BOARD OF TRUSTEES OF THE NEBRASKA STATE COLLEGES

ITEMS FOR DISCUSSION AND ACTION\ACADEMIC AND PERSONNEL

ACTION: **Approval Proposal for Data Analytics Minor for Chadron State College**

Per Board Policy 4200, which requires all new academic programs to be submitted to the Board for approval, Chadron State seeks approval to add a Minor in Data Analytics, beginning Fall 2022.

The System Office and Chadron State College recommend approval of the Proposal for Data Analytics Minor for Chadron State College.

ATTACHMENTS:

- CSC Data Analytics Minor Proposal - Jan 2022 FINAL (PDF)

Chadron State College
Proposal to Add a New Data Analytics Minor
To Math

1. Descriptive Information

   a. Name of Institution:
      Chadron State College

   b. Name of Program:
      Data Analytics

   c. Degrees/credentials to be awarded graduates of the program:
      Minor in Data Analytics

   d. Other programs offered in this field by the institution:
      Bachelor of Science in Math

   e. CIP code:
      30.7101

   f. Administrative units for the program:
      School of Business, Mathematics, and Science
      Department of Mathematical and Natural Sciences

   g. Proposed delivery site(s) and type(s) of delivery if applicable:
      Online

   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

      According to data from the US Bureau of Labor, between 2019 and 2029, the 11th fastest growing job is data scientists with a growth of 31% and a median salary of $98,000. This minor was developed with input from one of the leaders in the Big Data solutions world. With many Fortune 100 companies as clients, the main focus of this minor is to teach students the hard and soft skills needed to break into this rapidly growing field.

      The curriculum starts with the assumption that the student has limited to no experience with programming. By setting the foundation properly with an eye toward what employers want and providing experience in highly sought-after fields such as machine learning and business intelligence, students who complete this minor are setting

themselves up to provide an essential skillset for a multitude of industries or employers where they might be employed.

This minor consists of seven courses, each three (3) credit hours, for a total of twenty-one (21) credit hours. MATH 200 and MATH 201 each have calculus as a prerequisite. Each course beyond the proposed MATH 201 has a prerequisite of the course before it. MATH 426 and MATH 439 bring in additional components of programming (linear and parametric, found in MATH 426) as well as theoretical mathematics as it pertains to statistics (from MATH 439). Students, upon completion of this minor, will have the knowledge and skills to pursue positions in the programming marketplace, data analytics (including aspects of sports analytics), and other statistics-related occupations.

Data Analytics Minor - Course Requirements:

MATH 200	Introduction to Data Analytics*	3 cr
MATH 201	Introduction to Programmatic Data*	3 cr
MATH 202	Database Structures*	3 cr
MATH 301	Data Life Cycle and Application Development*	3 cr
MATH 302	Applied Big Data*	3 cr
MATH 426	Operations Research	3 cr
MATH 439	Theory of Statistics	3 cr

Descriptions for New Courses*:

MATH 200 Introduction to Data Analytics (3 cr)
Introduction to statistical programming in R and its applications. Students will become familiar with the process, techniques, and goals of exploratory data analysis. Students will be able to create, assess, debug code effectively, and interpret their findings in an effective manner.

MATH 201 Introduction to Programmatic Data (3 cr)
Introduction to programming: a holistic approach to learning how to code with a lens toward Big Data principles. Topics include but are not limited to Datatypes, Immutables, Functions, Packages, Loops, Recursion, and an introduction to object oriented programming (OOP)

MATH 202 Database Structures (3 cr)
Principles of the RDBMS, DBMS, Structured Query Language (SQL), MySQL, NoSQL, JSON, Remote Database Access, and API Requests

MATH 301 Data Life Cycle and Application Development (3 cr)
Principles of the Data Life Cycle and Management, Applying DLM principles to a real world scenario and data situations, Applying programming principles to learning additional languages

MATH 302 Applied Big Data (3 cr)
Machine learning, simple and linear regression, principal component analysis, neuro-linguistic programming, visualizations, and additional topics relevant to the field of "Big Data" – analysis and applications

2. Centrality to Role and Mission

This minor will help to fulfill the need of computer programmers who are up-to-date with the latest and most useful programming knowledge in the workplace. In adhering to the mission of Chadron State College, this minor would deliver experiences that foster knowledgeable and engaged leaders in the area of computer programming that would address a need for individuals with data analytics expertise. This minor will also address the CSC 2019-2023 Master Academic Plan (MAP) in the priorities of People, Purpose, and Place.

Completers of this minor will be able to engage with various constituents in the panhandle to improve efficiency in their businesses or operations. For example, a cattle operation in the Panhandle employs four data analysts who help in providing strategies for improved production and operation. Since this minor would provide a new and innovative opportunity to students, the learning and growth of these students addresses the Purpose priority. Lastly, this minor would enable students to develop relationships across the region, promoting connections between the college and many other constituencies.

3. Evidence of Need and Demand

It has been nearly twenty (20) years since Chadron State College has had a programming course offered. This area has evolved tremendously over that time, so the implementation of this minor into the curriculum will provide a solid foundation for students to pursue jobs in this area, an area with high demand and higher salaries.

According to the Bureau of Labor Statistics, https://www.bls.gov/ooh/math/operations-research-analysts.htm, employment of data analysts is projected to grow twenty-five percent (25%) from 2020 to 2030, much faster than the average for all occupations.

4. Adequacy of Resources

a. Faculty and Staff Resources:

All of the courses for this minor will be offered online, so Sakai support will be needed. Tenured faculty members will serve as instructors for existing courses, with uniquely qualified adjunct faculty initially serving as the instructor for each of the new courses. This will allow the College to evaluate the interest and potential growth in this curricular area and inform future faculty positions. Offering this minor will have no initial impact on current full-time faculty load/assignments.

b. Physical Facilities:

Since each of the courses for this minor will be offered online, no physical facilities will be needed.

c. Instructional Equipment and Informational Resources:

The current instructional equipment and informational resources available on campus are adequate to service this new minor.

d. Budget Projections:

Costs are approximately fifteen (15) hours of adjunct salary per academic year to add the new courses to the course schedule, which at $850 per credit computes to **$12,750 per year of instructional expenses**. Five (5) of the seven (7) courses in this minor will be offered every year. MATH 426 and MATH 439 will be offered alternately, every other year. With sole use of adjunct faculty, costs for first five years of offering the minor would equal **$63,750**.

For existing students who add this minor to their selected program(s) of study, no new revenue is generated, as students completing degrees will replace elective coursework with the courses to complete the minor and meet the one-hundred-twenty (120) credit degree requirement. However, the expectation is that the availability of this minor will positively impact student recruitment for CSC's undergraduate Math degree program, which is fully available online.

Using a very conservative recruitment estimation of three (3) new students per year who would not have otherwise selected to attend CSC without this minor, the estimated revenue for the first five years would be **$376,740**, which is outlined in the table below. This assumes each newly recruited student completes 30 credits per year, at the current online tuition rate of $299 per credit ($8970 per student).

TABLE 2: REVENUE SOURCES FOR PROJECTED EXPENSES - NEW INSTRUCTIONAL PROGRAM

	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Students in Program	3	6	9	12	12	
Total revenue	**$26,910**	**$53,820**	**$80,730**	**$107,640**	**$107,640**	**$376,740**

5. Avoidance of Unnecessary Duplication:

   After reviewing both state and regional constituencies, there are no other programs comparable to this minor.

6. Consistency with the Comprehensive Statewide Plan for Postsecondary Education

   This undergraduate minor addresses the Coordinating Commission's goals for meeting the needs of the students and meeting the needs of the state. This will also help provide an additional avenue for students with an interest in another academic area to complete this minor to make them more marketable. Likewise, this minor would be one of the first like it in the state colleges of Nebraska. Students will benefit from being able to focus their study in data analytics, where employment growth is predicted to grow twenty-five percent (25%) over the next decade, much faster than the average for all occupations. In addition, graduates with this minor would greatly add value to rural communities in the panhandle and the region.