

Chadron State College
Proposal to Add a New Field Endorsement
in Science (Grades 7-12) - Natural Science Concentration

1. Descriptive Information

- a. Name of Institution:
Chadron State College
- b. Name of Program:
Physical Sciences
- c. Degrees/credentials to be awarded graduates of the program:
Bachelor of Science – Education – Field Endorsement in Science (Grades 7-12) - Natural Sciences Concentration
- d. Other programs offered in this field by the institution:
 - Bachelor of Science – Education – Field Endorsement in Science (Grades 7-12)
 - Biology Concentration
 - Chemistry Concentration
 - Earth and Space Science Concentration
 - Bachelor of Science - Education - Subject Endorsement in Biology (Grades 7-12)
 - Bachelor of Science - Education - Subject Endorsement in Chemistry (Grades 7-12)
 - Bachelor of Science – Education - Subject Endorsement in Earth and Space Science (Grades 7-12)
 - Bachelor of Science -Education – Middle Level Education Academic Area in Sciences (Grades 5-9)
- e. CIP code:
13.1316
- f. Administrative units for the program:
School of Business, Mathematics, and Natural Sciences
Department of Mathematical and Natural Sciences
- g. Proposed delivery site(s) and type(s) of delivery if applicable:
Chadron State College Campus in an online and/or blended format
- h. Proposed date (term/year) the program will be initiated:
Fall 2022
- i. Description, including credit hours and other requirements (program of study) and purpose of the proposed program

The proposed Natural Science concentration will allow fully online students to complete the Field Endorsement in Science, which is a degree pathway that has been highly requested by both area School Districts and prospective students. The new concentration is necessary to provide courses

in an online format that will still adequately cover all material the students will need to be prepared to teach any science course for grades 7-12.

The Nebraska Department of Education (NDE) Rule 24 requires that the Field Endorsement in Science for grades 7-12 includes “a minimum of forty-eight (48) semester hours of laboratory-based courses with a minimum of two (2) laboratory-based courses in each of the four disciplines in the sciences (biology, chemistry, Earth and space, and physics.)

The Nebraska State College System Board Policy 4140 states that “the number of credit hours required to complete a field endorsement with fewer than fifty (50) minimum credit hours established, or a subject endorsement, shall not exceed the minimum credit hours required by NDE by more than twenty percent (20%).” Therefore, the maximum credit hours possible for the Field Endorsement in Science is fifty-seven (57) credit hours. The new concentration is within the acceptable number of hours, at a maximum of forty-nine (49) credits.

This concentration will require the same core requirements already included in the Bachelor of Science – Education – Field Endorsement in Science (Grades 7-12) with concentrations in Biology, Chemistry, or Earth and Space Science. These courses are shown below (see Table 1) and account for 36-37 hours of course work. Three new courses will be added (see Table 2) to provide an overview of upper-level chemistry.

Table 1 – Core Program Requirements (Already in the Catalog)

Course #	Title	Credits
BIOL 138/138L	General Biology Botany with Laboratory	4
BIOL 139/139L	General Biology Zoology with Laboratory	4
CHEM 131/131L	College Chemistry I with Laboratory	4
CHEM 132/132L	College Chemistry II with Laboratory	4
GEOS 231/231L	Physical Geology with Laboratory	4
GEOS 234/234L	Earth System History with Laboratory	4
PHYS 151/151L	College Physics I with Laboratory	4
PHYS 152/152L	College Physics II with Laboratory	4
CHEM/GEOS 310	Capstone I: Research Seminar	1
BIOL/CHEM/GEOS/PHYS 320	Supervised Study in Lab and Field Methods	1-2
CHEM/GEOS 401	Capstone II: Senior Research	1
CHEM/GEOS 410	Capstone III: Senior Research/Thesis	1
Total		36-37

Table 2 – Natural Science Concentration Course Requirements (New Addition to the Catalog)

Course #	Title	Credits
CHEM 313/313L	Quantitative, Organic, Biological Chemistry for Educators with Laboratory	4
BIOL 312/312L	Biology for Educators with Laboratory	4
GEOS 312/312L	Planetary Geology for Educators with Laboratory	4
Total		12

Descriptions for New Courses:

CHEM 313/313L Quantitative, Organic, Biological Chemistry for Educators with Lab (4 cr)
This course will examine basic principles in quantitative, organic, and biochemistry with the aim of learning how to teach these subjects in a high school classroom. Lesson planning, activity development, scientific literacy, critical thinking skills, and active learning will be incorporated in the class. Prerequisites: CHEM 131/131L and CHEM 132/132L; Corequisite: CHEM 312L

BIOL 312/312L – Biology for Educators with Lab (4 cr)
This course will examine basic principles in cell biology, genetics, anatomy and physiology, microbiology, and ecology with the aim of learning how to teach these subjects in a high school classroom. Lesson planning, activity development, scientific literacy, critical thinking skills, active learning, inquiry-based learning and brain-based learning will all be incorporated in the class. Prerequisites: BIOL 101/101L and BIOL 102/102L; Corequisite: BIOL 312L

GEOS 312/312L – Planetary Geology for Educators with Lab (4 cr)
This course will provide an overview of planetary geology, which will include a discussion on the Solar System, our understanding of the physical compositions of other planetary bodies, a look at the Earth and its unique atmosphere, the atmospheres of other planets in our system, and small bodies present in the Solar System. Students will learn about the geological techniques employed to learn about other planets and moons as well as the technology used to investigate space. Concurrent enrollment in GEOS 312L required.

2. Centrality to Role and Mission

Chadron State College's Mission is to deliver experiences that foster knowledgeable and engaged leaders and citizens to enrich the High Plains region and beyond. The addition of this concentration will fulfill a need in the High Plains region and beyond. There is currently a shortage of endorsed science teachers within the High Plains region, which is discussed in the Evidence of Need and Demand section (Number 3). Many students interested in this endorsement are currently employed in positions at schools across Nebraska, South Dakota, and Colorado, making it difficult for them to attend classes at a College Campus.

This new concentration will allow students to complete their endorsement in Science in a fully online format and maintain their current residence and employment. Therefore, CSC will be able to deliver a high quality, unique experience that will create knowledgeable, engaged leaders for the service region of Chadron State College. Additionally, these students will be able to provide quality Science education to 7-12 students, which are the leaders of tomorrow.

3. Evidence of Need and Demand

According to the [U.S. Department of Education Office of Postsecondary Education Teacher Shortage Area Nationwide Listing](#), **Science** has been listed as a shortage area among a significant majority of our states on a consistent basis. Additionally, Nebraska Department of Education reports, through their [Teacher Shortage Survey](#), that of the top 10 unfilled positions by endorsement area, several are the same for districts and systems – Language Arts, World Language, Mathematics, Career Education Areas, Music/Instrumental/Vocal, School Counselor, and **Science**. Of greater concern is the fact that of the 17 endorsement shortage areas, six have been designated shortage areas each year for the last

15 years: Language Arts, Math, **Science**, Special Education, Speech Language Pathology, and World Language.

This concern over the shortage of science teachers is similarly reflected in many other states including two that CSC serves heavily, [South Dakota](#) and [Colorado](#). Faced with shortages, schools have limited options that are less than ideal for the education of students, including hiring a teacher not certified in science, increasing class sizes, attempting distance learning, eliminating or reducing the program or courses, or leaving the position vacant. Many schools have individuals in their communities that would be interested in pursuing their science degree, including those they have hired for the position that are not endorsed in science, but due to distance from campuses or employment constraints they cannot physically attend a college campus to complete their coursework to earn their science endorsement. Offering an online pathway to science certification in Nebraska will provide a critical support to our state and regional schools for the purpose of improving the education of our students.

4. Adequacy of Resources

a. Faculty and Staff Resources

Current CSC faculty members have the necessary qualifications and expertise to teach the content required for all courses included in this degree, and there is availability of seats in the existing core courses required for this program to accommodate additional students who select this program. In an effort to ensure that the three new courses can be offered without an increase in load to current faculty, the following course rotation and offerings will be implemented:

- Due to the current overload of Chemistry faculty at CSC, CHEM 313/313L will be offered as an online summer course, which does not require the addition of FTE. The cost of paying a faculty member the summer stipend will be covered by the tuition generated by the course enrollment.
- In Geoscience, a current 6 credit hour FYI offering has been replaced with a 3 credit hour FYI. This will allow current faculty to teach GEOS 312/312L without the addition of FTE. Additionally, this new course may also be offered as a summer course should interest and need exist.
- In Biology, the curriculum and course offerings were recently updated. These updates will allow rotation of remaining course offerings to allow current faculty to teach BIOL 312/312L without the addition of FTE. Additionally, this new course may also be offered as a summer course should interest and need exist.

b. Physical Facilities

Current facilities and online learning management systems are appropriate to use for this proposed concentration.

c. Instructional Equipment and Informational Resources

No additional instructional equipment or informational resources are needed at this time.

d. Budget Projections

The predominant expenses associated with offering this program fall to instructional costs. However, as described above in the Faculty section, no additional sections of existing courses will be needed at this time, and the three new courses will either be included in faculty loads or offered during the summer, with the assurance that tuition generated will cover the costs of instruction. Therefore, no additional costs are expected that will not be covered through the new tuition generated by the program.

5. Avoidance of Unnecessary Duplication

The current concentrations in Biology, Chemistry, and Earth and Space Science require laboratory-based courses that cannot be taught safely and effectively in an online learning environment. The new concentration will provide high quality content with safe at-home laboratory experiences that will prepare our students to be Grades 7-12 educators. This degree program is not currently offered in an online format at any Higher Education Institution in the State of Nebraska.

6. Consistency with the Comprehensive Statewide Plan for Postsecondary Education

The CCPE Comprehensive Statewide Plan for Postsecondary Education states:

- The primary focus of Chadron State College's educational programs is high quality, comprehensive undergraduate programs leading to baccalaureate degrees in arts and sciences, business, and teacher education, all of which are enhanced by a coherent general education program.
- Chadron State College's new baccalaureate degree programs will reflect the needs of its service area and the priorities of the State College Board of Trustees.

Fully endorsed secondary science educators is currently an area of high demand. The addition of this new concentration directly aligns with the Comprehensive Statewide Plan for Postsecondary Education as it provides a high quality comprehensive undergraduate program leading to a baccalaureate degree in teacher education with a science endorsement. Additionally, this new concentration is filling a need of the CSC service area, which was previously addressed under the Evidence of Need and Demand section (Number 3).