ACADEMIC PROGRAM REVIEW REPORT

MASTER OF SCIENCE
AND
BACHELOR OF SCIENCE

IN

COMPUTER SCIENCE

BEACOM COLLEGE OF COMPUTER AND CYBER SCIENCES

SPRING 2024

DAKOTA STATE UNIVERSITY

ONSITE VISIT DATE: APRIL 25-26TH – 2024

EXTERNAL REVIEWER:
DR. SHERRI WEITL-HARMS
ASSOCIATE PROFESSOR
DEPARTMENT OF COMPUTER SCIENCE, DESIGN, & JOURNALISM
CREIGHTON UNIVERSITY
OMAHA, NE

P**art 1: Executive Summary of Findings**

The academic program review (APR) of the Master of Science in Computer Science (MSCS) and the Bachelor of Science in Computer Science (BSCS) program housed in the Beacom College of Computer and Cyber Sciences at Dakota State University (DSU) was conducted on April 25-26, 2024. The external reviewer was Dr. Sherri Weitl-Harms from Creighton University. This is the second time that the reviewer conducted an APR of the BSCS program, with the previous review conducted in spring 2016; but the first time that the reviewer conducted an APR of the MS program. This APR is merged in all areas except for separate sections on MSCS and BSCS curricula and assessment.

The reviewer reviewed the MCSC and BSCS self-study reports (SSR)s, the BSCS ABET Readiness Review Report and the ABET response to the Readiness Review, the DSU course catalog, and other documents provided by the Beacom College faculty and staff. The reviewer met with many constituents on campus as outlined in the schedule below, and reviewed the facilities. The reviewer used the same focus areas as used in 2016: program goals and strategic planning; program resources; program curriculum; technology integration; program assessment; student support/student enrollments; and program strengths and areas for improvement.

For the BSCS program, the reviewer appreciates the hard work that was taken to address issues identified in the 2016 review. The reviewer agrees that all those issues were effectively and professionally addressed as outlined in the BSCS SSR.

The reviewer found that the strengths identified in 2016 were still strengths in 2024*: the option for students to complete the BSCS (and now the MSCS) degree on campus or online, with blended classes that allow all students to interact; connections to industry with jobs, guest presentations, and career fairs; deep and meaningful relationships between students and faculty; outreach to K-12 students;* and *the strong international reputation of DSU programs in The Beacom College.* Additional strengths identified include: MSCS and BSCS curricula alignment with national standards; strong numbers of students at all levels with an outstanding 100% placement record; strong level of student retention that outpaces the national average; the new Beacom Institute of Technology building; the 4+1 option for students to move quickly from the BSCS program to the MSCS program; the depth and breadth of the current faculty body; program resources; the increased level of research and external grant funding ($3.2 M in FY22); the programs' agility to see and respond to needs in a timely manner; and the collaboration and support at the local, state, national and international level.

The reviewer also appreciates the recognition of the programs' agile responses to trends in the discipline as identified in Part 2 of each SSR. The proactive actions identified include a new Center for Quantum Information Science and Technology (C-QIST); the CybHER® program to empower, motivate, educate, and change the perception of girls and women in cybersecurity; as well as curricular changes in the BSCS program including Artificial Intelligence/Machine Learning and Software Engineering specializations. These actions show additional strengths of the programs – their ability to adapt and stay on the leading edge, and its strong support from university and legislative leadership in the state.

For the MSCS program, the reviewer agrees with the strengths identified in the MSCS SSR and found that the overall quality of the MSCS program was outstanding and in line with supporting industry needs/trends and in-line with the national 2023 curricular model developed by the Joint Task Force on Computing Curricula. The program should consider how it would address the new draft proposed ABET 2024-2025 criteria for MS CS programs. The reviewer believes that the MSCS curriculum is in-line with the proposed guidelines, but if the MSCS program were to seek ABET accreditation, the program would need to document how it meets each of these areas, especially the topic of "*principles and practices of privacy and security in computing"* for all possible paths through the MSCS program. Additionally, the program should consider strengthening some of the MSCS courses, especially for students in the 4+1 program, and should consider course-level assessment.

For the BSCS program, the reviewer paid especially close attention to the BSCS ABET Readiness Review Report and the ABET response in preparation for the upcoming 2024-25 ABET onsite visit. The reviewer views this external APR as a vehicle to help the BSCS program prepare for the upcoming ABET visit. However, this report reflects the reviewer professional review of the program, and is not an ABET review, as the reviewer is NOT affiliated with ABET. One item mentioned in the ABET response was related to Curriculum Criterion 5.2, which states that the curriculum must include "*Principles and practices of security and privacy in computing."* The reviewer notes the curricular modifications related to the change in the required CSC321 course (renamed to Cyber Law and Policy), with updated content, along with the other required course CSC 234 - Software Security and the breadth and depth of security-related course offerings, should help students gain basic understanding of principles and practices of secure computing as required in ABET Curriculum Criterion 5.2.

Minor curricular suggestions for both programs include introducing more industry tools across curriculum, such as Git, and Debugger; and incorporating more team projects.

The only minor resource concern that the reviewer found for the MSCS and BSCS programs to address is the level of technical support staffing to support all the programs in the College. Currently it seems that there is only one employee who manages all the technology setup for coursework, and only a few other people who only have partial knowledge needed to meet the College's technical needs when the staff member requests time off. Perhaps this could simply be addressed with hiring two student part-time support staff, one upper-level student and one lower-level student, so the students could transition the knowledge over time. This would ease the staffing load as well as provide support redundancy, especially in case of emergency.

Part 2: Schedule of On-Site Visit

Dakota State University
Beacom College of Computer and Cyber Sciences
MS and BS in Computer Science
Academic Program Review
Schedule for On-Site Visit
Dr. Sherri Weitl-Harms

Reviewer Agenda for 25 April 2024

12:45 PM -1:00 PM: arrive on campus, Erin Kahler will meet you in The Beacom Institute of Technology Lobby to provide you with a parking pass and show you to the conference room.

1:00 PM – 1:45 PM: Jeanette McGreevy, Director of Institutional Effectiveness, Assessment, and Policy.
Location: Beacom Institute of Technology, Room 235

2:00 PM-3:00 PM: Tom Halverson. Undergraduate Coordinator and Professor in The Beacom College.
Location: Beacom Institute of Technology, Room 235.

3:00 PM-3:15 PM: Dr. Mary Bell, Dean of The Beacom College.

3:30-4:30: Dr. Yong Wang-Graduate Coordinator & Professor in The Beacom College
Dr. Mark Hawkes, Dean of Graduate Studies
Dr. Austin O'Brien, Coordinator of MS in Computer Science & Associate Professor in The Beacom College.
Location: Beacom Institute of Technology, Room 235.

Reviewer Agenda for 26 April 2024

8:30 AM-10:00 AM: Computer Science Faculty (Tom Halverson, Yong Wang, Jason Mixon, Andrew Kramer, Shawn Zwach, Jason Jenkins, Austin O'Brien, Stephen Krebsbach, Jenny Schulte, Youssef Harrath, and Jihene Kaabi)
Breakfast will be served in the TC Club Hub.
Menu: Breakfast rolls, breads, fresh fruit, coffee, and water.

10:00AM to 11:00 AM: Meet with DSU Beacom College Students.
Location: Beacom Institute of Technology, Room 235.

11:00 AM -11:30 AM: DSU Facilities and Lab Environment Tour with Eric Holm.
Location: Pick up Dr. Sherri Weitl-Harms from Beacom 235.

11:30 AM -12:00 PM: Overflow time/Exit Interview Prep
Location: Beacom Institute of Technology, Room 235

12:00 AM to 12:45 PM: Exit interview with Dr. Chris Olson and Dr. Rebecca Hoey
https://dsu.zoom.us/j/99345164887?pwd=U2Y2blROWnFncnNFZ0VLTnplVC96Zz09&from=addon
Location: Beacom Institute of Technology, Room 235.

Part 3: Program Evaluation, organized by focus areas for review

1. **Evaluation of program goals and strategic planning**
   - **Appropriateness of goals and whether / not goals are being met**
     According to the SSRs, the mission of the Beacom College is: *to educate and prepare students to be lifelong learners and professionals in computer and, cyber sciences. We seek to challenge students to develop skills in computer and cyber sciences, to think logically, and to make sound decisions through our five major academic programs: Artificial Intelligence, Computer Game Design, Computer Science, Cyber Operations, and Network and Security Administration.*

     The mission of the MSCS program according to its SSR, is: *to equip individuals holding a Bachelor's degree in Computer Science or a closely related field with the knowledge and expertise needed to resolve issues of national significance arising from advancements in computer science. The MSCS program includes a 15-credit core curriculum designed to assist students in developing theoretical aspects of computer systems and computability, as well as the ability to solve real-world problems. Our program is unique in the way it enables students to apply this core knowledge in pre-designed specializations, such as Cyber Operations and Artificial Intelligence, through 15-credit electives. Additionally, students have the option to design their own plan of study without specialization, aligning with their current interests, responsibilities, and skills.*

     The mission of the BSCS program according to its SSR, are:
     - *Graduates with a Bachelor of Science in Computer Science have a strong background in both the theoretical and applied areas of computer science. This program stresses the technical and conceptual development of computer programs and systems.*
     - *Each graduate has an understanding of software development, operating systems, algorithms, data structures, as well as the opportunity to take advanced courses in various areas of computer science such as artificial intelligence and parallel programming. Students in this program may be eligible for the Fast Track (4+1) Program*[1].

   - **Program goals relative to institutional mission**
     According to the SSRs, the DSU mission is: *to prepare cyber-savvy graduates who are lifelong learners, problem solvers, innovators, and leaders to live lives of positive purpose and consequence.*

   - **Program goals relative to current national trends and forecasts for the discipline**
     As noted in the SSRs, the university, college, and the MSCS and BSCS program have all been proactive in responding to national trends and forecasts for the discipline. The proactive actions identified include a new Center for Quantum Information Science and Technology (C-QIST); the CybHER® program to empower, motivate, educate, and change the perception of girls and women in cybersecurity; as well as curricular changes in the MSCS and BSCS programs including Artificial Intelligence/Machine Learning and Software Engineering specializations at both levels. These actions show additional strengths of the programs – their

[1] Fast Track (4+1) Programs

ability to adapt and stay on the leading edge, and its strong support from university and legislative leadership in the state.

Based on a review of the assessment reports and data included in the SSRs and discussions with faculty, students, and administration, the goals of both programs are being met, are in line with the overall university mission, and are relevant to the current national trends and forecast for the discipline. Additionally, the national reputation and connection to industry, with invited talks, career fairs, and job announcements are strength of the programs.

2. **Program resources**
   - **Effective use of resources to meet program goals**
     Based on the SSRs and discussions with faculty, students and administration, the reviewer believes that the Beacom College is making excellent use of its existing resources in meeting its programs goals.

   - **Faculty -- staffing levels and credentials**
     As stated in the BSCS SSR, "The Beacom College has hired and continues to seek to hire multiple tenure-track, term, and adjunct faculty each academic year." "In AY2023-2024, there are 29 full-time faculty members who teach computer science courses in The Beacom College, 14 tenured, 4 tenure track, and 11 non-tenure track." The Beacom College also has high-quality adjunct faculty members who teach computer science courses. All faculty members have a master's degree or a Ph.D. degree in computer science or related area. The Beacom College has hired ten tenure-track and full-time (9 month) faculty positions for AY2024-2025 "due to unprecedented growth and reduction of current faculty workloads" and "four of the ten new hires to date are specifically for the BSCS program."

     Based on the SSRs and discussions with faculty, students and administration, the reviewer finds the MSCS and BSCS programs to be adequately staffed to meet the course load demand for the current number of students and to allow for continued growth. The faculty report that they feel supported and new faculty appreciated the strong on-boarding processes and procedures in place to assist them in their transition to DSU. Faculty share curricular ideas to ensure consistency in all sections of a course as well as to ensure adequate student preparation as they progress through the curriculum. Faculty are cross-trained to be able to teach in all Beacom College curricula, and when a gap in skillset is discovered, it is addressed through hiring or through training camps for current faculty, as was done in the case of computer forensics.

     The MSCS and BSCS faculty course loads are in line with national norms, and the faculty report that they have time for their curricular, service and scholarship responsibilities. DSU also has outstanding professional development opportunities in place for faculty, and the faculty report that they feel supported by the administration. The international collaborative program opportunities, such as with programs in Ireland and Nepal, are also appealing to faculty. In the 2016 report, faculty overloads were reported to be draining to the faculty. The added faculty members and other steps taken by DSU has eliminated this issue, and now overloads are based on faculty choice rather than program necessity. The level of stress noted by the faculty in 2016 was entirely absent during this review, and not a concern at all.

- **Classroom, laboratory and equipment facilities**
  Based on the SSRs, a tour of the classrooms and laboratory facilities, and discussions with faculty, students and administration, the reviewer agrees with the SSRs that the facilities meet the needs of the MSCS and BSCS programs. As noted in the SSRs, "the new Beacom Institute of Technology building allows "specialized needs to have a dedicated space," and "students at DSU are given access to industry standard software and a virtual Information Assurance Lab to meet all their computing needs." DSU also provides students with a modern laptop "configured specifically for DSU academic programs."

  Because all these modern resources, the MSCS and BSCS programs' general computing, classroom and laboratory needs are met. Additionally, the new Beacom Institute of Technology building provides several common meeting spaces for students to interact and socialize.

- **Financial support**
  Based on the SSRs and discussions with faculty, students and administration, the reviewer noted several sources of funds to support the MSCS and BSCS programs, especially the DSU Rising and Rising II initiatives. Additionally, as noted especially by Dean Bell, there has been a strong growth in faculty and student led research and grant funding.

3. **Program curriculum**
   The reviewer finds the MSCS and BSCS program curricula to be up-to-date and in line with the latest ACM curricular standards, as well as the ABET curriculum criterion. The faculty are doing an outstanding job with continuous improvement, making sure the curricula meet current standards and business and graduate school needs.

- **MSCS curriculum**
  For the MSCS program, the reviewer agrees with the strengths identified in the MSCS SSR and found that the overall quality of the MSCS program was outstanding and in line with supporting industry needs/trends and in-line with the national 2023 curricular model developed by the Joint Task Force on Computing Curricula, as illustrated in Figure 1 and Table1 of the MSCS SSR.

  The program should consider how it would address the new draft proposed ABET 2024-2025 criteria for MS CS programs especially the curricular requirements:
  1. a minimum of 30 semester credit hours (or equivalent) beyond the baccalaureate level,
  2. topics in a specific field of study or area of professional practice consistent with the program name and at a level beyond baccalaureate-level programs, and
  3. a project or research activity resulting in a set of deliverables that demonstrates both the mastery of the subject matter and a high level of communication skills.
  …
  The documented experiences must include computing topics covering:
  1. techniques, skills, and tools necessary for computing practice,
  2. principles and practices of privacy and security in computing, and
  3. local and global impacts of computing solutions on individuals, organizations, and society.

The reviewer believes that the MSCS curriculum is in-line with the proposed ABET guidelines, but if the MSCS program were to seek ABET accreditation, the program would need to document how it meets each of these areas. The one area that is not clear to the reviewer in how the curriculum covers the computing topic of "*principles and practices of privacy and security in computing"* for all possible paths through the MSCS program.

One suggested improvement came from the students. Students love the 4+1 MSCS program, but they commented that because of the strength of the BSCS program, the MSCS courses somewhat felt like the same courses they took at the BSCS level, and desired the MSCS courses to be strengthened.

- **BSCS curriculum**
  For the BSCS curriculum, the reviewer paid especially close attention to the DSU BSCS ABET Readiness Review Report and the ABET response in preparation for the upcoming 2024-25 ABET onsite visit. The reviewer views this external APR as a vehicle to help the BSCS program prepare for the upcoming ABET visit. The reviewer consulted several ABET provided materials that correspond with what the ABET reviewers will be looking for during their visit. However, this report reflects the reviewer professional review of the program, and is not an ABET review, as the reviewer is NOT affiliated with ABET. One item mentioned in the ABET response was related to Curriculum Criterion 5.2, which states that the curriculum must include "*Principles and practices of security and privacy in computing."* The reviewer notes the curricular modifications related to the change in the required CSC321 course (renamed to Cyber Law and Policy), with updated content, along with the other required course CSC 234 - Software Security and the breadth and depth of security-related course choices offered to BSCS students, should help students gain basic understanding of principles and practices of secure computing as required in ABET Curriculum Criterion 5.2.

  BSCS students expressed appreciation for the strong curriculum. The reviewer was impressed that students understood the need for and even expressed appreciation for, the use of Assembly Language and C programming across the curriculum.

  BSCS students noted that the CSC 150 course could be modified to help bridge the transition from high school for those students who did not have any background in CS. They suggested that all courses start with a big picture before getting into details, to help the students understand why the course content is important. They also expressed a desire for more flexibility in general studies program. Students expressed concern that other students intentionally sought out the "easier" instructors to seek the easiest path through the program. Faculty and students both noted that inconsistencies between the instruction in a course causes issues, and the faculty noted that they felt this was being handled better than in the past, with faculty discussions and shared curricular ideas.

- **Curricular overview**
  A key strength noted includes the strong ties between all of the programs housed in a college entirely focused on computing. This allows MSCS and BSCS students to take quality elective courses in related areas such as cybersecurity and game design. Other key strengths are the 4+1 option for students to move quickly from the BSCS program to the MSCS program, the curricular changes in the BSCS program including Artificial Intelligence/Machine Learning

and Software Engineering specializations, and the addition of the BS in Artificial Intelligence.

The curriculum management process works well in making the necessary adjustments required of Beacom College programs and ensuring the Program Educational Objectives (PEO)s and Student Outcomes (SO) are being met. According to the SSR and based on discussions with faculty, staff and students, the process includes an annual review by the Beacom College Industry Board of Advisors.

Curricular strengths noted by students include the way the faculty make the material learnable, by focusing on its application and not just theory, with hands-on, resume-building experiences provided in the curricula. The students noted that they appreciate the pathways provided to them for research and internships; and they appreciated the collaboration they have with fellow students and faculty. They appreciate that the faculty regularly record the courses and students make use those recordings. Student athletes noted that they would not have been able to succeed as a student athlete without those recordings. The faculty enjoy working with both online and on campus and believe both get good experience. The strong international reputation of the DSU programs, especially for its online programs, is well known.

Curricular suggestions identified by students for both programs include introducing more industry tools across curriculum, such as Git, and Debugger; and incorporating more team projects.

4. **Technology integration**

As noted in the SSRs, DSU has an excellent technology infrastructure supporting wired and wireless access to computing resources. Information Technology Services staff provides technology support to faculty, staff, and students.

The only minor area that should be considered for addressing is the level of technical support staffing to support all programs in the College. Currently it seems that there is only one employee who manages all the technology setup for coursework, and only a few other people who only have partial knowledge needed to meet the College's technical needs when the staff member requests time off. Perhaps this could simply be addressed with hiring two student part-time support staff, one upper-level student and one lower-level student, so the students could transition the knowledge over time. This would ease the staffing load as well as provide support redundancy, especially in case of emergency.

5. **Program assessment**

- **Appropriateness of assessment measures / activities for the discipline**
- **Major-field assessment activities, relative to the program goals**
- **Program accreditation, if appropriate**

A departmental Assessment Committee was formed in 2023. DSU utilizes the Trojan Assessment Profile (TAP) system for program assessment. According to Jeanette McGreevy, Director of Institutional Effectiveness, Assessment, and Policy, DSU policies and procedures

are currently under revision to strengthen and tighten the process, especially to assist programs in the use assessment data for continual improvement.

The reviewer recommends that meeting minutes be kept that show 1.) how the continual improvement process includes a review of assessment results to inform curriculum and instruction, and 2) a review of the assessment process to update and perhaps streamline the process itself.

- **MSCS Program Assessment**
  The assessment and program evaluation processes are explained in Table 17 of the MSCS SSR. As stated in the SSR, the MSCS Program Learning Outcomes (PLOs) are assessed through comprehensive exam generally taken by students during their final semester of the program. All five parts of the exam must receive a passing grade.

  The MSCS SSR does not describe any course-level assessment, and the reviewer recommends that this be considered in the future.

  The MSCS program is not currently seeking any program-level accreditation, but with the newly proposed ABET accreditation standards for MSCS programs, this is something to be considered in the future. If so, the MSCS program will need to verify that the ABET student outcomes of communication, team work, ethics, and local and global impacts of computing solutions on individuals, organizations, and society; are all incorporated in the program, in addition to the curricular suggestions mentioned above.

- **BSCS Program Assessment**
  The assessment and program evaluation processes are explained in Figure 5 of the BSCS SSR. As stated in the SSR for the BSCS program, “in the AY2022-2023, a comprehensive assessment and evaluation process was established in preparation for ABET accreditation application and visit. A comprehensive assessment cycle for all 24 courses during the AY2023-2024 is currently in progress and the assessment data and evaluation results are anticipated to be available after the Spring 2024 semester has concluded.” “Within a week after final grades are submitted, course instructors will complete course level assessment, submit the evaluation results including student work samples, grade book, and share the assessment data with the Assessment Committee.”

  For several years, the BSCS program has used the Major Field Test (MFT) in Computer Science to assess student knowledge. The BSCS program new assessment process also uses course assignments to measure student outcomes, and includes a rotating schedule of course assessment. As explained in the ABET Readiness Review, the BSCS program has done a good job utilizing the assessment process in adjusting the curriculum.

  The assessment process should be a useful exercise to assist in program continual improvement, and not be overly burdensome. It is the reviewer’s opinion that the current BSCS program assessment process contains elements that are not necessary. If the BSCS program finds the MFT exam results to be useful for informing curriculum and instruction, the exam could be kept, but it is not necessary. The current program assessment using course assignments to measure student outcomes along with the use of the Beacom College Industry

Board of Advisors to assist with the review of the PEOs is sufficient.

When the BSCS students were informally asked about where they understood they were learning the student outcomes, such as oral, writing, team, ethics, and societal issues, they identified one course as the place where they utilized these outcomes– Advanced Data Structures. This differs from the BSCS SSR Table 33, which presented the BSCS courses mapped to student outcomes. Perhaps students had not completed the other courses, or perhaps the curriculum has changed since the students had taken the other courses, but this may be something for the Assessment Committee to investigate.

The BSCS program has completed the ABET Readiness Review and will be seeking its first ABET review in fall 2024.

6. **Student support / student enrollments**
   - **Student recruitment efforts**

     The Beacom College faculty regularly visit high schools to provide outreach as well as recruit students. The College also offers several camps for middle and high school students, which provides students with the opportunity to learn about the Beacom College programs and DSU.

     The addition of the CybHER® program to empower, motivate, educate, and change the perception of girls and women in cybersecurity and related programs is a great addition for attracting and retaining female students. Given that the current BSCS student body is about only 18% female, there is room for improvement. The reviewer recommends that marketing materials include images of female students in action, and include verbiage on being creative and making a difference, which are known traits of CS that tend to be attractive to female students.

     The faculty noted that the reputation of the quality online BSCS and MSCS programs is key to staying in front of other online options. Faculty noted that the new MS in AI my cause some student loss in the MSCS program, but they believe that overall, the new program will add more students to DSU. The 4+1 program is a strong recruitment tool for both the BSCS and MSCS programs.

     Students mentioned that they heard about the DSU programs through their high school teachers who completed their education at DSU, through attending GenCyber camps, and through word of mouth, as DSU has a strong reputation with its specialized STEM and cyber-computing foci. The students also noted the power of DSU being a small student-focused university. DSU also has the reputation of being reasonably priced, and a strong value for the cost. The addition of the NSF S-STEM grant with $1 million in new scholarships is also a very attractive recruitment tool.

   - **Student enrollment numbers**

     Table 6 of the MSCS SSR shows the number of MSCS students, which has been steady for the last few years, and in 2022 included 52 online students and 17 on campus students.

Table 9 of the BSCS SSR shows steady enrollment data for the BSCS program from Fall 2016 to Fall 2023, while there have been slight increases in the Beacom College and the DSU university enrollment overall. The persistent rate for first-time full-time baccalaureate degree seeking freshman returning to complete a second semester was an outstanding 93% in fall 2023, higher than the university average. Also impressive is the 82% retention of students to a second year.

- **Student graduation rates and student placement**
  The MCSC program SSR reported 34 MSCS graduates in 2022, as shown in Table 6. No placement data was provided, but the listing of employers where graduates are employed is impressive.

  The weighted average six-year graduation rate reported in the BSCS SSR Table 16 was 61% for the fall 2017 cohort, higher than the university average of 48%. According to the BSCS SSR, the placement was 100% for those graduates contacted that were seeking employment.

  The students were amazed at how well they were received at career fairs, simply because they were DSU CS students. Students recognized that the reputation of the program makes it easy for them to seek employment.

- **Student support services**
  As noted in the BSCS SSR, DSU has good student support services.

- **Academic advising**
  The advising process described in the BSCS SSR continues to show a student-first attitude.

  In general, students report that they feel a true bond with their faculty. They report that they like that the faculty have a desire to connect with students, and that students are all on a first-name basis with the faculty. Students note that faculty and administration are available, responsive, approachable, and personable. The students enjoy that they are given choices in homework and that due dates are sometime flexible to accommodate student needs.

7. **Program strengths and areas for improvement**
   - **Strengths**
     The strong relationship bond between the Beacom College faculty and students is a strength of the program. The reviewer found that the strengths identified in 2016 were still strengths in 2024*: the option for students to complete the BSCS (and now the MSCS) degree on campus or online, with blended classes that allow all students to interact; connections to industry with jobs, guest presentations, and career fairs; deep and meaningful relationships between students and faculty; outreach to K-12 students;* and *the strong international reputation of DSU programs in The Beacom College.* Additional strengths identified include: MSCS and BSCS curricula alignment with national standards; strong numbers of students at all levels with an outstanding 100% placement record; strong level of student retention that outpaces the national average; the new Beacom Institute of Technology building; the 4+1 option for students to move quickly from the BSCS program to the MSCS program; the depth and breadth of the current faculty body; program resources; the increased level of research and external grant funding ($3.2 M in FY22); the programs' agility to see and respond to needs in

a timely manner; and the collaboration and support at the local, state, national and international level.

- **Suggestions for Improvement**
  The reviewer believes that the MSCS curriculum is in-line with the proposed ABET guidelines, but if the MSCS program were to seek ABET accreditation, the program would need to document how the curriculum and assessment meets the ABET requirements. Additionally, the program should consider strengthening some of the MSCS courses, especially for students in the 4+1 program, and should consider course-level assessment.

  For the BSCS program, the reviewer suggests the CSC 150 course be reviewed to help bridge the transition from high school for those students who did not have any background in CS. The reviewer agrees with the students' suggestion that all courses start with a big picture before getting into details, to help the students understand why the course content is important. Faculty should consider a review the core curriculum to ensure that the courses are being taught consistently, especially for the first few courses in the curriculum.

  Minor curricular suggestions for both programs include introducing more industry tools across curriculum, such as Git, and Debugger; and incorporating more team projects.

  For assessment, the reviewer recommends that meeting minutes be kept that show 1.) how the continual improvement process includes a review of assessment results to inform curriculum and instruction, and 2) a review of the assessment process to update and perhaps streamline the process itself.

  The only minor resource area for improvement that the reviewer found is the level of technical support staffing to support all the programs in the College.

  Finally, the reviwer suggests that the programs onsider how marketing messaging and images can be modified to be more attractive to female students.

- **General comments**
  As stated above, the MSCS and BSCS programs are outstanding programs with numerous strengths. The BSCS assessment processes have improved, and the time is right to seek ABET accreditation. The reviewer is impressed with the changes made since the 2016 review, and noted a much more peaceful and collaborative relationship between faculty and administration. The faculty and students overwhelming and repeated praised the DSU leadership for their effectiveness and support.

  Finally, the reviewer would like to thank everyone at DSU for the opportunity to conduct this external review. Clearly the Beacom College faculty and the DSU administration are working hard to deliver strong programs for students, with key ties to business and security industries. I am confident that DSU is extremely proud of the MSCS and BSCS program and its faculty, students, and alums.