Intent to Plan for a New Program
South Dakota Board of Regents
Academic Affairs Forms

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Use this form to request authorization to plan a new baccalaureate major, associate degree program, or graduate program; formal approval or waiver of an Intent to Plan is required before a university may submit a related full proposal request for a new program. The Executive Director and/or their designees may request additional information. After the university President approves the Intent to Plan, submit a signed copy to the Executive Director through the System Academic Officer through the proper process. Only post the Intent to Plan to the university website for review by other universities after approval by the Executive Director, System Academic Officer or designee. This form is meant to capture critical elements for stakeholders to review prior to a full proposal.

University	NSU - Northern State University
Degree	BSED : Bachelor of Sci in Education
Name of Major	X999 : New Major Requested Science Education
Specialization Required?	No Note: If the new proposed program includes specific specializations within it, complete and submit a New Specialization Form for each proposed specialization and attach it to this form. Since specializations appear on transcripts, they require Board approval.
College/Department	5A : NSU College of Arts & Sciences/NSCM : Science and Mathematics
Intended Date of Full Proposal	Fall 2023
Planned CIP Code	13.1316

Program Description

1. Provide the working program description that may appear in the university catalog.

Northern State University's BSEd Science Education program provides a path to teaching certification in multiple science disciplines through one comprehensive major. NSU’s science education degree prepares individuals through content knowledge and practical experiences to teach a wide range of science courses. Upon completion of this program individuals learn a combination of biological, physical, geographical, chemical, and earth sciences and are able to share the excitement of general science at the middle and high school level.

Strategic Impact

2. Describe how the program fits in with the institutional mission, strategic plan, existing institutional program array, and academic priorities.

Northern State University (NSU) is statutorily authorized to offer university academic programs in accordance with SDCL § 13-59-1 “in the preparation of elementary and secondary teachers, and a secondary purpose is to offer preprofessional, one-year and two-year terminal and junior college programs”. Board Policy 1:10:6 establishes the mission of NSU as a comprehensive regional university to: "serve the educational and programming needs of [its] geographic region and offer several undergraduate and limited master’s-level programs. Faculty emphasis is on teaching, scholarly research and creative activity, and service. Universities operating within this sector are nationally recognized to promote access to affordable education in a regional location. Northern State University (NSU) focuses on personalized teaching and student services and expands access through its special emphasis on E-Learning. NSU has unique characteristics and is critical in advancing student access, affordability, degree completion, and quality education in South Dakota."

NSU’s mission is “provide diverse academic, civic, social and cultural opportunities that prepare students through the liberal arts, professional education and E-learning for their future endeavors, while also enriching the local and regional community.” Developing the next level of educator-scholars, versed in all areas of science and equipped with practical experiences, meets the mission of the university not only through the educational opportunities but the community outreach. The BSEd in Science Education meets and supports the NSU mission, primarily by providing preparation for teachers and serving the educational needs of the region as well as the workforce needs of the region and nation (as indicated in item two above).

If the program does not align to the strategic plan, provide a compelling rationale for the institution to offer the program.

N/A

3. How does the program connect to the Board of Regent’s Strategic Plan?

Northern seeks to build a comprehensive science education program that integrates a combination of biological, chemical, geographical, physical, and earth sciences into one degree. The intent is to integrate undergraduate research, practical experiences, and/or other similar high impact practices into the core curriculum of science courses.

The proposed program contributes directly to BOR Strategic Plan Goal 3 (Academic Excellence, Student Success and Educational Attainment), Academic Excellence Action Step 2, which calls for prioritizing new program proposals with high-impact practices and workforce alignment. This is met through revising teacher preparation to better prepare professionals to meet the needs of small regional and rural schools.

Students graduating from NSU’s BSED Biology or BSED Chemistry already gain practical experiences through undergraduate research, serving as a STEM outreach educator, or both. These experiences build confidence and skills with science content and delivery. STEM outreach at NSU is overseen by a School of Education graduate student and science faculty member and allows pre-service teachers to design and deliver science programs to elementary classrooms in northeastern South Dakota. Topical science programs range from chemical to life science to physical, all focusing on important science standards addressed in the elementary classroom. Each developed training will include science and math in the curriculum, built around a particular topic with project development and statistical training included. As part of these efforts, we will also formulate a successful internship program for students pursuing careers as STEM educators to help increase numbers of teachers in these fields, provide well-trained, knowledgeable teachers into the work place while influencing young minds at the elementary and middle school levels. To date, the program has been very successful and continues to grow, and with the help of the new Harvey Jewett IV Regional Science Education Center (RSEC), NSU continues to expand its efforts to bring science education to more communities and students in the region.

It also will contribute to Goal 4 (Workforce and Economic Development), Workforce Alignment Action Step 1 which calls for the alignment of new or enhanced undergraduate programs to the South Dakota and national workforce and Workforce Alignment Action Step 3, which places special emphasis on STEM, Teacher Education, Nursing and Healthcare, and Business undergraduate completion.

Research shows that achievement and interest in science and math fields falter after 4th grade and significantly drop at 8th grade (https://nces.ed.gov/programs/coe/indicator/cnt/intl-grades-4-8-math-science). After this point, the decreased interest in learning science and math affects the aptitude of young minds. However, STEM fields are growing rapidly, particularly in the technology and computer science arena. Data show that careers in STEM fields will continue to rise over the next decade but that STEM education isn't keeping pace to provide students equipped to fill the jobs (https://www.idtech.com/blog/stem-education-statistics). To accommodate this need, it is increasingly important to train teachers and expose students early and often to STEM fields. To do so, it is imperative to consider different educational models, as they relate to science and math, as well as provide additional opportunities to learn science and math from individuals trained in such fields. Key elements to successfully expose students to STEM fields are: 1) teachers who are knowledgeable in science and math content, 2) effective delivery methods, and 3) adequate time to cover topics. Providing a comprehensive degree that touches on all the science not only provides teachers with the knowledge and pedagogical skills to adequately deliver a variety of science topics, it also allows teachers to provide intentional, focused science lessons.

Program Summary

4. If a new degree is proposed, what is the rationale?

This question refers to the type of degree, not the program. For example, if your university has authorization to offer the Bachelor of Science and the program requested is a Bachelor of Science, then the request is not for a new degree.

N/A

5. What modality/modalities will be used to offer the new program?
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.

	Yes/No	Intended Start Date		
On Campus	Yes	2023		
	Yes/No	**Location(s)**	**Intended Start Date**	
Off Campus Location	No			
	Yes/No	**Delivery Method(s)**		**Intended Start Date**
Distance Delivery	Yes	015 Internet Asynchronous-Term Based; 019 Internet Synchronous; 030 Blended/Hybrid; HyFlex		Fall 2023

	Yes/No	Identify Institutions
Does another BOR institution already have authorization to offer the program online?	No	

6. If the program will be offered through distance delivery, identify the planned instructional modality:

Both / HyFlex

Academic Quality

7. What peer institutions and current national standards will be referenced to develop the curriculum for this program? Include links to at least 3 comparable programs at peer institutions and links to national or accreditation standards, if any.

Three institutions will be referenced when developing the curriculum for this program. These are identified as peer-institutions or institutions of smaller size and focus. This determination is made through the National Center for Education Statistics (NCES) per Chronicle of Higher Education data as well as membership within the Council of Public Liberal Arts Colleges (COPLAC).

BS Secondary Education Science - University of Maine Farmington (COPLAC peer institution)
(https://catalog.farmington.edu/preview_program.php?catoid=5&poid=332)

BSE Secondary Education Science – Midwestern State University Texas (COPLAC peer institution)
(https://catalog.msutexas.edu/preview_program.php?catoid=35&poid=4878&returnto=1909)

BA/BS Broad Field Science – University of Wisconsin, Superior (NCES peer institution)
(https://www.uwsuper.edu/admissions/majors-minors/broad-field-science_majorminor1752673)

NSU will follow the standards set by the SD Department of Education to ensure the competencies of teacher candidates trained in the science education program. (South Dakota Science Standards. May 2015. Pp. 23-26, 27-34
https://doe.sd.gov/contentstandards/documents/sdSciStnd.pdf)

8. What program accreditation is available, if any?

Northern's current BSEd Biology major and BSEd Chemistry major are accredited through the Council for the Accreditation of Educator Preparation (CAEP) (reaffirmed in spring 2021) through the Northern State University Millicent Atkins School of Education. The BSEd Science Education will be accredited through CAEP.

9. Will the proposed program pursue accreditation or certifications?

Yes

If no, why has the department elected not to pursue accreditation for the program?

N/A

Duplication and Competition

10. Do any related programs exist at other public universities in South Dakota?

A list of existing programs is available through the university websites and the RIS Reporting: Academic Reports Database. If there are no related programs within the Regental system, indicate none.

Black Hills State University – BSEd Math & Science Education [conferred 4 degrees in 2021-2022]
This program provides a composite teaching major in science and math. Students prepare to teach math and select one science teaching field from biology, chemistry, earth science, and physics. Our proposal does not include mathematics and has a broad multi-disciplinary function, whereas this BHSU program includes a single science discipline.

Black Hills State University – BSEd Science Education [conferred 2 degrees in 2021-2022]
This program prepares students to teach in two science content areas: biology, chemistry, earth science or physics. The key difference between this and our proposed program is that students in the BHSU program must take 24 credit hours from each of two different science disciplines (48 hours total), which lacks the broad multi-disciplinary function of our proposal.

South Dakota State University – BSEd Biology Education (5-12) [Program not listed independently in IPEDS]
This program prepares students to teach biology in middle school and high school. While this program focuses on one science discipline, our program has a multi-discipline focus within the sciences. While the SDSU website directs that secondary education majors “that may teach in a rural school or apply to graduate school, speak to an advisor about taking additional chemistry, physics, and math classes,” our program is specifically geared toward students who intend to teach in small rural or regional schools, so it naturally incorporates these types of courses within the curriculum rather than encouraging taking these additional courses above and beyond what is required for the major.

South Dakota State University – BSEd Chemistry Education (5-12) [SDSU conferred 1 degree in 2021-2022]
This program prepares students to teach chemistry in middle school and high school. While this program focuses on one science discipline, our program has a multi-discipline focus within the sciences.

South Dakota State University – BSEd Physics Education (5-12) [Program not listed independently in IPEDS]
This program prepares students to teach physics/physical science in middle school and high school. While this program focuses on one science discipline, our program has a multi-discipline focus within the sciences.

University of South Dakota – BSEd Biology Education [USD conferred 0 degrees in 2021-2022]
This program prepares students to teach biology in middle school and high school. While this program focuses on one science discipline, our program has a multi-discipline focus within the sciences.

University of South Dakota – BSEd Chemistry Education [USD conferred 0 degrees in 2021-2022]
This program prepares students to teach chemistry in middle school and high school. While this program focuses on one science discipline, our program has a multi-discipline focus within the sciences.

A. If yes, defend the need for an additional program within the state, Include IPEDS enrollment data and additional data as needed.

NSU Reasoning: Black Hills State University is the only institution among the six regental schools that provides a similar program. Northern State University seeks to provide such a program due to the nature of the middle and high schools our region serves. Many schools are rural in northeastern and central South Dakota, and these schools require teachers versed in a variety of science disciplines. Currently, NSU focuses on either biology or chemistry, which does not adequately prepare teachers to teach sciences in all areas. We request this degree to address the needs of the region.

B. If yes, would this program be a candidate for Regental system collaboration?

Students within the program can elect to take online courses through other regental schools that fit within the curriculum for this program.

11. Do any related programs exist at any non-Regental college or university within 100 miles of the university?

List those programs here:

No related programs exist at any non-Regental college or university within 100 miles of Northern State University.

A. If yes, use IPEDS to identify the enrollment in those programs.

N/A

B. What evidence suggests there is unmet student demand for the proposed program, or that the proposed program would attract students away from the existing program?

N/A

Market Demand

This section establishes the market demand for the proposed program (eg Regental system need, institutional need, workforce need). Use the following sources for your data:

- South Dakota Department of Labor & Regulation
- O-Net
- US Department of Labor Projections Central
- SDBOR Workforce and Degree Gap Analysis Report

12. What is the expected growth of the industry or occupation in South Dakota and nationally? Include the number of openings, as well as the percentage of growth when possible.

This program provides a path to teaching certification in multiple science disciplines through one comprehensive major. As indicated above, this broad education prepares graduates to teach a wide range of science courses at the secondary level, which is especially beneficial in smaller and rural school districts where it is often necessary for teachers to instruct multiple subjects. This degree prepares graduates to meet this demand and increases their marketability when they enter the workforce.

Nationally, approximately 1 in 16 workers (or 6.2%) have occupations in science, engineering or technology, whereas in South Dakota, approximately 1 in 23 workers (or 4.3%) have occupations in science, engineering or technology fields [1]. However, only 16% of U.S. high school seniors are proficient in and/or interested in pursuing a career in science, technology, engineering, and math (STEM) careers [2]. This problem is due in part to minimal preparation and training of teachers at the elementary and secondary levels, and limited exposure of students to STEM fields at an early age. Existing teachers sometimes struggle with time management and content knowledge in dynamic STEM fields, thereby affecting students. It is important to “prepare, recruit, retain, and support” teachers and students to not only increase student proficiency in STEM but also to recruit students into education and/or STEM fields.

The South Dakota Department of Labor and Regulation indicates that the employment need for middle school teachers in South Dakota is projected to grow 6.48% through 2030, and the employment need for high school teachers in South Dakota is projected to grow 6.55% through 2030 [3].

The US Bureau of Labor and Statistics’ Occupational Outlook Handbook indicates that the employment need for middle school teachers nationwide is projected to grow 4% through 2031 [4], and the employment need for high school teachers nationwide is projected to grow 5% through 2031 [5]. Both of these growth rates match the average in all occupations.

The US Department of Education’s Office of Secondary Education report includes science as an area in which South Dakota has a shortage of qualified teachers in secondary education [6]. This shortage is persistent and has manifested in every year since 2006. Because the nation faces a skills gap in science and mathematics, the South Dakota Department of Education (SDDOE) has identified STEM fields as critical need areas . Post-secondary science educators are challenged with developing curricula that is meaningful for the students and feasible in the classroom. Many middle and high school teachers face similar issues and struggle to generate students’ interest in STEM. Quality STEM education therefore is increasingly important to foster student interest and adequately educate/train interested students. This is particularly important when considering perpetually low funding and/or budget cuts that plague many districts. If teachers are trained as researchers and become knowledgeable in current scientific and technological advances in science, they become more confident in their ability to effectively teach scientific content part of the state science standards, which positively influences their students. This has the potential to both increase interest in pursuing careers in STEM fields and augment confidence in students already considering STEM careers.

[1] https://www.bls.gov/oes/current/oessrcst.htm
[2] https://www.whitehouse.gov/sites/default/files/microsites/ostp/stem_stratplan_2013.pdf
[3] The South Dakota Department of Labor and Regulation. Occupational Employment Projections - Long Term. https://www.southdakotaworks.org/vosnet/analyzer/resultsNew.aspx?session=occproj&qlink=1&plang=E
[4] U.S. Bureau of Labor and Statistics. Occupational Employment Handbook. Middle School Teachers. https://www.bls.gov/ooh/education-training-and-library/middle-school-teachers.htm
[5] U.S. Department of Education Office of Secondary Education. Teacher Shortages Nationwide, https://www2.ed.gov/about/offices/list/ope/pol/bteachershortageareasreport201718.pdf, p. 161.
[6] https://doe.sd.gov/oatq/shortageareas.aspx

13. What evidence, if any, suggests there are unfilled openings in South Dakota or nationally?

Middle and high school science teachers are needed in South Dakota, apparent from job searches on SchoolSpring (https://www.schoolspring.com/), Indeed (https://www.indeed.com/), and K12Jobspot (https://k12jobspot.com/). Specifically searching for science middle and high school teachers on these sites, there were 13 unique positions in rural locations in South Dakota. Not all positions are be posted on these sites, as districts advertise their positions and may not utilize more universal search engines.

All postings are listed as “high school science” or “middle school science” with a generalization of understanding and teaching science in mind/need. Some positions include math as a part of the requirements. A current search posted by E-learning at Northern State University states that “successful candidates should be confident in their subject mastery, well-versed in content standards, and dedicated to sharing their instructional skills with students across the state.” This also suggests the need to be broadly-trained in science to effectively teach to rural communities.

With a general search for “science teacher” through K12Jobpsot, over 2,000 positions were identified within the United States. Most of these positions are at private and public schools, or private entities, that require science educators versed in all areas of science.

14. What salaries can program graduates expect to earn in South Dakota and nationally?

The most recent US Bureau of Labor and Statistics’ Occupational Outlook Handbook indicates that the 2021 median pay for middle school teachers is $61,320 and the median pay for high school teachers is $61,820. Based on the South Dakota Department of Education “data dashboard,” [7] the median baseline salary of new teachers in South Dakota in Aberdeen, SD is $42,500. According to South Dakota Department of Labor, the median wage estimate for South Dakota middle school teachers is $48,037 and high school teachers is $48,096 (both with a range of $37,793 to $60,902) [8]. Data are not specific to science.

[7] https://doe.sd.gov/data/Teacher-Salary.aspx
[8] https://dlr.sd.gov/lmic/menu_occupational_wages.aspx

15. Optional: Provide any additional evidence of regional demand for the program.
e.g. prospective student interest survey data, letters of support from employers, community needs...

Student Demand

16. Provide evidence of student enrollment at peer institutions that offer the same/similar program using data obtained from IPEDS.
Choose programs not already listed in question 11. Use the most recent year available.

University Name	State	Program Name	Number of Degrees Conferred in Program	Total Number of Conferrals at Level (Undergrad or Grad)
University of Maine Farmington	ME : Maine	BS Secondary Education Science	6	6
Midwestern State University Texas	TX : Texas	BSE Secondary Education Science	5	5
University of Wisconsin, Superior	WI : Wisconsin	BA/BS Broad Field Science	30	30

17. What evidence suggests there is interest from prospective students for this program at the university?

Students currently in the BSED Biology and BSED Chemistry have expressed interest in a general science education degree. Between these two programs, there are nine students. Further, school districts, particularly rural school districts support a general science education degree.

Enrollment

18. Are students enrolling in this program expected to be new to the university or redirected from existing programs at the university?
Include the number of openings, as well as the percentage of growth when possible.

Initially, we expect some students will convert to the BSEd Science Education major from an existing BSEd Biology major or BSED Chemistry major. Long term, we expect that this program will attract additional students to NSU. In particular, students interested in teaching secondary education in small rural or regional schools as well as students who want to teach science at the secondary level but do not want to specialize in one scientific discipline. Further, NSU has requested a “flexible learning BSEd in Secondary Education” that lists the BSEd Science Education as a specialization as a part of this new initiative. This helps provide another pathway to science education completion and teacher certification.

It is not anticipated that adding this comprehensive major will lead to the elimination of the biology education or chemistry education options. Students who begin in the BS Biology or BS Chemistry programs and later decide to pick up education certification will likely opt for the BSEd Biology or BSEd Chemistry if they choose to teach in larger, more urban areas.

19. Narrative Description of the preliminary estimates on annual enrollment in this program by year six Include all students within the program, not just those new to the program.

Expected enrollment and graduation:

First Year Enrollment	5-8
Fourth Year Enrollment	12-15
Graduation (Fourth Year and thereafter)	10-12

Further Explanation:
To calculate the first-year enrollment, we took a percentage of our current BS Biology and BSEd Biology majors as well as our BS Chemistry and BSEd Chemistry majors and anticipated that a minimum of 10% will enroll in this program as either a new major or a converted major from one of these programs, which is in keeping with the amount of Biology and Chemistry majors combined that we graduate each year. To calculate the fourth-year enrollment, we anticipated that the program would serve as a recruiting tool for students to select NSUs BSEd Science Education major, which would then allow for an increase in students entering the program by its fourth year.