SOUTH DAKOTA BOARD OF REGENTS

Full Board

AGENDA ITEM: 9

DATE: May 12, 2015

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SUBJECT: Articulation Agreement – DSU & NSA

Board of Regents Policy 2:27 Program to Program Articulation Agreements establishes requirements for institutions seeking to develop program level agreements for interested transfer students from accredited institutions. However, the policy does not speak specifically to the formation of articulation agreements with recognized entities that provide equivalent training that is not formally transcripted for college credit. Despite this fact, in Spring 2014 the National Security Agency (NSA) approached DSU to gauge their interest and ability in providing academic credit to their military employees for cyber security education & training courses offered as part of their NSA employment. The NSA employs thousands of military members and a bachelor's degree is required for employment once an employee leaves the military but wants to keep their NSA job as a civilian.

Currently, NSA provides training for their employees in one of two tracks: 1) NETO3200[1] which consists of the Joint Cyber Analysis Course (JCAC) training program; and 2)

[1] Following assessment of the NETO3200 program, DSU faculty aligned curriculum and learning outcomes with existing coursework which is further designated in the attached Agreement. Upon completion of the program, the student will be able to apply digital forensics including network tunneling, monitoring and analysis, and response to known and unknown cyber-attacks; demonstrate how packets traverse the network; execute and redirect to and from a remote system via multiple systems; analyze active network enumeration and perform vulnerability assessments; identify and demonstrate core Solaris/Unix and Windows system features including boot-time startup processes, file system architecture, configuration files and scripts, and available utilities and tools; demonstrate situational awareness and perform risk analysis in different scenarios; triage survey Solaris/Linux and Windows systems with thirty minutes; apply problem solving techniques associated with Solaris/Linux systems and Windows Systems to other UNIX and Windows variants; describe the features of various personal security products and demonstrate knowledge of computer security threats; analyze the mindset and methodologies of attackers/hackers and defenders; and formulate remedial network protection action.

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RECOMMENDED ACTION OF THE EXECUTIVE DIRECTOR

Approve the Articulation Agreement between DSU and NSA to allow enrollment of students in the Cyber Operations program to students successfully completing the Joint Cyber Analysis Course training program, and Remote Interactive Operator Training program.

CYBR3420[2] which is the Remote Interactive Operator Training program. Each of these programs offered exclusively through NSA represent classified courses that are taken by military personnel as part of the education and training curriculum which prepares those employees to conduct cyber operation missions. This foundational coursework at NSA is consistent with the foundational courses offered at DSU in the BS in Cyber Operations degree. This is to be expected given DSU's Cyber Operations major is an NSA-designated program and therefore must adhere to the CAE-CO knowledge unit requirements.

Because of the institution's strong relationship with the NSA, and the NSA-designated BS in Cyber Operations program is available 100% via distance education, DSU was the preferred choice for the NSA to create a formal articulation agreement. 100% of the NSA's cyber security education & training material is classified, so DSU faculty members that hold a Department of Defense top secret security clearance were able to work alongside NSA personnel to perform an in-depth investigation of NSA's academic content and map it to DSU courses. DSU is expecting approximately 50 online students in our BS in Cyber Operations for Fall 2015 from this articulation agreement with the potential for explosive growth. The Cyber Operations articulation agreement between DSU and NSA would serve as the first ever articulation agreement with any institution of higher education in the 63 year history of the NSA.

Background Information - DSU Relationship with NSA

NSA has had a formal relationship with DSU for the past four years. The Center of Academic Excellence in Cyber Operations (CAE-CO) is a designation program created by the NSA in 2011 in order to identify the most technical cyber security programs in higher education at the bachelors, masters, and doctorate level. The NSA was not able to adequately find the exact skillset they needed in college graduates, so the CAE-CO designation was created to more efficiently find viable talent. Although there are other CAE designation programs that have been in existence for over ten years, the CAE-CO program is the first program-level designation; previous designations were at the institution level. The CAE-CO designation involves a deep investigation of a program's coursework, lab facilities, faculty, research, and outreach. This review is executed every five years.

DSU's Bachelor of Science in Cyber Operations was named one of the inaugural four CAE-CO programs in Spring 2012 and was the only undergraduate program designated in the nation. Since that time, nine other programs have been added with a final goal of reaching 20-25

[2] Additional information regarding CYBR3420 cannot be shared given its sensitive nature. In totality, these two curriculum blocks span 12 full months of full-time instruction and laboratory work in excess of well over 2,000 hours. Given the number of "seat hours" dedicated to NETO3200 and CYBR 3420, the skills and content knowledge garnered in these two blocks of curriculum equates to 50 DSU credit hours as outlined in the contractual agreement. Syllabi were reviewed one-by-one to match the NSA's course content to DSU's courses.

designated programs in the nation. The current 13 programs are a mix of undergraduate and masters programs at institutions across the nation as introduced below.

- Air Force Institute of Technology (Ohio); 2013-2018 (Graduate)
- Auburn University (Alabama); 2013-2018 (Undergraduate and Graduate)
- Carnegie Mellon University (Pennsylvania); 2013-2018 (Graduate)
- Dakota State University (South Dakota); 2012-2017 (Undergraduate)
- Mississippi State University (Mississippi); 2013-2018 (Graduate)
- Naval Postgraduate School (California); 2012-2017 (Graduate)
- Northeastern University (Massachusetts); 2012-2017 (Undergraduate)
- Polytechnic School of Engineering, New York University (New York) 2014-2019 (Graduate)
- Towson University (Maryland); 2014-2019 (Undergraduate)
- United States Military Academy at West Point (New York); 2014-2019 (Undergraduate)
- University of Cincinnati (Ohio); 2014-2019 (Graduate)
- University of New Orleans (Louisiana); 2014-2019 (Undergraduate and Graduate)
- University of Tulsa (Oklahoma); 2012-2017 (Undergraduate and Graduate)

As a CAE-CO program, DSU's Cyber Operations undergraduate degree is recognized as one of the most elite cyber security programs in the nation. Cyber Operations is tightly coupled with Computer Science where special attention is paid to low-level programming, cellular and mobile communications, reverse engineering of software, malware analysis, and software vulnerabilities and exploits. For more information on DSU's Cyber Operations program, visit: http://dsu.edu/academics/degrees-and-programs/cyber-operations-bs

Although the National Science Foundation (NSF) funds the DSU Cyber Corps Scholarship Program, it is tightly coupled with our NSA work and merits mention in this document. Via an NSF grant originally awarded in 2011 and renewed in 2015, high-achieving DSU students are provided full-ride scholarships and $20,000-32,000 in yearly stipends as part of annual scholarships that range from $30,000-45,000 and can be renewed for three years. In return for the scholarship, students must work for a Federal, State, Local, or Tribal government entity for a 1:1 match of scholarship years. The $4.6M renewal of this grant in August 2015 was one of the largest renewals ever awarded to an institution to support Cyber Corps students in the history of the NSF program. Likewise, DSU's current count of 27 Cyber Corps scholars is one of the largest, if not the largest, program in the nation. The DSU Cyber Corps selects 10 new scholars every year, thus it is expected we will have approximately 30 Cyber Corps scholars in the program at all times.

PROGRAM TO PROGRAM ARTICULATION AGREEMENT

Between the
NATIONAL CRYPTOLOGIC SCHOOL
of the
NATIONAL SECURITY AGENCY
and
DAKOTA STATE UNIVERSITY

Agreement with Respect to Applying to the

Bachelor of Science in
CYBER OPERATIONS

I. Parties

The parties to this agreement are the National Cryptologic School (NCS) of the National Security Agency (NSA) and Dakota State University (DSU).

II. Purpose

The purpose of this agreement is to:

A. Have a signed articulation agreement that addresses the varying needs of students and complementary nature of the institutions' programs;
B. Provides increased educational opportunities for students at NSA who have completed NETO3200 or CYBR3420;
C. Extends and clarify educational opportunities for students;
D. Provides NSA students who have completed, or who are currently enrolled, in the Joint Cyber Analysis Course (JCAC) and/or the Foundations module (hereafter NCS equivalent CYBR3420) of the Remote Interactive Operator Training (RIOT) program an opportunity to earn a Bachelor of Science Degree in Cyber Operations.

III. Academic Program

A. Upon successful completion of the JCAC and RIOT program requirements, Dakota State University will accept 50-56 credits from NSA prior to transferring to Dakota State University. Students must meet all Board of Regents (BOR) 'policies and university graduation requirements in order to receive a degree.
B. Requirements to be completed at Dakota State University to earn a Bachelor of Science degree with a major in Cyber Operations are outlined in Appendix A.

Additional requirements:

1. In accordance with BOR policy 2:28, students must demonstrate satisfactory performance in writing, mathematics, reading and science reasoning as evidenced by receiving a passing score on all sections of the Collegiate Assessment of Academic Proficiency (CAAP) exam.
2. Students must take the Exit Exam prior to graduation.
3. DSU will waive the graduation requirements that 15 of the last 30 credits for the baccalaureate degree must be earned as institutional credits.
4. DSU will waive the admissions requirement that a student is to provide their high school transcript or GED with scores based on military admissions requirements.
5. DSU allows degree-seeking students who are currently enrolled to earn academic credit for non-traditional learning experience when those experiences are equivalent to coursework provided at DSU. Credits earned through nationally normed exams (AP, CLEP, DSST, etc.) are accepted. A maximum limit of 30 hours of credit for baccalaureate degrees is accepted. The permanent record will show the equivalent course name and a grade of EX for the specified number of credits.
6. DSU allows transfer of formal classwork from accredited institutions in partial or complete fulfillment of the General Education requirements. The individual applying to the program should request an official NCS transcript be mailed to DSU, following the "Request Official Transcript for Colleges and Universities" process.
7. DSU allows transfer of formal classwork credits from Department of Defense, NCS, as well as other ACE-accredited courses, for equivalency of coursework provided at DSU.
8. DSU allows transfer of external courses such as SANS, etc. that will be mapped on a case-by-case basis.
9. DSU will require official transcripts from any accredited college or university, or military service-affiliated college office paperwork, in order for coursework to be transcripted.
10. DSU allows transfer of external certifications. Appendix A contains a non-exhaustive list. Others will be mapped on a case-by-case basis.

IV. Obligations

Both parties agree to confer with each other on a yearly basis regarding changes in curricula involved in this articulation agreement.

V. Modification

This agreement may be modified from time to time by the South Dakota Board of Regents and NSA. Modifications may not diminish the entitlements enjoyed by students who have already attended classes delivered under the terms of earlier versions of the agreement, except in rare instances in which retroactive

implementation of modifications may be required to comply with accreditation standards or to conform to professional licensure requirements.

VI. Effective Date of Agreement: Start date of the Fall 2015 Terms at NSA and DSU.

VII. Acceptance of Agreement:

For Dakota State University:

Richard D Puetz Date: 3-20-15
Dr. Richard Puetz
Interim Dean, College of Business & Information Systems

Judy L. Dittman Date: 03-20-15
Dr. Judy Dittman
Vice President for Academic Affairs

For National Security Agency:

Leonard T. Reinsfelder Date: 3/19/15
Dr. Leonard T. Reinsfelder
Commandant, National Cryptologic School

Monica L. Johnson Date: 3/19/15
Ms. Monica L. Johnson
Registrar, National Cryptologic School

Appendix A

JCAC and CYBR3420 Transfer credits **27 + 23 = 50 credits**

JCAC → DSU (27 credits):

Computer Technology	= CSC 105 Introduction to Computers (3)
Introduction to Programming	= CSC 150 Computer Science I (3)
C Programming	= CSC 250 Computer Science II (3)
Intro to Information System Security	= CIS 245 IA Fundamentals (3)
Computer Programming Scripting Dev	= CIS 275 Web Programming I (3)
Computer Programming Scripting Dev	= CIS 328 Operating Environments (3)
Data Communications	= CIS 363 TCOM, HW & Virtualization (3)
CISCO Routers & Routing Basics	= CIS 383 Networking I (3)
Information Assurance	= CIS 484 Database Management (3)

NOTE: The undergraduate cyber training of those United States Air Force (USAF) members who have not taken JCAC, but rather a comparable USAF training solution, will be evaluated on a case-by-case basis.

CYBR3420 → DSU (23 credits):

Windows module	= CIS 332 Systems Analysis & Design (3), Free Electives (3)
Unix module	= CIS 375 Web Programming II (3), Free Electives (3)
Networks module	= CIS 385 Networking II (3), Free Electives (2)
Security module	= CIS 487 Database Programming (3), Free Electives (3)

Remaining Major program requirements: **30-35 credits**

Remaining DSU Cyber Operations Major Courses **must** be taken from DSU include:

CSC 300 Data Structures	3 credits
CSC 314 Assembly Language	3 credits
CSC 420 Cellular and Mobile Communications	3 credits
CSC 432 Malware Analysis	3 credits
CSC 434 Web Software Security	3 credits
CSC 436 Offensive Network Security	3 credits
CSC 438 Defensive Network Security	3 credits
CSC 444 Reverse Engineering	3 credits
CSC 456 Operating Systems	3 credits
CSC 470 Software Engineering	3 credits
MATH 204 Math Structures for Cyber Operations	5 credits*

*MATH courses may be transferred in but recommend taking at DSU.

General Education/Institutional Graduation Requirement Courses: 41 credits

The following General Education/Institutional Graduation Requirements have been

met upon completion of JCAC:

CSC 105 Introduction to Computers	3 credits
CSC 150 Computer Science I	3 credits
WEL 100L Wellness Lab	1 credit

Certifications → DSU (credits):

A+	= CIS 363 TCOM, HW & Virtualization (3)
Sec+	= CIS 245 IA Fundamentals (3)
CISSP	= CIS 245 IA Fundamentals (3)
Net+	= CIS 383 Networking I (3)
Cisco	= CIS 383 Networking I (3)

The remaining **34 credits** must meet system general education requirements, in addition to institutional graduation requirements, globalization requirements and writing intensive requirements, and must be selected from the approved list of courses.

Remaining major credits required at DSU: 30-35
Remaining general education credit required at DSU: 34
Transfer credits from NCS and JCAC: 50-56
Total credits required: 120