SOUTH DAKOTA BOARD OF REGENTS

Academic and Student Affairs
Consent

AGENDA ITEM: 4 – F (2)
DATE: December 5-7, 2017

SUBJECT
New Certificate: DSU Certificates in Cybersecurity, Network Services, & Software Development

CONTROLLING STATUTE, RULE, OR POLICY
BOR Policy 2:23 – Program and Curriculum Approval
BOR Policy 2:12 – Distance Education
AAC Guideline 2.11 – Request to Offer an Existing Degree Program at a New Site

BACKGROUND / DISCUSSION
Dakota State University (DSU) requests authority to offer undergraduate certificates in Cybersecurity, Network Services, and Software Development.

The certificates target traditional age students unsure of committing to a full bachelor’s programs and non-traditional students seeking high demand workforce skills. Graduates of these certificate programs will receive entry-level skills and experience leading to careers as computer scientists, software engineers, programmers, security specialists, and other computing professionals. All three of the certificates stack to associate and bachelor’s degree programs, providing certificate holders with options for additional higher education in addition to applicable workforce skills. The proposed certificates consist of twelve credit hours each and include previously approved courses.

DSU requests authorization to offer the certificates online and at the UC-Sioux Falls.

IMPACT AND RECOMMENDATION
DSU currently has 17 undergraduate certificate programs available. DSU does not request new resources to offer the certificates.

Board staff recommend approval of the certificates.

ATTACHMENTS
Attachment I – DSU New Certificate Request Form: Cyber Security
Attachment II – DSU New Certificate Request Form: Network Services
Attachment III – DSU New Certificate Request Form: Software Development

DRAFT MOTION 20171205_4-F(2):
I move to approve DSU’s undergraduate certificates in Cybersecurity, Network Services, and Software Development as presented.
SOUTH DAKOTA BOARD OF REGENTS
ACADEMIC AFFAIRS FORMS

New Certificate

Use this form to propose a certificate program at either the undergraduate or graduate level. A certificate program is a sequence, pattern, or group of academic credit courses that focus upon an area of specialized knowledge or information and develop a specific skill set. Certificate programs typically are a subset of the curriculum offered in degree programs, include previously approved courses, and involve 9-12 credit hours including prerequisites. In some cases, standards for licensure will state explicit requirements leading to certificate programs requiring more than 12 credit hours (in such cases, exceptions to course or credit requirements must be justified and approved). The Board of Regents, Executive Director, and/or their designees may request additional information about the proposal. After the university President approves the proposal, submit a signed copy to the Executive Director through the system Chief Academic Officer. Only post the New Certificate Form to the university website for review by other universities after approval by the Executive Director and Chief Academic Officer.

<table>
<thead>
<tr>
<th>UNIVERSITY:</th>
<th>DSU</th>
</tr>
</thead>
<tbody>
<tr>
<td>TITLE OF PROPOSED CERTIFICATE:</td>
<td>Certificate in Software Development</td>
</tr>
<tr>
<td>INTENDED DATE OF IMPLEMENTATION:</td>
<td>Fall 2018</td>
</tr>
<tr>
<td>PROPOSED CIP CODE:</td>
<td></td>
</tr>
<tr>
<td>UNIVERSITY DEPARTMENT:</td>
<td>Beacom College of Computer &amp; Cyber Sciences</td>
</tr>
<tr>
<td>UNIVERSITY DIVISION:</td>
<td></td>
</tr>
</tbody>
</table>

University Approval

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

[Signature]
Institutional Approval Signature
President or Chief Academic Officer of the University

11/29/2017
Date

1. Is this a graduate-level certificate or undergraduate-level certificate (place an “X” in the appropriate box)?

   Undergraduate Certificate ☒  Graduate Certificate ☐

2. What is the nature/purpose of the proposed certificate?

   The primary purpose for this undergraduate certificate is to better prepare society by producing more trained computer scientists, software engineers, programmers, and other computing professionals at the pre-baccalaureate level. This certificate gives the pre-baccalaureate student introductory theory and application knowledge of software development. The format of this certificate allows for the accumulation of courses to constitute a degree of content mastery and provide an area of academic

Program Forms: New Certificate Form (Last Revised 05/2017)
specialization. With the ubiquitous presence of websites, mobile apps, and mission-critical data management systems, there is a need to prepare people on every level including pre-baccalaureate, baccalaureate, masters and doctoral levels.

3. Provide a justification for the certificate program, including the potential benefits to students and potential workforce demand for those who graduate with the credential.¹

Software developers are the creative minds behind computer programs. Some develop the applications that allow people to do specific tasks on a computer or another device. Others develop the underlying systems that run the devices or that control networks. Certificate programs in software development are increasingly relevant and useful as students have begun concentrating more on skills needed in the workforce. Employers, in turn, are placing more emphasis on specialized skills. We see this certificate as accomplishing the following tasks: (a) create educational success. Some estimates suggest one third of the people who get a certificate will go on to get a two- or four-year degree, while others get a certificate after they get a two- or four-year degree;² (b) assists DSU in meeting its mission as a leader in the computer and cyber sciences.

Employment of software developers is projected to grow 24 nationally percent from 2016 to 2026, much faster than the average for all occupations. Employment of applications developers is projected to grow 30 percent, and employment of systems developers is projected to grow 11 percent. The main reason for the growth in both applications developers and systems developers is a large increase in the demand for computer software. The need for new applications on smart phones and tablets will help increase the demand for applications software developers. The health and medical insurance and reinsurance carrier’s industry will need innovative software to manage new healthcare policy enrollments and administer existing policies digitally. As the number of people who use this digital platform increases over time, demand for software developers will grow.³ The median annual wage for software developers (B.S. prepared) was $102,280 in May 2016.⁴

4. Who is the intended audience for the certificate program (including but not limited to the majors/degree programs from which students are expected)?

There are two intended audiences: (a) learners poised to graduate from high school who do not see college or other education as an immediate option; and (b) older learners who seek workforce entry or advantage after being out of the educational environment for a period of time.

5. List the courses required for completion of the certificate in the table below (if any new courses are proposed for the certificate, please attach the new course requests to this form):²

<table>
<thead>
<tr>
<th>Prefix</th>
<th>Number</th>
<th>Course Title (add or delete rows as needed)</th>
<th>Credit Hours</th>
<th>New (yes, no)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSC</td>
<td>150</td>
<td>Computer Science I</td>
<td>3</td>
<td>No</td>
</tr>
<tr>
<td>CSC</td>
<td>234</td>
<td>Software Security</td>
<td>3</td>
<td>No</td>
</tr>
<tr>
<td>CSC</td>
<td>250</td>
<td>Computer Science II</td>
<td>3</td>
<td>No</td>
</tr>
<tr>
<td>CSC</td>
<td>260</td>
<td>Object Oriented Design</td>
<td>3</td>
<td>No</td>
</tr>
</tbody>
</table>

Subtotal 12.0

¹ For workforce related information, please 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.
³ https://www.bls.gov/ooh/computer-and-information-technology/software-developers.htm#tab-6

Program Forms: New Certificate Form (Last Revised 05/2017)
6. Student Outcome and Demonstration of Individual Achievement.  
   A. What specific knowledge and competencies, including technology competencies, will all 
   students demonstrate before graduation? The knowledge and competencies should be specific to 
   the program and not routinely expected of all university graduates.

   Competencies and intended outcomes from this certificate: (a) develop skills in problem solving, 
   algorithm development, design, and programming concepts; (b) become proficient in object-oriented 
   programming methodologies, including Unified Modeling Language (UML); and (c) hands-on 
   exercises in compiled and web-based software to understand software vulnerabilities.

   B. Complete Appendix A – Outcomes using the system form. Outcomes discussed below should be 
   the same as those in Appendix A.

   Graduates of this program are expected to achieve these learning outcomes:
   - Develop skills in problem solving, algorithm development, design, and programming 
     concepts;
   - Understand compiled and web-based software to illustrate attack methodologies and 
     techniques that lead to software vulnerabilities that violate fundamental security principles.
   - Understands object-oriented programming methodologies.

7. Delivery Location.

   A. Complete the following charts to indicate if the university seeks 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)?

<table>
<thead>
<tr>
<th>On campus</th>
<th>Intended Start Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>Fall 2018</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Off campus</th>
<th>If Yes, list location(s)</th>
<th>Intended Start Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>University Center, Sioux Falls</td>
<td>Fall 2018</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Distance Delivery (online/other distance delivery methods)</th>
<th>If Yes, identify delivery methods</th>
<th>Intended Start Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>Online</td>
<td>Fall 2018</td>
</tr>
</tbody>
</table>

   B. Complete the following chart to indicate if the university seeks authorization to deliver more 
   than 50% but less than 100% of the certificate through distance learning (e.g., as an on-line 
   program)?

<table>
<thead>
<tr>
<th>Distance Delivery (online/other distance delivery methods)</th>
<th>If Yes, identify delivery methods</th>
<th>Intended Start Date</th>
</tr>
</thead>
</table>

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2 Board Policy 2:23 requires certificate programs to “have specifically defined student learning outcomes.”
3 The accreditation requirements of the Higher Learning Commission (HLC) require Board approval for a university 
   to offer programs off-campus and through distance delivery.
4 Delivery methods are defined in AAC Guideline 5.5.
5 This question responds to HLC definitions for distance delivery.

Program Forms: New Certificate Form (Last Revised 05/2017)
8. **Additional Information:** Additional information is optional. Use this space to provide pertinent information not requested above. Limit the number and length of additional attachments. Identify all attachments with capital letters. Letters of support are not necessary and are rarely included with Board materials. The University may include responses to questions from the Board or the Executive Director as appendices to the original proposal where applicable. Delete this item if not used.

All courses in this certificate program meet either core or elective requirements and are stackable into the A.S. in Software Development, A.S. in Network & Security Administration as well as the B.S. in Computer Science, Cyber Operations, and Network & Security Administration degrees.

### Appendix A

**Individual Student Outcomes and Program Courses**

List specific individual student outcomes—knowledge and competencies—in each row. Label each column with a course prefix and number. Indicate required courses with an asterisk (*). Indicate with an X the courses that will provide the student with an opportunity to acquire the knowledge or competency listed in the row. All students should acquire the program knowledge and competencies regardless of the electives selected. Modify the table as necessary to provide the requested information for the proposed program.

<table>
<thead>
<tr>
<th>Individual Student Outcome</th>
<th>Program Courses that Address the Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prefix &amp; Number</td>
</tr>
<tr>
<td>Develop skills in problem solving, algorithm development, design, and programming concepts</td>
<td>CSC 150</td>
</tr>
<tr>
<td>Understand compiled and web-based software to illustrate attack methodologies and techniques that lead to software vulnerabilities that violate fundamental security principles</td>
<td>CSC 234</td>
</tr>
<tr>
<td>Understands object-oriented programming methodologies</td>
<td>CSC 260</td>
</tr>
</tbody>
</table>

Expand the table as necessary to include all student outcomes. Outcomes in this table are to be the same ones identified in the text.