

SOUTH DAKOTA BOARD OF REGENTS

Academic and Student Affairs

AGENDA ITEM: 6 – D (2)
DATE: December 11-12, 2024

SUBJECT

New Undergraduate Certificate Request – SDSMT & SDSU – Gateway to Engineering

CONTROLLING STATUTE, RULE, OR POLICY

[BOR Policy 2.3.2](#) – New Programs, Program Modifications, and Inactivation/Termination

BACKGROUND / DISCUSSION

South Dakota School of Mines & Technology (SDSMT) and South Dakota State University (SDSU) request authorization to offer an undergraduate certificate in Gateway to Engineering. The proposed certificate will provide an opportunity to engage South Dakota high school students about potential future careers in engineering. The certificate provides a foundation in general education courses relevant to the study of engineering while exploring the profession of engineering.

This certificate is part of a larger initiative to offer certificates to high school students through the High School Dual Credit (HSDC) program.

IMPACT AND RECOMMENDATION

The proposed certificate will be offered on campus, online, and at approved In-District delivery sites for HSDC. New resources are not requested. No new courses will be required.

Board office staff recommends approval.

ATTACHMENTS

- Attachment I – New Certificate Request Form: SDSMT & SDSU – Gateway to Engineering
- Attachment II – Gateway to Engineering Marketing Flyer

DRAFT MOTION 20241211_6-D(2):

I move to authorize SDSMT and SDSU to offer an undergraduate certificate in Gateway to Engineering, 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.

UNIVERSITY:	SDSM&T, SDSU
TITLE OF PROPOSED CERTIFICATE:	Gateway to Engineering
INTENDED DATE OF IMPLEMENTATION:	Fall 2025
PROPOSED CIP CODE:	14.0101
UNIVERSITY DEPARTMENT:	SDSMT – Materials & Metallurgical Engineering SDSU – Construction and Concrete Industry Management
BANNER DEPARTMENT CODE:	SDSMT – MMEM SDSU – SCCM
UNIVERSITY DIVISION:	SDSMT – Engineering SDSU – Jerome J. Lohr College of Engineering
BANNER DIVISION CODE:	SDSMT – 4E SDSU – 3E

Please check this box to confirm that:

- The individual preparing this request has read [AAC Guideline 2.3.2.2.C](#), 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.

Institutional Approval Signature
President or Chief Academic Officer of the University

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? Please include a brief (1-2 sentence) description of the academic field in this certificate.**

This certificate provides an opportunity to engage South Dakota high school students about potential future careers in engineering. The certificate provides a foundation in general education courses relevant to the study of engineering while exploring the profession of engineering.

3. **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.**

South Dakota Mines and South Dakota State University offer many undergraduate degrees in engineering.

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

The Gateway to Engineering certificate will serve to generate interest in engineering careers by providing opportunities to South Dakota high school students to explore the various disciplines within engineering.

U.S. Bureau of Labor Statistics data indicate that employment in engineering occupations is projected to grow faster than the average between 2022 and 2032. For example, industrial engineering and mechanical engineering positions are expected to grow by 12% and 11% respectively during this 10-year period, much faster than the average. The South Dakota Department of Labor and Regulation indicates that there are 573 current job openings in Architecture and Engineering occupations statewide with an average annual salary of \$83,883.

These national employment projections and statewide job openings document a need to development opportunities to develop the engineering talent pipeline, which the Gateway to Engineering certificate will serve to do.

USBLS: <https://www.bls.gov/emp/tables/stem-employment.htm>

SD DLR:

<https://www.southdakotaworks.org/vosnet/analyzer/JobTrends.aspx?enc=JrcV0frE3SRuqhxbyzs6GENcZKGOsCBTC0umWNIOwPo=>

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

The primary intended audience for this certificate program is high school students in South Dakota.

6. Certificate Design

A. 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?

No.

B. 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.

No.

C. 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 certificate is stackable for any student who pursues an engineering major at the baccalaureate level.

7. 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	Prerequisites for Course <i>Include credits for prerequisites in subtotal below.</i>	Credit Hours	New (yes, no)
CHEM	112/112L	General Chemistry I w/Lab (3,1)	Completion or concurrent math registration	4	No
PHYS	207/207L	OR Fundamentals of Physics I w/Lab (3,1)	MATH 123		
GE	101	Intro to Engineering & Tech Prof (1)	None	1 - 2	No
GES	130/130L	OR Intro to Engineering and Science (2) OR Any other equivalent Introduction to Engineering course	None		
MATH	115	Precalculus (5)	MATH 114 or placement	4-5	No
MATH	116	OR Engineering Precalculus w/Lab (4,1)	MATH 101 or placement		
MATH	121	OR Survey of Calculus (4)	MATH 114, 115, 120 or placement		

Prefix	Number	Course Title	Prerequisites for Course <i>Include credits for prerequisites in subtotal below.</i>	Credit Hours	New (yes, no)
MATH	123	OR Calculus I (4)	MATH 115, 120, or placement		
Subtotal				9-11	

8. Student Outcome and Demonstration of Individual Achievement. *Board Policy 2:23 requires certificate programs to “have specifically defined student learning outcomes.*

A. What specific knowledge and competencies, including technology competencies, will all students demonstrate before graduation?

- Problem Solving
- Critical Thinking
- Inquiry and Analysis

B. Complete the table below to list specific learning outcomes – knowledge and competencies – for courses in the proposed program in each row.

Student Learning Outcomes	Program Courses that Address the Outcomes		
	MATH	CHEM or PHYS	GE or GES
Students will be able to define a problem and apply appropriate techniques to obtain valid solutions.	X	X	X
Analyze available facts, evidence, and observations and apply rational, unbiased analysis to form judgements.	X	X	
Systematically explore and investigate complex issues to develop well-supported conclusions.		X	

9. 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.*

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., 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)?

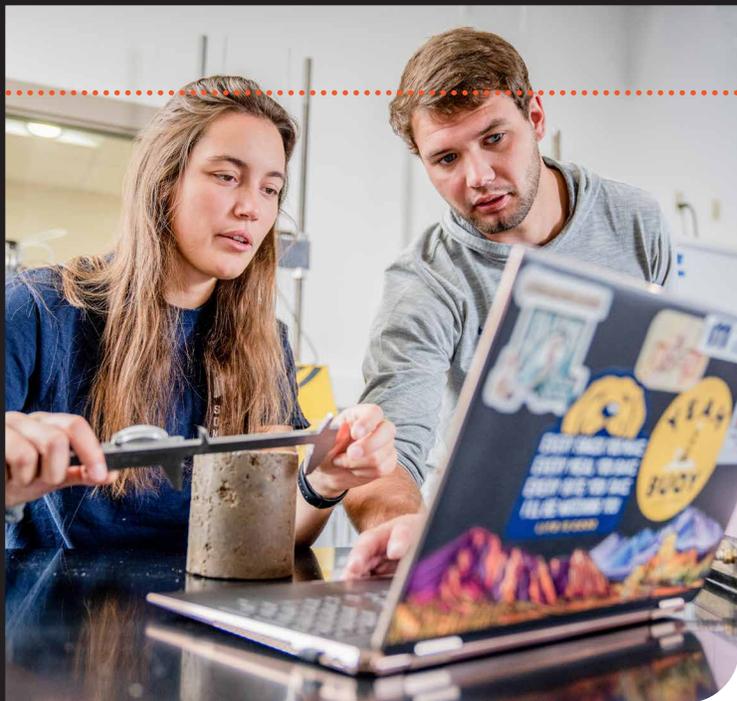
	Yes/No	Intended Start Date
On campus	Yes	Fall 2025

	Yes/No	If Yes, list location(s)	Intended Start Date
Off campus	Yes	In-district, where approved	Fall 2025

	Yes/No	<i>If Yes, identify delivery methods</i> <i>Delivery methods are defined in AAC Guideline 2.4.3.B.</i>	<i>Intended Start Date</i>
Distance Delivery (online/other distance delivery methods)	Yes		Fall 2025
Does another BOR institution already have authorization to offer the program online?	No	If yes, identify institutions:	

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

	Yes/No	<i>If Yes, identify delivery methods</i>	<i>Intended Start Date</i>
Distance Delivery (online/other distance delivery methods)	Yes	Online Synchronous Online Asynchronous Receive Site Send Site Hybrid Online Hybrid Face-to-Face	Fall 2025



HIGH SCHOOL DUAL CREDIT

GATEWAY TO ENGINEERING

ARE YOU INTERESTED IN ENGINEERING? VIEW THE FOLLOWING MAJORS AVAILABLE AT SOUTH DAKOTA'S PUBLIC UNIVERSITIES AND GET A HEAD START WITH HIGH SCHOOL DUAL CREDIT (HSDC).

POTENTIAL DEGREES:

SOUTH DAKOTA MINES

Biomedical Engineering
Chemical Engineering
Civil Engineering
Computer Engineering
Electrical Engineering
Geological Engineering
Industrial Engineering & Engineering Management
Mechanical Engineering
Metallurgical Engineering
Mining Engineering

SOUTH DAKOTA STATE UNIVERSITY

Agricultural and Biosystems Engineering
Civil Engineering
Computer Science
Concrete Industry Management
Construction Management
Electrical Engineering
Electronics Engineering Technology
Mechanical Engineering
Operations Management

Note: Some courses may only be available during one semester; make sure to research this when creating your certificate plan.

CERTIFICATE PLAN

If you're considering a career in engineering, below are some courses we recommend.

SCIENCE

Take one of the following:

CHEM 112/L General Chemistry I w/Lab
PHYS 207/207L Fundamentals of Physics I w/Lab

ENGINEERING

Take one of the following:

GE101 Intro to Engineering & Technical Professions
GES 130/130L Intro to Engineering and Science

MATH

Take one of the following:

MATH 115 Precalculus
MATH 116 Engineering Precalculus w/Lab
MATH 121 Survey of Calculus
MATH 123 Calculus I

INDIVIDUAL STUDENT OUTCOMES

- Define a problem and apply appropriate techniques to obtain valid solutions.
- Analyze available facts, evidence, and observations and apply rational, unbiased analysis to form judgments.
- Systematically explore and investigate complex issues to develop well-supported conclusions.



**UPON COMPLETION: UNDERGRADUATE
GATEWAY TO ENGINEERING CERTIFICATE**