

Course Prefix/Number/Title: UAS 210 – UAS Applications in Agriculture

Number of Credits: 2

Course Description: This course explores the use of small Unmanned Aircraft Systems (sUAS) in precision agriculture. Crop monitoring, crop scouting, yield assessments, weather damage, and precision crop spraying will be investigated. sUAS software and agricultural image processing will also be examined. Legal and environmental considerations will be reviewed as it pertains to safe and ethical use of sUAS in precision agriculture.

Pre-/Co-requisites: None

Course Objectives: Upon successful completion of this course students will be able to:

1. Understand the current agricultural applications and uses of sUAS.
2. Describe the differences in the types and designs of various unmanned systems.
3. Understand the regulations and restrictions on sUAS ownerships and operations.
4. Analyze the strategy and economics of incorporating sUAS into various industries.

Instructor: Michelle Cauley and Linda Burbidge, PhD

Office: Molberg 20 & Molberg 27

Office Hours: MW 2:00pm – 3:00pm & Tu Th 10:00am – 11:00am

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Lecture Schedule: Online, 2nd 8 weeks

Textbook(s): Material will be provided throughout the semester.

Course Requirements: This is an introductory course. Students are expected to read the materials and come to class prepared to listen and discuss during lectures. Points will come from homework, professionalism, exam, and a course project. The breakdown will be as follows:

Requirement	Percentage
Homework / Quizzes	30%
Professionalism	10%
Course Presentation	30%
Exam	30%
Total	100%

Homework / Quizzes: There will be a combination of assigned readings, end of the week quizzes, and traditional assignments. Homework and quizzes must be submitted on time to receive full credit. Late homework and quizzes will be accepted with a deduction of 20%.

Professionalism: In preparation for the real world, your class grade will be dependent upon professionalism. This means you will be graded on a combination of attendance at weekly check-ins, engagement in learning, online discussion work, and meeting deadlines.

Course Presentations: Each student will put together a presentation on the type of equipment and software best suited for their future plans in UAS. More details forthcoming.

Final Exams: There will be one exam over the material covered during the 8 week period. It will be worth 90 points. The final exam will be administered on Blackboard.

Grading and Evaluation:

Total Point Percentage	Letter Grade
90% and ↑	A
80% - 89.99%	B
70% - 79.99%	C
60% - 69.99%	D
59.99% and ↓	F

Tentative Course Outline:

Week of:	Topic(s) Covered / Assessments Given
March 11 – 15	Welcome Discussion / Syllabus Quiz Overview of UAS in Ag and Precision Ag
March 18 – 22	History of UAS in Agriculture / Weekly Quiz Explore “Final Project” Options and Ideas
March 25 – 29	Drone Designs / Equipment and Payload Weekly Quiz and Payload Homework
April 1 – 5	Sensors Weekly Quiz and Homework
April 8-12	Safety, Certifications, and Software Weekly Quiz, Guest Speakers and Discussion
April 15 – 19	Cost Effectiveness / Scope Group Discussion and Weekly Quiz
April 22 – 26	Mission Planning Mission Plan Homework <i>Course Project Presentations</i>
April 29 – May 3	Catch up / Review / <i>Final Exam</i>

General Education Competency/Learning Outcome(s) OR CTE Competency/Department Learning Outcome(s): This course meets the CTE department learning outcome of employing industry-specific skills in preparation for workplace readiness by:

1. Demonstrate problem-solving aptitude.

- a. Identify appropriate equipment to use in the field.
 - b. Determine weights and payloads appropriate for different UAS.
2. Expand critical thinking competence.
 - a. Assess weather, weight, and other risk factors to ensure safe flight.
 - b. Understand the how the scope and scale of your mission affects specific choices about equipment needed to complete each mission.

Relationship to Campus Focus: This course addresses the campus theme of Nature, Tehnology, and Beyond by incorporating the latest procedures, technologies and innovative designs of unmanned aircraft systems and their operations.

Classroom Policies: Be polite and respectful of the instructor, other students, and any guests in our class.

Student Email Policy: Dakota College at Bottineau is increasingly dependent upon email as an official form of communication. A student's campus-assigned email address will be the only one recognized by the Campus for official mailings. The liability for missing or not acting upon important information conveyed via campus email rests with the student.

Academic Integrity: According to the DCB Student Handbook, students are responsible for submitting their own work. Students who cooperate on oral or written examinations or work without authorization share the responsibility for violation of academic principles, and the students are subject to disciplinary action even when one of the students is not enrolled in the course where the violation occurred. The Code detailed in the Academic Honesty/Dishonesty section of the Student Handbook will serve as the guideline for cases where cheating, plagiarism or other academic improprieties have occurred.

A note on the use of Artificial Intelligence (AI): Understanding how and when to use generative AI tools is going to be an important skill for your chosen career path. To preserve the integrity of the course, students are not permitted to submit text that is generated by artificial intelligence (AI) systems for any classwork or assessments. It is a violation of the DCB student policy on plagiarism to misrepresent work that you submit from an AI generator as your own to your instructor. This includes using AI to generate answers to assignments, exams, or projects, or using AI to complete any other course-related tasks. Using AI in this way undermines your ability to develop critical thinking, writing, or research skills that are essential for this course and your academic success. Students may use AI as part of their research and preparation for assignments, or as a text editor, but text that is submitted must be written by the student. For example, students may use AI to generate ideas, questions, or summaries that they then revise, expand, or cite properly. Students should also be aware of the potential benefits and limitations of using AI as a tool for learning and research. AI systems can provide helpful information or suggestions, but they are not always reliable or accurate. Please ask me if you have questions about the appropriate use of AI in this course.

Disabilities or Special Needs: Students with disabilities or special needs (academic or otherwise) are encouraged to contact the instructor and Disability Support Services.

Title IX: Dakota College at Bottineau (DCB) faculty are committed to helping create a safe learning environment for all students and for the College as a whole. Please be aware that all DCB employees (other than those designated as confidential resources such as advocates, counselors, clergy and healthcare providers) are required to report information about such discrimination and harassment to the College Title IX Coordinator. This means that if a student tells a faculty member about a situation of sexual harassment or sexual violence, or other related misconduct, the faculty member must share that information with the College's Title IX Coordinator. Students wishing to speak to a confidential

employee who does not have this reporting responsibility can find a list of resources on the DCB Title IX webpage.