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| S:\Communications\Logos and photos\SDBORLogos\final_sdbor_webreadyBW_trans.gif | **SOUTH DAKOTA BOARD OF REGENTS**  ACADEMIC AFFAIRS FORMS |
| Intent to Plan for a New Program |
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Use this form to request authorization to plan a new baccalaureate major, associate degree program, or graduate program; formal approval or waiver of an Intent to Plan is required before a university may submit a related request for a new program. The Board of Regents, Executive Director, and/or their designees may request additional information. After the university President approves the Intent to Plan, submit a signed copy to the Executive Director through the system Chief Academic Officer. Only post the Intent to Plan to the university website for review by other universities after approval by the Executive Director and Chief Academic Officer.

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| **UNIVERSITY:** | DSU |
| **DEGREE(S) AND TITLE OF PROGRAM:** | Ph.D. in Cyber Operations |
| **INTENDED DATE OF IMPLEMENTATION:** | Fall 2018 |

**University Approval**

*To the Board of Regents and the Executive Director: I certify that I have read this intent to plan, that I believe it to be accurate, and that it has been evaluated and approved as provided by university policy.*

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|  |  | 3/22/2018 |
| President of the University |  | Date |

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1. **What is the general nature/purpose of the proposed program?**

DSU is proposing a change in the degree designation from the Doctor of Science (D.Sc.) to the Doctor of Philosophy (Ph.D.). DSU received authority to offer the D.Sc. in Cyber Security at the April 2014 Board meeting. The Ph.D. would be a new degree to the university. In addition to making the change from D.Sc. to Ph.D., we are also requesting a name change for the program. We request the name be changed from Cyber Security to Cyber Operations. Cyber security is the umbrella title for more specific areas such as cyber operations and cyber defense. This title also aligns with our BS in Cyber Operations.

According to Techtarget.com[[1]](#footnote-1), “cyber security is the body of technologies, processes and practices designed to protect networks, computers, programs and data from attack, damage or unauthorized access. In a computing context, security includes both cybersecurity and physical security. One of the most problematic elements of cyber security is the quickly and constantly evolving nature of security risks”.

When DSU proposed its first doctoral program (Information Systems) in 2005, the Board of Regents issued the D.Sc. rather than the traditional Ph.D. designation. DSU received authorization from the Board in 2014 to offer a second doctoral degree, the D.Sc. in Cyber Security. During our doctorate program review, we found the more traditional nomenclature (Ph.D.) to be more readily understandable and relevant to growing and increasing the reputation of the programs. Secondly, the field of computer-cyber sciences is growing and maturing rapidly and this change in designation will better reflect our current research focused programs. It is essential that DSU programming reflect current and evolving market awareness. DSU has developed a national reputation for excellence in its existing doctoral programs. Offering the Ph.D., the most recognizable doctoral degree in the field, helps DSU maintain that reputation. The Ph.D. degree serves us better in this highly competitive and demanding market. Preserving and expanding our niche or place depends on quality programming along with a quality reputation.

When DSU proposed this program in 2014, the expert consultant who reviewed the program asked why we were proposing the degree as a D.Sc. rather than as a Ph.D.? He strongly encouraged us to make the program a Ph.D. at that time.

1. **What is the need for the proposed program (e.g., Regental system need, institutional need, workforce need, etc.)? What is the expected demand for graduates nationally and in South Dakota (provide data and examples; data sources may include but are not limited to the South Dakota Department of Labor, the US Bureau of Labor Statistics, Regental system dashboards, etc.)?**

The Beacom College of Computer and Cyber Sciences at Dakota State University seeks to change the degree designation from D.Sc. to Ph.D. for the following reasons:

1. The Ph.D. more accurately reflects the nature of the present DSU programs as research focused and dissertation driven.
2. The Ph.D. is accepted as the terminal academic doctoral degree in the U.S. In terms of student community and issues of recognizability and legitimacy, the Ph.D. has a higher reputation simply because it is known in nearly all parts of the world.
3. The Ph.D. is an already well-known degree, but the D.Sc. is still rather vague to many, particularly in the United States.
4. The Beacom College feels awarding the Ph.D. will better serve our students who work in trans-national and higher education settings.
5. DSU is recognized by government agencies, industry and education rankings as one of the premier cyber programs in the country.  This Ph.D. will be the first stand- alone cyber operations Ph.D. in the country.
6. DSU is a leader in preparing doctorate level cyber professionals. The Ph.D. is needed to be consistent with this leadership position in the field.

Employment demand for occupations requiring expertise in cyber security remains high. For example, positions as information security analysts are expected to grow by 28% nationally through 2026.[[2]](#footnote-2) In South Dakota, similar positions are expected to grow by 15% through 2024.[[3]](#footnote-3)

1. **How would the proposed program benefit students?**

The D.Sc. in Cyber Security from the Beacom College of Computer and Cyber Sciences provides learners who possess a solid foundation in computer science (BS or MS) an opportunity to pair their computer science emphasis with research in the many forms of IT security. In this program students learn how to take leadership roles in cybersecurity environments. Students are pushed to think in innovative and creative ways about offensive and defensive cybersecurity issues and are prepared for a variety of technology leadership roles in both government and private organizations. Upon graduation, students are well prepared to anticipate and mitigate risks in managing and deploying data-intensive systems. Building on the latest techniques in specialized cyber operations activities, particularly software exploitation, malicious code, and reverse engineering, these students leave prepared to occupy leadership roles in intelligence, military and law enforcement organizations, as well as to employers in other data-driven industries.

The faculty of the Beacom College are experts in cyber security. We leverage our expertise in all things tech to give students an innovative doctoral degree that meets the needs of a vast array of organizations. The Beacom College has strong working relationships with organizations including NSA, CIA, Navy SPAWAR, Department of Homeland Security, Johns Hopkins University’s Applied Physics Lab, Army INSCOM, Carnegie Mellon’s Software Engineering Institute and MIT’s Lincoln Labs. The college partners with these organizations to help fill the national need for cyber security leaders.

1. **How does the proposed program relate to the university’s mission as provided in South Dakota Statute and Board of Regents Policy, and to the current Board of Regents Strategic Plan 2014-2020?**[[4]](#footnote-4)

The Legislature established Dakota State University as an institution specializing in programs in computer management, computer information systems, and other related undergraduate and graduate programs as outlined in SDCL 13-59-2.2. The Beacom College of Computer and Cyber Sciences provides complete realization of this mission in its programs related to computer science, network administration, computer game design and cybersecurity. The Board implemented SDCL 13-59-2.2 by authorizing undergraduate and graduate programs that are technology-infused and promote excellence in teaching and learning. These programs support research, scholarly and creative activities and provide service to the State of South Dakota and the region.

This request to change the name from D.Sc. to Ph.D. relies on the same logic: The program is a strong, integrated and effective culmination degree consistent with the mandated mission of the university and the Beacom College.

The transition to the Ph.D. also recognizes the Board’s Strategic Plan 2014-2020, including goals to improve academic quality and to graduate more students from STEM fields by offering the most recognizable degree in the field.

1. **Do any related programs exist at other public universities in South Dakota? If a related program already exists, explain the key differences between the existing programs and the proposed program, as well as the perceived need for adding the proposed new program. Would approval of the proposed new program create opportunities to collaborate with other South Dakota public universities?**[[5]](#footnote-5)*If there are no related programs within the Regental system, enter “None.”*

There are no related programs in the SD Regental System.

1. **Do related programs exist at public colleges and universities in Minnesota, North Dakota, Montana, and/or Wyoming?** *If a related program exists, enter the name of the institution and the title of the program; if no related program exists, enter “None” for that state. Add additional lines if there are more than two such programs in a state listed.*[[6]](#footnote-6)

There are no related programs in Minnesota, North Dakota, Montana nor Wyoming.

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|  | **Institution** | **Program Title** |
| ***Minnesota*** |  |  |
| ***North Dakota*** |  |  |
| ***Montana*** |  |  |
| ***Wyoming*** |  |  |

In a google search for Ph.D. degrees in Cyber Operations, we were not able to find any which would make DSU the first University to offer this degree. What we found were three Computer Science Ph.D. programs with specializations or certificates in cyber operations. Those included 1) University of New Orleans, B.S., M.S., or Ph.D. in Computer Science with a Specialization in Cyber Operations; 2) University of Texas at Dallas, M.S. or Ph.D. in Computer Science with a Certification in Cyber Operations; and 3) University of Tulsa, B.S., M.S., Ph.D. in Computer Science, Specialization in Cyber Operations.

1. **Are students enrolling in this program expected to be new to the university or redirected from other existing programs at the university?**

Students enrolling in this program are new to the university in most cases, although some MS students from the Beacom College of Computer and Cyber Sciences do apply to the doctorate program. Students in the existing D.Sc. program will transition to the new Ph.D. program upon approval of the degree.

1. **What are the university’s expectations/estimates for enrollment in the program through the first five years? What are the university’s expectations/estimates for the annual number of graduates from the program after the first five years? Provide an explanation of the methodology the university used in developing these estimates.**

Below is information for number of applications and acceptance percentage for our current program:

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| Fall 2017 | 83 applicants | 19 invitations | 16 accepted | 19.28% acceptance | 77.10% rejection |
| Fall 2016 | 63 applicants | 15 invitations | 13 accepted | 20.63% acceptance | 76.19% rejection |
| Fall 2015 | 19 applicants | 8 invitations | 7 accepted | 36.84% acceptance | 57.89% rejection |
| Spring 2015 | 13 applicants | 6 invitations | 6 accepted | 46.15% acceptance | 53.85% rejection |

The demand for this program is growing at a rapid pace. Cyber Security as a discipline is in huge demand at all levels of higher education attainment. Since July 2015, the program coordinator has received 573 emails inquiring about the program. To date, two degrees have been conferred with two more dissertations being defended in spring 2018. Currently there are 38 candidates in the program. We estimate accepting approximately 15 students annually.

By January 15, 2018 DSU will be applying to the National Security Agency and Department of Homeland Security to earn the Advanced Center of Academic Excellence in the Cyber Operations designation. DSU has been Cyber Operations designated at the undergraduate level since 2012. The curriculum will be closely examined as we go through this designation process.

1. **Complete the following charts to indicate if the university intends to seek authorization to deliver the entire program on campus, at any off-campus location (e.g., UC Sioux Falls, Capital University Center, Black Hills State University-Rapid City, etc.) or deliver the entire program through distance technology (e.g., as an on-line program)?**[[7]](#footnote-7)

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|  | **Yes/No** | ***Intended Start Date*** |
| **On campus** | No | Choose an item.Choose an item. |

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| --- | --- | --- | --- |
|  | **Yes/No** | ***If Yes, list location(s)*** | ***Intended Start Date*** |
| **Off campus** | No |  | Choose an item.Choose an item. |

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|  | **Yes/No** | ***If Yes, identify delivery methods[[8]](#footnote-8)*** | ***Intended Start Date*** |
| **Distance Delivery (online/other distance delivery methods)** | Yes | Presently the program is an online only program | Choose an item. **2018** |

1. **What are the university’s plans for obtaining the resources needed to implement the program?** *Indicate “yes” or “no” in the columns below*.

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|  | Development/Start-up | Long-term Operation |
| Reallocate existing resources | No | No |
| Apply for external resources[[9]](#footnote-9) | No | No |
| Ask Board to seek new State resources[[10]](#footnote-10) | No | No |
| Ask Board to approve a new or increased student fee | No | No |

Because this is not a new degree program, existing resources are satisfactory. However, the program continues to grow so we are advertising for an additional faculty member. This is a faculty line we had already approved through the DSU campus budget process.

1. **Curriculum Example: Provide (as Appendix A) the curriculum of a similar program at another college or university.** *The Appendix should include required and elective courses in the program. Catalog pages or web materials are acceptable for inclusion*. **Identify the college or university and explain why the selected program is a model for the program under development**.

Not necessary since the program is already being offered.

1. **Additional Information:** *Additional information is optional. Use this space to provide information not specifically requested above. Delete this item it is not used.*

* DSU has had considerable success in our Cyber programs. In February 2018, “Military Times” named the top 218 universities for cybersecurity programs; DSU was named as the 3rd best program.11
* DSU recently hosted the eighth annual DakotaCon on the DSU campus. This event included 12 guest speakers and the annual North Central Collegiate Cyber Defense Competition, as well as training sessions for cybersecurity practitioners. Attendance for this conference averages about 700 participants.
* DSU professors received a $479,658 NSF grant for Cyber Training Center, to bridge skill set gap with cyber security works. This is a three-year award which began in September 2017.12
* DSU team wins regional pen testing competition; DSU student is only member of the competing teams to successfully hack into the simulated election booth at national competition.13
* Two DSU students awarded SWISIS scholarships. 14
* DSU team wins regional pen testing competition; DSU student is only member of the competing teams to successfully hack into the simulated election booth at national competition.15
* In an article called “Will the Ph.D. become the Cybersecurity Terminal Degree?” by Sans.edu, they note that while the M.S. currently serves as the terminal degree in the field of cybersecurity, “it is reasonable to assume that something on the order of 23% of the jobs available would be mid to senior level employees. However, if 23% continues to grow, then clearly schools will have to develop quality programs for Ph.D.s”.16

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16 <https://www.sans.edu/cyber-research/security-laboratory/article/sec-terminal-degree>

1. <http://whatis.techtarget.com/definition/cybersecurity> [↑](#footnote-ref-1)
2. 1 Bureau of Labor Statistics, U.S. Department of Labor, *Occupational Outlook Handbook*, Information Security Analysts, on the Internet at <https://www.bls.gov/ooh/computer-and-information-technology/information-security-analysts.htm> (visited *January 05, 2018*). [↑](#footnote-ref-2)
3. Projections Central – State Occupational Projections, Long Term Occupational Projections, South Dakota, Information Security Analysts,   
   on the Internet at wwww.projectionscentral.com/projections/longterm (visited *January 05, 2018*).

   4 Ph.D. Programs with Specializations in Cyber Operations [↑](#footnote-ref-3)
4. South Dakota statutes regarding university mission are located in SDCL 13-57 through 13-60; Board of Regents policies regarding university mission are located in Board Policies 1:10:1 through 1:10:6. The Strategic Plan 2014-2020 is available from <https://www.sdbor.edu/the-board/agendaitems/Documents/2014/October/16_BOR1014.pdf>. [↑](#footnote-ref-4)
5. Lists of existing system programs are available through university websites and the RIS Reporting: Academic Reports database available from <http://apps.sdbor.edu/ris-reporting/AcademicProgramReports.htm>. [↑](#footnote-ref-5)
6. This question addresses opportunities available through Minnesota Reciprocity and WICHE programs such as the Western Undergraduate Exchange and Western Regional Graduate Program in adjacent states. List only programs at the same degree level as the proposed program. For example, if the proposed program is a baccalaureate major, then list only related baccalaureate majors in the other states and do not include associate or graduate programs. [↑](#footnote-ref-6)
7. The Higher Learning Commission (HLC) and Board of Regents policy requires approval for a university to offer programs off-campus and through distance delivery. [↑](#footnote-ref-7)
8. Delivery methods are defined in [AAC Guideline 5.5](https://www.sdbor.edu/administrative-offices/academics/academic-affairs-guidelines/Documents/5_Guidelines/5_5_Guideline.pdf). [↑](#footnote-ref-8)
9. If checking this box, please provide examples of the external funding sites identified [↑](#footnote-ref-9)
10. Note that requesting the Board to seek new State resources may require additional planning and is dependent upon the Board taking action to make the funding request part of their budget priorities. Universities intending to ask the Board for new State resources for a program should contact the Board office prior to submitting the intent to plan.

    11 <https://dsu.edu/news/10-schools-stand-out-in-latest-military-times-ranking-of-cybersecurity-prog>

    12 <https://dsu.edu/news/dsu-professors-fill-niche-with-cyber-training-center>

    13 <https://dsu.edu/news/dsu-team-takes-the-offense-at-national-cyber-competition>

    14 <https://dsu.edu/news/students-win-swsis-scholarships>

    15 <https://dsu.edu/news/dsu-team-takes-the-offense-at-national-cyber-competition>

    [↑](#footnote-ref-10)