



**SOUTH DAKOTA BOARD OF REGENTS
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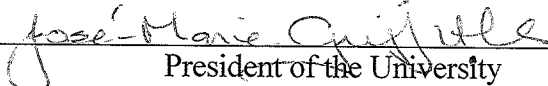
**Institutional Program Review
Report to the Board of Regents**

Use this form to submit a program review report to the system Chief Academic Officer. Complete this form for all units/programs undergoing an accreditation review, nationally recognized review process, or institutional program review. The report is due 30 days following receipt of the external and internal review reports.

UNIVERSITY:	DSU
DEPARTMENT OR SCHOOL:	The Beacom College of Computer and Cyber Sciences
PROGRAM REVIEWED:	Ph.D. in Cyber Operations
DATE OF REVIEW:	5/9/2023
TYPE OF REVIEW:	Institutional Program Review

University Approval

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



President of the University

6/8/2023

Date

1. Identify the program reviewers and any external accrediting body:

Two senior faculty from University of Alabama Huntsville, a fellow National Security Agency (NSA) designated Center of Academic Excellence (CAE) institution, conducted the institutional program review:

- Dr. Thomas Morris, Professor, Director of Center for Cybersecurity Research and Education, University of Alabama Huntsville. Primary research area is computer security. Current research involves security for industrial control systems (SCADA, Smartgrid, Smart meters, process control systems). Together with a group of student researchers, is investigating control system vulnerabilities and developing methods for control system intrusion detection, forensic data logging, and network traffic authentication.
- Dr. Rayford Vaughn, former Vice President for Research and Economic Development (retired), University of Alabama in Huntsville. Head of the Department of Computer Science and Engineering, Director, Critical Infrastructure Protection Center (CIPC), and Director, Center for Computer Security Research (CCSR). MS and Ph.D. in computer Science from Kansas State University. Numerous honors and recognitions in Software Engineering and Cyber Security. Previously reviewed emerging program in Cyber Operations for DSU.

2. Items A & B should address the following issues: mission centrality, program quality, cost, program productivity, plans for the future, and assessment of progress.

2(A). Describe the strengths and weaknesses identified by the reviewers

The external reviewers reviewed our program self-study. They interviewed faculty, students, alumni, administration, support staff and others, toured our facilities, and produced their unscripted summary, a snippet of which is included below:

Overall, the [DSU] Ph.D. in Cyber Operations program is healthy and has an outstanding national reputation for teaching cybersecurity skills to its students and is recognized by national level credentials. The faculty are exceptionally dedicated to this program and well qualified to deliver the technical material required. It is clear to the reviewers that substantial effort has taken place at DSU to increase the number, quality, and academic diversity of the cybersecurity faculty. The facilities dedicated to this and other cybersecurity programs are outstanding and they continue to grow and improve. It was noted that DSU produces a unique PhD graduate that is “industry ready” and well versed in applied cybersecurity research.

The PhD program in Cyber Operations at DSU has a very strong National reputation that has been gained from many years of providing excellent and highly technical graduates that are prepared to work right away in industry and government positions.

The increase in research funding is commendable and the creation of a VP for Research and Economic Development in 2018 seems to have had the intended effect and has focused faculty efforts on research activity. Additionally, the external support created through the DSU Rising initiatives is exemplary and demonstrates the importance placed by others on the DSU programs.

The faculty teaching and advising loads seem very high. While some relief is granted for research active faculty – the loads still seem higher than that normally found at other PhD granting institutions we are familiar with.

2(B). Briefly summarize the review recommendations

While the current program is excellent – it can always be improved. Specific recommendations for improvement are:

- Increase the number of tenured/tenure track faculty. The current faculty have an exceptionally high workload in teaching and dissertation guidance.
- Consider adding the requirement that PhD students submit their research for publication. While DSU focuses on the student research and production of a dissertation – they should also consider requiring the student to publish in peer reviewed venues appropriate to the discipline.
- Consider increasing the student dissertation committee to include a member external to the Cyber Operations program. This is a normal requirement in other PhD granting programs.
- Reduce the teaching load with a target of a 2/2 split (Fall and Spring) with the expectation of funded research activity.

2(C). Indicate the present and continuous actions to be taken by the college or department to address the issues raised by the review. What outcomes are anticipated as a result of these actions?

The actions taken include, but are not limited to:

- The Beacom College is continuing to recruit and retain tenured/tenure track faculty in critical computer science and cyber fields to sustain the program and support continuous growth of the program. In addition, The Beacom College has been very successful in faculty development in the past in growing our own faculty to become domain experts.
- The Ph.D. in Cyber Operations program has taken a few actions to promote publications from students: 1) We created a public repository at DSU Library for students to publish technical reports. 2) The program is planning to offer a three-paper publication option for dissertation and expects to have this implemented in AY 2023-2024. 3) With the increase in research funding, the program will encourage more students to conduct research with faculty receiving externally funded projects and publish their research findings.
- The Ph.D. in Cyber Operations program will work the Graduate Office to implement a plan to require a dissertation committee member external to the Cyber Operations program.

The anticipated outcomes from these actions include: 1) the addition of new tenured/tenure track faculty will help relieve the overload of existing faculty and dissertation guidance. 2) more publications from students in the program.

- 3. Starting in Fall 2019 reporting year, campuses will identify the undergraduate cross-curricular skill requirements as part of programmatic student learning outcomes and identify assessment methods for cross-curricular skill requirements as outlined in Board Policy 2:11. Program review completed prior to Fall 2019 need not include cross curricular skills.**

N/A