

Chadron State College
Proposal to Add an Undergraduate Certificate
in Unmanned Aircraft Systems for Remote Sensing (UASRS)
to the Rangeland Management Major

1. Descriptive Information

- a. Name of Institution
Chadron State College
- b. Name of Program
Unmanned Aircraft Systems for Remote Sensing (undergraduate certificate)
Major: Rangeland Management
- c. Degrees/credentials to be awarded graduates of the program
Undergraduate Certificate
- d. Other programs offered in this field by the institution
No other similar program offered
- e. CIP code
36.0207
- f. Administrative units for the program
School of Professional Studies and Applied Sciences
Department of HPER, FCS, Range and MSL
- g. Proposed delivery site(s) and type(s) of delivery if applicable
Offered at Chadron State College campus, with AGRI 211 and AGRI 311 being offered online and AGRI 212 and AGRI 336 being offered in a face-to-face format
- h. Proposed date (term/year) the program will be initiated
Initial offering to begin fall 2021
- i. Description, including credit hours and other requirements (program of study) and purpose of the proposed program

This certification will prepare student to operate sUAS systems for a variety of agricultural missions and will address a growing need in the areas of agriculture, justice studies, and business.

Unmanned Aircraft Systems for Remote Sensing Certificate – Rangeland Management Major

Course Prefix	Course Number	Course Title	Course Credits
AGRI	211	Introduction to Unmanned Aerial Systems	3
AGRI	212	THE FAA Small, Unmanned Aircraft *(UAS) License Test	3
AGRI	311	Agriculture and Range Management UAS Applications	3
AGRI	336	UAS Training Laboratory	3
		Total	12

New Courses:

AGRI 211 INTRODUCTION TO UNMANNED AERIAL SYSTEMS (3 cr)

This course introduces the student to remote sensing platforms for the carriage of sensors for gathering data to support a broad range of agriculture and range management missions. These platforms will include satellites, fixed-wing aircraft, rotary-wing aircraft (helicopters and multi-copters), and hybrid aircraft. Finally, the technology associated with multi-copters will be addressed.

Prerequisites: None

AGRI 212 THE FAA SMALL UNMANNED AIRCRAFT (sUAS) LICENSE TEST (3 cr)

This course is an introduction the Federal Aviation Administration (FAA) restrictions covering operation of sUAS (Code of Federal Regulations (CFR) Part 107), and Nebraska laws governing sUAS operation. In addition, the course will prepare the student to take and pass the FAA sUAS Certification Test. *Prerequisites: AGRI 211*

AGRI 311 AGRICULTURE & RANGE MANAGEMENT UAS APPLICATIONS (3 cr)

This course introduces the student to the fifteen most common UAS missions associated with agriculture and range management, and the purpose of each mission and the desired outcomes of each mission. The student will become knowledgeable of the sensors needed to gather data for each mission. *Prerequisite: AGRI 212*

AGRI 336 sUAS TRAINING LABORATORY (3 cr)

In this course, the student will develop a proficiency in the basic and safe operation of a multi-copter drone. In addition, a commercial-grade drone, its sensors and software that are specific to the agriculture and range management industry will be introduced. *Prerequisite: AGRI 311*

2. Centrality to Role and Mission

This program will meet the 2019-23 Master Academic Plan addressing two of the focus areas (People and Place) of the MAP. The UASRS will provide opportunities for the residents of the panhandle to become licensed unmanned aircraft system (UAS) operators who can utilize the skill to fulfill personal or professional goals. This license will allow individuals to expand opportunities in ranching, as well as positively impact a number of other careers.

3. Evidence of Need and Demand

Unmanned aircraft systems provide new and needed technology that directly benefit farmers and ranchers across the state. These systems are being utilized by farmers to assist in precision agriculture where they can accurately track inputs and yields. With the right configuration they can survey pastures, map plant health, check weather damage, as well as monitor irrigation and cattle watering stations. Thermal cameras allow ranchers to spot cows under tree canopies. Offering a program that allows individuals to obtain the knowledge and skills necessary to be licensed to run these systems would be of clear benefit.

In addition to uses in agriculture, the Aircraft Owners and Pilots Association reported that the "FAA survey results on the types of commercial operations being undertaken are consistent with other data collected by private analysts: About one in five operations conducted under Part 107 (unmanned aircraft) are flown for filming and entertainment (including live event coverage), and a similar number fall into the research, training, and education category. Utility and industrial uses across the

electric and petroleum energy sectors have grown in number to represent about 16 percent of all Part 107 missions; real estate (13 percent) and construction industry applications (8 percent) are also leading use cases.”

FAA expects remote pilots will outnumber instrument-rated pilots (including private, commercial, and airline transport pilot certificate holders) by 2022 or 2023. RPs are set to experience tremendous growth following the growth trends of the non-model sUAS sector. Non-model activities may require almost 350,000 RPs in 5 years, a three-fold increase, providing tremendous opportunities for growth in employment associated with commercial activities of UAS. Potential for RPs may enhance even more if larger UAS are used in commercial activities and urban air mobility becomes a reality in the near future.”

4. Adequacy of Resources

a. Faculty and Staff Resources

These courses would be taught by adjunct faculty who possess the certification and experience necessary for instruction. AGRI 211 and 311 will be offered online and AGRI 212 and 336 will be offered in a face-to-face format. Each course will be offered once a year in an 8-week session. AGRI 211 and 212 will be offered in the fall and AGRI 311 and 336 will be offered in the spring.

These courses will be taught using adjunct instructors. The instructional rate for each course would be \$850.00 per credit hour, which is the established rate for adjunct instruction. See attached expenses and revenue tables for full details.

b. Physical Facilities

The program will utilize the current locations of the courses currently being offered; no additional physical facilities or renovations will be required.

c. Instructional Equipment and Informational Resources

Initial new equipment (unmanned systems) will be required and will cost about \$30,000 for the implementation of the program. An additional \$10,000 every other year will be required for maintenance and equipment upgrades. Current Library holdings are appropriate.

d. Budget Projections

Budget projections are based upon a total of twelve students enrolling in the coursework each year and completing all four courses. These students are expected to be a combination of current degree-seeking students who wish to add the certificate to their programs, and non-degree seeking students from the area who wish to solely complete the certificate and seek the FAA license.

As the Expense Table reflects, the primary costs associated with offering this Certificate are the costs of instruction, which are projected at \$10,200 each year for adjunct instruction of 12 credits of coursework, and the initial and ongoing costs of equipment. Overall expenses for this program over the first five years is projected to be **\$110,000**.

As the Revenue Table reflects, the primary revenue is generated from the tuition and fees that students will pay to enroll in the courses required for this new Certificate. The annual tuition and

fees generated by the two on-campus courses is projected to be \$1544.16 per student, and the annual tuition generated by the two online courses is projected to be \$ 1794.00 per student. With enrollments for each course tentatively set at 12, total annual revenue is projected to be \$40,057.92. Total revenue for the program for the first five years is projected to be **\$200,289.60**.

5. Avoidance of Unnecessary Duplication

While no other institutions appear to offer an undergraduate certificate in this area, similar degree programs offered include the following:

- University of Nebraska Omaha has a B.S. in Aviation-Unmanned Aircraft Systems.
- Surrounding states have several degree programs (undergraduate and graduate), including the University of North Dakota, South Dakota State University, and Kansas State University.

The offering of a Certificate that includes coursework aligned to the current curriculum for taking the FAA license exam will be an affordable option for individuals who wish to obtain the knowledge and skills needed to fly unmanned aircraft. The certificate is very viable, as it can be added to an array of majors.

6. Consistency with the Comprehensive Statewide Plan for Postsecondary Education

Adding this certificate to the Rangeland Management degree will address the Coordinating Commission's goals for meeting the needs of the students and meeting the needs of the state. Students will benefit from the focus on student and workforce needs and the state will benefit from the building and sustaining of a knowledgeable and skill workforce in the panhandle.

Additionally, as stated above, this new program will address the 2019-23 Master Academic Plan in preparing students in the Panhandle to address an emerging skill set for ranchers and farmers. In addition, it will provide graduating students from business, criminal justice, and journalism added skills that will allow them to be more competitive in their fields. This program will be the only one in the CSC geographic area and will provide current students, as well as residents within the panhandle, the opportunity to complete the certificate in preparation for taking the FAA sUAS License test.

TABLE 1: PROJECTED EXPENSES - NEW INSTRUCTIONAL PROGRAM

Personnel	(FY19/20) Year 1		(FY20/21) Year 2		(FY21/22) Year 3		(FY22/23) Year 4		(FY23/24) Year 5		Total	
	FTE	Cost	FTE	Cost								
Faculty ¹ (Adjunct)	.5	\$10,200	.5	\$10,200	.5	\$10,200	.5	\$10,200	.5	\$10,200	2.5	\$60,000
Professional	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
Graduate assistants	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
Support staff	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
Subtotal	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
Operating												
General Operating		\$0		\$0		\$0		\$0		\$0		\$0
Equipment ²		\$30,000		\$0		\$10,000		\$0		\$10,000		\$50,000
New or renovated space		\$0		\$0		\$0		\$0		\$0		\$0
Library/Information Resources		\$0		\$0		\$0		\$0		\$0		\$0
Other ⁷												\$0
Subtotal		\$0		\$0		\$0		\$0		\$0		\$50,000
Total Expenses		\$40,200		\$10,200		\$20,200		\$10,200		\$20,200		\$110,000

¹ Each of the four courses will be taught each year by adjunct faculty, and it is expected that one section of each course will meet the enrollments needs. Using the rate of \$850 per credit, the total for twelve (12) credits of coursework equates to \$10,200 per year. FTE is .5, as a full teaching load would be 24 credits per year.

² An initial cost of \$30,000 is needed to purchase the equipment to offer the program coursework. After that, a cost of \$10,000 is needed every other year for upgrades and maintenance.

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

	FY(21/22) Year 1	(FY22/23) Year 2	(FY23/24) Year 3	(FY24/25) Year 4	(FY25/26) Year 5	Total
Reallocation of Existing Funds	\$0	0	0	0	0	\$0
Required New Public Funds	\$0	0	0	0	0	\$0
1. State Funds	\$0	0	0	0	0	\$0
2. Local Tax Funds (community colleges)	\$0	0	0	0	0	\$0
Tuition and Fees ¹	\$40,057.92	\$40,057.92	\$40,057.92	\$40,057.92	\$40,057.92	\$200,289.60
Other Funding	\$0	\$0	\$0	\$0	\$0	\$0
Total Revenue	\$40,057.92	\$40,057.92	\$40,057.92	\$40,057.92	\$40,057.92	\$200,289.60

¹ Tuition is calculated based using 2020-2021 tuition rates, and on a total of twelve students completing 6 credits of online coursework (AGRI 211 and AGRI 311) and 6 credits of on-campus coursework (AGRI 212 and AGRI 336) each year. Online tuition is \$299 per credit and includes all fees. On campus tuition is \$186 per credit, and on campus fees are \$71.36 per credit.

- 6 credits of online coursework = \$1794
- 6 credits of on campus coursework = \$1544.16
- Total tuition and fees per student = \$3338.16