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|  | **SOUTH DAKOTA BOARD OF REGENTS**  ACADEMIC AFFAIRS FORMS |
| New Certificate |
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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.

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| --- | --- |
| **UNIVERSITY:** | DSU |
| **TITLE OF PROPOSED CERTIFICATE:** | Computer Science and Cyber Education |
| **INTENDED DATE OF IMPLEMENTATION:** | Fall 2025 |
| **PROPOSED CIP CODE:** | 11.0101 |
| **UNIVERSITY DEPARTMENT:** | Beacom College of Computer and Cyber Sciences |
| **BANNER DEPARTMENT CODE:** | DCOC |
| **UNIVERSITY DIVISION:** | Computer Science |
| **BANNER DIVISION CODE:** | DSCI |

**Please check this box to confirm that:**

* The individual preparing this request has read [AAC Guideline 2.3.2.2.C](https://public.powerdms.com/SDRegents/documents/1677062), which pertains to new certificate requests, and that this request meets the requirements outlined in the guidelines.
* This request will not be posted to the university website for review of the Academic Affairs Committee until it is approved by the Executive Director and Chief Academic Officer.

**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.*

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| A picture containing text  Description automatically generated |  | 3/4/2025 |
| Institutional Approval Signature  *President or Chief Academic Officer of the University* |  | Date |

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Note: In the responses below, references to external sources, including data sources, should be documented with a footnote (including web addresses where applicable).

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

|  |  |  |  |
| --- | --- | --- | --- |
| Undergraduate Certificate |  | Graduate Certificate |  |

1. **What is the nature/ purpose of the proposed certificate? Please include a brief (1-2 sentence) description of the academic field in this certificate.**

The Computer Science & Cyber Education certificate creates a stronger disciplinary foundation for educators to offer new opportunities to their students. The certificate in Computer Science & Cyber Education will equip teachers to teach in the Governor’s Cyber Academy (GCA) by credentialing them in secondary computer science education. The South Dakota Department of Education is in the process of creating and approving K-8 Computer Science Standards, which will impact over 150 accredited public and accredited non-public schools. In 2023, the South Dakota Department of Education published a K-8 enrollment of 106,164 for public and non-public schools (<https://doe.sd.gov/ofm/enrollment.aspx>). These changes provide an opportunity to train teachers to implement the upcoming K-8 Computer Science Standards. These changes aim to foster innovative, competent professionals prepared to lead in the computer-science sector, which is what the South Dakota Board of Regents has encouraged graduate programs at its member institutions to do.

The courses in this certificate form the specialization within the MSEd in Education and Technology. These new courses will be taught by current faculty members who possess expertise in the relevant fields.

1. **If you do not have a major in this field, explain how the proposed certificate relates to your university mission and strategic plan, and to the current Board of Regents Strategic Plan 2014-2020.**

*Links to the applicable State statute, Board Policy, and the Board of Regents Strategic Plan are listed below for each campus.*

*BHSU:* [*SDCL § 13-59*](https://sdlegislature.gov/Statutes/Codified_Laws/DisplayStatute.aspx?Type=Statute&Statute=13-59)[*BOR Policy 1.2.1*](https://public.powerdms.com/SDRegents/documents/1729445)

*DSU:* [*SDCL § 13-59*](https://sdlegislature.gov/Statutes/Codified_Laws/DisplayStatute.aspx?Type=Statute&Statute=13-59)[*BOR Policy 1.2.2*](https://public.powerdms.com/SDRegents/documents/1729444)

*NSU:* [*SDCL § 13-59*](https://sdlegislature.gov/Statutes/Codified_Laws/DisplayStatute.aspx?Type=Statute&Statute=13-59)[*BOR Policy 1.2.3*](https://public.powerdms.com/SDRegents/documents/1729443)

*SDSMT:* [*SDCL § 13-60*](https://sdlegislature.gov/Statutes/Codified_Laws/DisplayStatute.aspx?Type=Statute&Statute=13-60)[*BOR Policy 1.2.4*](https://public.powerdms.com/SDRegents/documents/1729442)

*SDSU:* [*SDCL § 13-58*](https://sdlegislature.gov/Statutes/Codified_Laws/DisplayStatute.aspx?Type=Statute&Statute=13-58)[*BOR Policy 1.2.5*](https://public.powerdms.com/SDRegents/documents/1729439)

*USD:* [*SDCL § 13-57*](https://sdlegislature.gov/Statutes/Codified_Laws/DisplayStatute.aspx?Type=Statute&Statute=13-57)[*BOR Policy 1.2.6*](https://public.powerdms.com/SDRegents/documents/1729438)

[*Board of Regents Strategic Plan*](http://sdbor.edu/wp-content/uploads/2023/09/StrategicPlan_22_27.pdf)

**Alignment with Dakota State University’s Mission and Strategic Plan**

Dakota State University’s mission, as outlined in SDCL § 13-59-2.2, emphasizes instruction in computer management, computer information systems, electronic data processing, and related undergraduate and graduate programs. It also specifically authorizes the preparation of elementary and secondary teachers with an emphasis on computer and information processing.

The Computer Science & Cyber Education Certificate directly supports this mission by:

* Equipping educators with foundational knowledge in computer science, cybersecurity, artificial intelligence, and networking to prepare them for teaching these subjects in K-12 settings.
* Expanding DSU’s role in workforce development by ensuring that South Dakota’s educators are credentialed to teach computer science and cybersecurity in alignment with the Governor’s Cyber Academy (GCA).
* Fulfilling the university’s purpose of providing innovative computer science education while addressing the growing demand for qualified computer science teachers in South Dakota’s public and non-public schools.

Additionally, the certificate aligns with DSU’s strategic initiatives by:

1. Advancing DSU’s reputation as a national leader in cybersecurity education, consistent with its designation as a National Center of Academic Excellence in Cybersecurity (NCAE-C).
2. Enhancing K-12 pipeline development, ensuring that students are better prepared for postsecondary education and careers in STEM fields.
3. Promoting workforce readiness by developing future educators who can teach computer science, cybersecurity, and artificial intelligence in South Dakota schools.

**Alignment with the South Dakota Board of Regents Strategic Plan (2014-2020)**

The South Dakota Board of Regents (BOR) Strategic Plan (2014-2020) emphasizes student success, academic quality, workforce development, and economic growth. The proposed certificate directly supports these priorities by:

1. Strengthening K-12 and Postsecondary Partnerships (BOR Goal 2)
   * The certificate aligns with South Dakota’s K-8 Computer Science Standards and prepares educators to deliver high-quality instruction, creating a strong pipeline from K-12 to higher education.
   * The program also supports the Governor’s Cyber Academy, an initiative designed to enhance South Dakota’s STEM education ecosystem.
2. Expanding Workforce Development in High-Demand Fields (BOR Goal 3)
   * The certificate addresses the critical shortage of qualified computer science educators by providing targeted training in cybersecurity, programming, and networking.
   * By preparing teachers to instruct in computer science and cybersecurity, the program contributes to the state’s long-term workforce needs in cybersecurity, artificial intelligence, and related fields.
3. Supporting Innovation and Economic Development (BOR Goal 4)
   * By credentialing educators in cybersecurity and computer science, the certificate program supports South Dakota’s growing technology sector, ensuring that students at the K-12 level receive the foundational skills needed for future careers in high-tech industries.
   * The program aligns with state and national workforce demands by fostering a highly skilled, digitally literate workforce, essential for South Dakota’s continued economic growth.

The Computer Science & Cyber Education Certificate is well-aligned with DSU’s legislative mandate, university mission, and strategic goals. Additionally, it supports the South Dakota Board of Regents’ emphasis on K-12 education partnerships, workforce development, and economic growth by equipping educators with essential skills to teach computer science and cybersecurity in South Dakota’s schools. This initiative enhances the state’s commitment to innovation and digital education, positioning South Dakota as a leader in cyber and computer science education at the K-12 level.

1. **Provide justification for the certificate program, including the potential benefits to students and potential workforce demand for those who graduate with the credential.** *For workforce related information, please provide data and examples. Data may include, but are not limited to the South Dakota Department of Labor, the US Bureau of Labor Statistics, Regental system dashboards, etc. Please cite any sources in a footnote.*

This certificate highlights students' skills in computer and cyber education and will help to address the teacher shortage in computer science and cyber. Based on data from the [Computer Science Teachers Association (CSTA) survey conducted in 2022](https://members.csteachers.org/documents/en-us/1d16f7a7-e39b-4ebd-a5fa-b8cf82e6f029/1/), there aren’t enough teachers qualified to teach computer science courses in many schools. This survey had 2,238 participants and the first recommendation, based on the data collected, was to: “Recruit, retain, and diversify the pool of CS teachers. There are not enough CS teachers to meet the needs across schools, particularly for those serving marginalized communities.”

Some additional data to support this claim of a lack of qualified CS teachers comes from the [Trends in the State of Computer Science in U.S. K-12 Schools](https://services.google.com/fh/files/misc/trends-in-the-state-of-computer-science-report.pdf) conducted by Google and Gallup in 2016. This survey data came from 4,357 participants which included students, parents, and teachers. Below are some of the key findings that speak to the need for more CS teachers:

*Schools report a lack of qualified teachers and funds as key barriers to offering CS. Additionally, schools continue to report that they have too many other classes that support required testing for students, which may immobilize some schools from adding CS offerings, especially in lower grade levels. Sixty-three percent of K-12 principals and 74% of superintendents who do not have CS in their school or district say a reason they do not offer CS is the lack of teachers available at their school with the necessary skills to teach it. Additionally, at least half of principals and superintendents (50% and 55%, respectively) note that they must devote most of their time to other courses that are related to testing requirements.*

*High school principals without CS classes are more likely to cite a lack of qualified teachers (22%) and lack of student demand (19%) as the main reason for not offering CS than they are to cite too many classes related to testing requirements (14%).*

This data comes from surveys conducted nationally. Because this is an online program, we have the potential to attract students from across the country to help meet the workforce demand for more qualified CS teachers.

As schools continue to expand their offerings in computer science and cyber, this shortage will increase and teachers with these qualifications will be in high demand. Additionally, students that complete this specialization will be able to teach dual credit computer science courses as well as potentially teach courses in the Governors Cyber Academy which will help address workforce demand at DSU as well as other BOR institutions.

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

The **Computer Science and Cyber Education** graduate certificate is designed for K-12 educators seeking to develop expertise in computer science instruction. This certificate is particularly relevant for teachers who will support South Dakota’s **Governor’s Cyber Academy (GCA)** or implement the state’s upcoming **K-8 Computer Science Standards**, impacting over 150 public and private schools. Additionally, this program is valuable for **career and technical education (CTE) instructors**, instructional technology specialists, and STEM educators who want to integrate computer science into their teaching. The intended audience also includes **educators seeking professional development**, school administrators looking to expand their district’s computer science offerings, and professionals transitioning into education from technical fields. Given the national shortage of qualified computer science teachers, this certificate provides an opportunity for educators to gain the necessary credentials to teach **dual-credit courses**, AP computer science, and foundational programming and cybersecurity courses. Since the certificate is delivered **fully online**, it is accessible to teachers across the country, increasing the potential impact of the program on workforce development in computer science education.

1. **Certificate Design**
   1. **Is the certificate designed as a stand-alone education credential option for students not seeking additional credentials (i.e., a bachelor’s or master’s degree)? If so, what areas of high workforce demand or specialized body of knowledge will be addressed through this certificate?**

The **Computer Science and Cyber Education** certificate is designed as a **stand-alone credential** **that enables high school educators to teach computer science without requiring a master’s degree. This is crucial given the high workforce demand for qualified computer science educators**. According to the **Computer Science Teachers Association (CSTA) 2022 survey**, schools nationwide lack qualified teachers to meet the growing demand for computer science instruction. The report recommends increasing recruitment and credentialing efforts, particularly for **underserved and rural communities**. In South Dakota, new **K-8 Computer Science Standards** will require trained educators to implement curriculum changes, creating an immediate need for **credentialed computer science teachers**. Additionally, **high schools offering dual-credit programs** and **career and technical education (CTE) pathways** will benefit from teachers who can provide instruction in cybersecurity, artificial intelligence, and programming. This certificate addresses these workforce needs by equipping educators with **practical skills in cybersecurity, AI, networking, and programming**, ensuring they are prepared to teach emerging technologies.

* 1. **Is the certificate a value added credential that supplements a student’s major field of study? If so, list the majors/programs from which students would most benefit from adding the certificate.**

The **Computer Science and Cyber Education** certificate enhances existing degrees by **providing specialized expertise in a rapidly growing field**. It serves as an **add-on credential** for students pursuing **education, instructional technology, and computer science-related majors**. DSU’s **M.S.Ed. in Education and Technology** is a natural pathway for this certificate, as the courses are embedded within the program’s curriculum. This certificate is also valuable for **educators looking to expand their teaching certifications**. Many states, including South Dakota, are requiring teachers to obtain additional endorsements to teach **computer science and cybersecurity**. By completing this program, educators gain **immediate qualifications** to teach in the **Governor’s Cyber Academy (GCA).** Additionally, **students in DSU’s graduate education programs** can use this certificate to broaden their professional credentials, increasing their **employability and career advancement opportunities**. The program is particularly beneficial for those teaching **dual-credit courses, Advanced Placement (AP) computer science**, or working in **CTE programs** that integrate **technology-focused curricula**. By earning this certificate, educators not only enhance their subject-matter expertise but also improve their schools’ ability to offer **high-quality computer science instruction**.

* 1. **Is the certificate a stackable credential with credits that apply to a higher level credential (i.e., associate, bachelor’s, or master’s degree)? If so, indicate the program(s) to which the certificate stacks and the number of credits from the certificate that can be applied to the program.**

The Computer and Cyber Education certificate consists of six core courses (18 credits). The certificate is a specialization in MSEd Education and Technology.

1. **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).** *Certificate programs by design are limited in the number of credit hours required for completion. Certificate programs consist of nine (9) to twelve (12) credit hours, including prerequisite courses. In addition, certificates typically involve existing courses. If the curriculum consists of more than twelve (12) credit hours (including prerequisites) or includes new courses, please provide explanation and justification below.*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Prefix** | **Number** | **Course Title**  *(add or delete rows as needed)* | **Prerequisites for Course**  *Include credits for prerequisites in subtotal below.* | **Credit Hours** | **New**  **(yes, no)** |
| CSC | 611 | Cybersecurity Policy, Law, and Ethics for Educators | None | 3 | No |
| CSC | 613 | Artificial Intelligence for Educators | None | 3 | No |
| CSC | 617 | Cybersecurity for Educators | None | 3 | No |
| CSC | 626 | Computer Programming for Educators | None | 3 | No |
| CSC | 653 | Hardware and Networking for Educators | None | 3 | No |
| CSC | 683 | Cybersecurity Practicum | None | 3 | No |
|  |  |  | Subtotal | 18 |  |

There are two reasons the proposed certificate is 18 credits:

1. DSU has received a grant in collaboration with 6 other CAE schools to fund up to 18 credits of graduate level computer science and cybersecurity coursework for current high school teachers. Some scholarship recipients will apply these to a MSED degree, others will just complete the 18 credits. We would like to award a graduate certificate for this.
2. As we work to expand and scale the Governors Cyber Academy, these 18 CSC credits will meet institutional and accreditation requirements so high school teachers can teach these dual enrollment courses in their local schools. It will allow more courses to be taught in person around the state.
3. **Student Outcome and Demonstration of Individual Achievement.**

*Board Policy 2:23 requires certificate programs to “have specifically defined student learning outcomes.*

* 1. **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.*

**Student Learning Outcomes.**

1. **Apply** foundational concepts in computer science, artificial intelligence, and cybersecurity to develop instructional strategies for secondary education.
2. **Design** computer science and cybersecurity curricula that align with South Dakota’s K-8 Computer Science Standards.
3. **Evaluate** cybersecurity risks and mitigation strategies to create engaging, hands-on learning experiences for students in K-12 settings.
   1. **Complete the table below to list specific learning outcomes – knowledge and competencies – for courses in the proposed program in each row.** *Label each column heading with a course prefix and number. Indicate required courses with an asterisk (\*). Indicate with an X in the corresponding table cell for any student outcomes that will be met by the courses included. 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.*

|  |  |
| --- | --- |
|  |  |
| Individual Student Outcome | CSC 611 | | CSC 613 | CSC 617 | CSC 626 | CSC 653 | CSC 683 |
| **Apply** foundational concepts in computer science, artificial intelligence, and cybersecurity to develop instructional strategies for secondary education. | X | | X | X | X |  |  |
| **Design** computer science and cybersecurity curricula that align with South Dakota’s K-8 Computer Science Standards. |  | |  |  | X | X | X |
| **Evaluate** cybersecurity risks and mitigation strategies to create engaging, hands-on learning experiences for students in K-12 settings. | X | |  | X |  | X | X |

1. **Delivery Location.**

*Note: The accreditation requirements of the Higher Learning Commission (HLC) require Board approval for a university to offer programs off-campus and through distance delivery.*

1. **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., USD Community College for Sioux Falls, Black Hills State University-Rapid City, Capital City Campus, etc.) or deliver the entire program through distance technology (e.g., as an on-line program)?**

|  |  |  |
| --- | --- | --- |
|  | **Yes/No** | ***Intended Start Date*** |
| **On campus** | No |  |

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

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| --- | --- | --- | --- |
|  | **Yes/No** | ***If Yes, identify delivery methods***  *Delivery methods are defined in AAC Guideline* [*2.4.3.B*](https://public.powerdms.com/SDRegents/documents/1677940)*.* | ***Intended Start Date*** |
| **Distance Delivery (online/other distance delivery methods)** | Yes | X15 Online Asynchronous – Term Based Instruction | **Fall 2025** |
| **Does another BOR institution already have authorization to offer the program online?** | No | **If yes, identify institutions:** |  |

1. **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)?** *This question responds to HLC definitions for distance delivery.*

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Yes/No** | ***If Yes, identify delivery methods*** | ***Intended Start Date*** |
| **Distance Delivery (online/other distance delivery methods)** | No |  | Choose an item.Choose an item. |

1. **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.*