIS core: CSC 105 Introduction to Computers, CSC 150 Computer Science I, ACCT 210 Accounting, BADM 220 Business Statistics, BADM 370 Marketing, ECON 201 Principles of Microeconomics, CIS 332 Systems Analysis and Design, CIS 338 Project Management, CIS 484 Database Management Systems, and CSC 363 Hardware, Virtualization, and Data Communications. The test is administered through Desire2Learn (D2L) and students must complete the exam with a proctor with a 150-minute time limit.

Table 33 shows the score averages in the respective classes since Fall 2017 when the exam was revised due to updated curriculum, and **Figure 8** represents the data in a chart for comparison. Scores are not statistically significant due to a low number of students completing the exam.

Table 33. BS CIS Major Field Assessment Scores

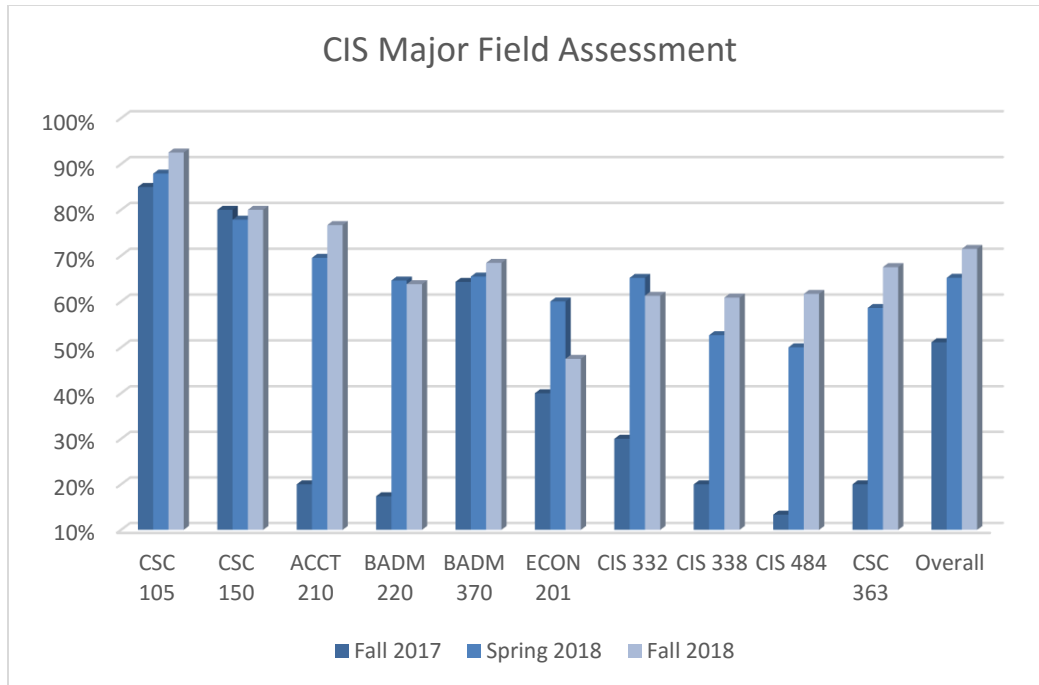| Class	Fall 2017	Spring 2018	Fall 2018
CSC 105	85.00%	87.90%	92.50%
CSC 150	80.00%	77.85%	80.00%
ACCT 210	20.00%	69.53%	76.67%
BADM 220	17.39%	64.57%	63.78%
BADM 370	64.29%	65.43%	68.43%
ECON 201	40.00%	60.00%	47.50%
CIS 332	30.00%	65.15%	61.25%
CIS 338	20.00%	52.65%	60.85%
CIS 484	13.33%	50.00%	61.67%
CSC 363	20.00%	58.60%	67.50%
Overall	51.11%	65.17%	71.48%

Figure 8. CIS Major Field Assessment Scores Since Fall 2017

MSIS Assessment

All MSIS candidates for graduation must participate in an assessment activity.

Students completing Option A (project option) are required to complete the comprehensive exam. Student selecting this option cannot revert to the course-only option once the project has been started.

Students choosing Option B (course-only option) must successfully complete a 3-credit elective course (to replace the 3-credit project) AND pass the comprehensive exam. Students must pass all 6 sections to pass the exam. Candidates for graduation who do not pass the exam will be allowed two re-tests. The exam must be successfully completed prior to graduating. Student selecting this option cannot revert to the project option.

MSIS comprehensive exam guidelines

The exam covers materials from the 6 core MSIS courses. It is expected that students adequately prepare for the exam by reviewing and studying the materials covered in these courses (lectures, slides, assignments, quizzes, etc.). Students are responsible for "ALL" materials covered in each course.

- The exam is a multiple choice, closed-book and closed note exam.
- The exam is comprised of 90 questions (15 questions per section).
- The exam time is 3 hours.

- Students will test in the semester in which they apply to graduate, testing will be offered toward the end of each semester.
- If students need to retest, testing will be available the next semester when testing is offered again.

The exam is offered via D2L (Desire2Learn) and is password protected. Proctors will receive a password and supporting instructions for administering the exam from the Graduate Office for the DSU student.

The Graduate Office will email students with the dates in which testing will be available for students each semester. Students may take the information systems exam at any time during this period. It is the responsibility of the student to ensure that the proctor is available during this period and for the duration of the exam.

Figure 9 shows a breakdown of the results by each of the six core classes in the MSIS core. When scores for a class are lower or the content of the class is updated, questions in that area are revised.
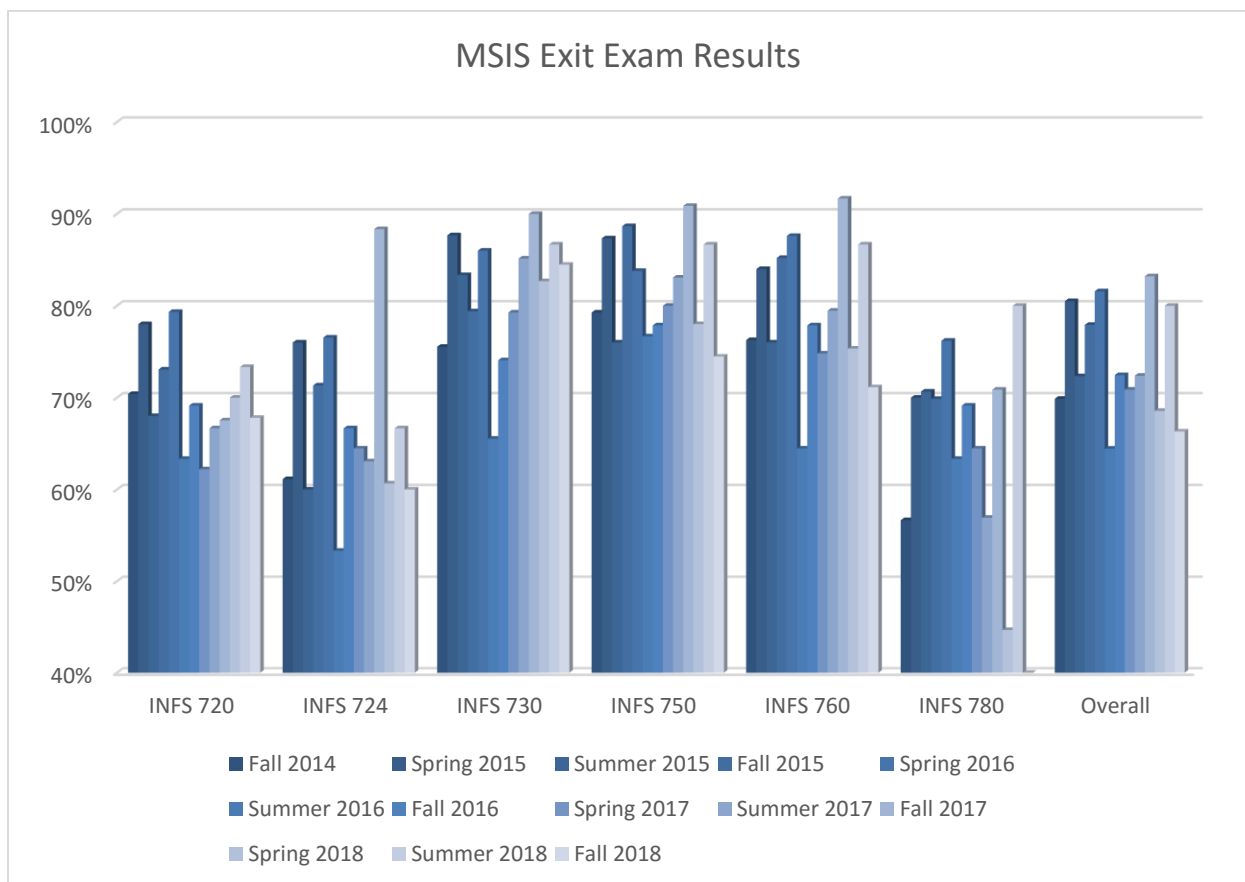

Figure 9. MSIS Exit Exam Results Since Fall 2014

PhD IS Assessment

The Ph.D. program committee and a student's research advisory committee will evaluate the student's progress using these three evaluation methods: comprehensive examination, qualifying portfolio with original research and dissertation defense.

- Comprehensive Examination
- Portfolio
- Dissertation

Comprehensive Examination Guidelines

The objective of the comprehensive examination is to assess the student's knowledge of information systems literature, particularly in their area of specialization and as well as their understanding of information systems research methods and ability to conduct research and evaluate research results. The comprehensive exam is a significant milestone towards determining the students' readiness to undertake independent research.

The comprehensive examination will consist of the following components:

1. Written comprehensive course exam
2. Oral comprehensive course exam

Written comprehensive course exam

Structure

The written comprehensive course exam consists of 4 sections, each worth 100 points (total points: 400), based on the 1 research specialization course and 3 research methodology courses mentioned in the comprehensive exam prerequisites. Each section may contain multiple questions. The exam on each section will test the readiness of the students to undertake independent research and thus may be significantly different than the corresponding course exam. The examination will be open book, open notes. Students will have the flexibility of distributing their time and effort on each section during the overall test period. Email or other such mechanism will be used for sending and receiving the exam.

Timeline

Students must schedule their written comprehensive course exam no earlier than the semester in which they will be completing the prerequisites for the comprehensive exam. The written comprehensive course exam will be held twice a year. It will be scheduled on the weekend following the finals week for the Fall and Spring semesters, starting on Friday at 5:00 p.m. and due on the following Monday at 8:00 a.m. No written comprehensive course exam will be scheduled in the summer semester. The results of the written comprehensive course exam will be provided to the students in 3 weeks following the exam.

Evaluation

The written comprehensive course exam will be evaluated by an examination committee. Students will be given a pass/fail grade on each section. Students passing all the sections of this exam would be considered as an overall pass in the written comprehensive course exam. If a student fails one or more sections, he/she may re-take the exam for that section in the following semester or when it is offered the next time. There will be a maximum of 2 attempts for appearing for the exam for each section. Failing to successfully pass each of the sections (with a maximum of 2 attempts per section) will result in not advancing towards the degree.

Oral comprehensive course exam

Structure

The oral comprehensive course exam complements the written component of the exam. The comprehensive exam committee members will ask questions based on the student's coursework on research methodology and research specialization and may ask the student to comment on their answers in the written comprehensive exam.

Timeline

The exam will be held within two weeks from completing the written comprehensive exam. The Office of Graduate Studies and Research in conjunction with the exam committee will schedule the exam for individual students.

Evaluation

The oral comprehensive course exam will be evaluated by the comprehensive examination committee based on the student's fundamental and applied knowledge about the issues covered in the research methodology and research specialization courses. Students will be given a pass/fail grade for this component. Failing to successfully pass these components (with a maximum of 2 attempts per component) will result in not advancing towards the degree.

Overall Evaluation

Students passing both components of the comprehensive exam will be considered as an overall pass. There will be a maximum of 2 attempts for any of the components.

Aligning DSU's Strategic Planning with Information Systems Programs

In Fall 2013, 259 DSU employees, students, and community members began work on the university's new Strategic Plan. Participants were divided into 26 groups, facilitated by DSU faculty and staff, who met to discuss campus values, marketing mission, and a university vision. In 2015, new university President Dr. Griffiths used this campus-wide work as a basis to define the institution's five-year strategic plan, Excellence through Innovation: Vision 2020. The goals were also informed by the University's Academic Quality Improvement Program, associated

with accreditation in the Higher Learning Commission of the North Central Association. The goals are:

1. **Goal 1: Educate to Inspire** - Dedicated to academic quality and excellence, DSU promotes active engagement in scholarship, teaching, and learning to prepare students to excel in their disciplines and be leaders in their communities.
2. **Goal 2: Grow to Thrive** - Dedicated to student access and success by improving access and opportunity, DSU will enroll, retain, and graduate a larger, more diverse student body.
3. **Goal 3: Innovate to Transform** - Dedicated to continuous improvement by continuously enhancing our academic programs, university facilities, student services, and campus technologies to become a more effective and efficient university.
4. **Goal 4: Collaborate to Lead** - Dedicated to internal and external partnerships by fostering collaborative relationships with internal and external stakeholders, DSU will expand educational opportunities for students.

Table 34 shows how the Information Systems programs align with DSU's strategic goals and initiatives.

Table 34. Alignment of IS Programs with DSU's Strategic Plan

Goal	Initiative	IS Response
Goal 1: Educate to Inspire	Initiative 1: Offer innovative and robust academic programs that link to our mission	The Information Systems programs are actively exploring accreditation. The BS CIS Advisory Board was formed in 2017.
	Initiative 2: Advance inquiry, scholarship, research, and creative activity	The appointment of an Undergraduate Research Coordinator and VP of Research will help IS students in research
	Initiative 4: Infuse innovative technology in the delivery of academic programs	All levels of IS programs strive to use the latest software and technology in their courses.
	Initiative 5: Support clear and defined learning outcomes to ensure that DSU graduates are competitive in their fields.	The BS CIS, MSIS, and PhD IS programs have 100% placement with highly competitive average entry salaries.
Goal 2: Grow to Thrive	Initiative 1: Optimize undergraduate and graduate enrollment.	The BS CIS enrollment has increased from 45 to 62 in a 3-year span.

Goal	Initiative	IS Response
Goal 3: Innovate to Transform	Initiative 2: Through continuous quality improvement, DSU will evaluate university-wide processes to promote a student-friendly environment	The IS programs review their curriculum annually, using input from the advisory board and national trends in the industry to ensure that students are being taught the skills desired by companies who look to hire IS graduates.
Goal 4: Collaborate to Lead	Initiative 2: Expand industry, government, and K-12 partnerships to enhance the student educational experience.	The IS programs have long-lasting relationships with companies who hire IS graduates. The BS CIS program is working to increase relationships with K-12 schools by offering dual-credit courses that allow high school students to take CIS courses.
	Initiative 3: Increase alumni involvement through university-wide programs that engage both current and former students.	Nearly half of the members of the BS CIS Advisory Board are DSU alumni.

The next phase in strategic planning, DSU 2025, has already begun, and the Information Systems programs will strive to align with the new goals and initiatives.