

PAG 115 Introduction to Precision Agriculture Precision Ag. Program

Course Information:

Course Prefix: PAG

Catalog Number: 115

Course Credits: 2

Time and Place: Tuesday and Thursday

9:30AM - 10:20AM, LADD 107

Instructor:

Dr. Xin (Rex) Sun

Email: xin.sun@ndsu.edu

Phone Number: 701-231-5756

Office: LADD 101H

Office Hours: Monday 11:00AM –
12:00 PM

Bulletin Descriptions:

This course is designed to introduce the student to a broader view of the precision agriculture, crop and livestock production in precision agriculture, fundamental concepts of GIS, GPS, sensors, drones, data acquisition and management, Remote sensing. The course is offered in 2 fifty mins lectures per week.

Course Co-requisite:

- MATH 103 College Algebra

Course Objectives:

After successfully completing this course, the students will be able to

1. explain the fundamental concepts of precision agriculture topics which include GIS, GPS, yield monitoring and mapping, remote sensing, data collection and analysis, weather station, sensors, robotics, UAV and robotics in precision agriculture.
2. explain most advanced technologies in precision agriculture area.

Pedagogical Style:

- This is primarily a lecture-discussion class. The first 5-10 min of each lecture will be dedicated to the class discussion of student questions and review of the previous lecture.
- Students should feel free to ask questions at any time during lectures.
- This classroom is a place where you will be treated with respect and individuals of all ages, backgrounds, national origins, religious affiliations, sexual orientations, abilities, and other visible and nonvisible differences are welcome. All members of this class are expected to contribute to a welcoming and inclusive environment for every other member of the class.

Class Text Book:

- *Precision Agriculture Basics (Recommend)*
Authors: D. Kent Shannon, David E. Clay, Newell R. Kitchen
Publisher: American Society of Agronomy, Incorporated, 2018
Amazon: <https://goo.gl/jey2DC>
ISBN: 0891183663, 9780891183662
- *Precision Agriculture (Recommend)*
Author: Terry A. Brase
Publisher: Thomson/Delmar Learning, 2006
Amazon: <https://goo.gl/zzSPFD>
ISBN: 140188105X, 9781401881054

Outcomes:

Students will better understand the basic theory and application topics in precision agriculture. They will learn different topics in precision agriculture which include crop and livestock production, GIS and GPS basics and applications, UAV system, remote sensing and imagery analysis etc.

Syllabi on Web Pages:

The course syllabus, class topic presentations will be available at Blackboard.

Evaluation Procedures and Grading Criteria**Assignment Policy:**

The due dates for homework and projects will be given with the assignments. Late assignments will be accepted with a 10% penalty per NDSU class day. All assignments must be submitted before 5 p.m. to be credited to the day it is received. Late assignments will not be accepted after solutions are posted/handed out/discussed or after 2 NDSU class days from the date they are due.

You are encouraged to work together with others for your homework and lab assignments because that will help you learn. Mentors are also available through our department's mentoring program and NDSU ACE tutoring (https://www.ndsu.edu/studentssuccess/about_ace/). You are also encouraged to see the instructor for assistance during office hour times or any other time as long as I am in my office. Although students are encouraged to work together and assist one another with assignments, all work submitted should be created by that individual. If it is apparent that work has simply been copied from other's work, all students involved will receive 0 points for that assignment.

Grading Policy:

The course work consists of the following five categories: 1) homework 2) unannounced quizzes, 3) oral presentation, 4) midterm exam, and 5) a comprehensive final exam. The oral presentation

requires each student to select one topic in the scope of the class contents and give a 10-minute presentation. The possible points can be earned for all work categories are listed in the table below.

Work category	Possible Points
1. Homework (4 homework, 50 each)	200
2. Quizzes (unannounced, 2 quizzes)	100
3. Oral presentation/Discussion	100
4. Midterm exam	100
5. Final exam (comprehensive)	200
Total	700

Each student's final letter grade will be determined by the percentage of the total earned points over the total possible points using the following grading scale:

Grading Scale	Grade Percentage of Total Points for the Course
A	90% and above
B	80% through < 90%
C	70% through < 80%
D	60% through < 70%
F	Less than 60%

Attendance and Late Assignments:

Attendance in classes is expected and important. (The term "class" includes class, online class, laboratory, field trips, group exercises, or other activities.) However, there are instances in which students are unable to attend class and in which those absences will be excused. These instances are described in policy 333 (<https://www.ndsu.edu/fileadmin/policy/333.pdf>). Absences not covered by this policy are excusable at the discretion of the instructor. However, class policies regarding class absence are provided below. (Note: NDSU Student Health Service does not provide students with excuses for class absences or tardiness due to illness or injury.)

If you will be missing class for a university club or team event or other excusable reason to be determined by the instructor, you must let the instructor know *before* you miss class. Consideration will be given to those students who have a *valid emergency* (severe illness or a death in the family) as their reason for a late assignment.

"Other excusable reason to be determined by the instructor or presented in policy 333, you must let the instructor known in advance." The course instructor must clearly inform students on the first day of class and in writing in the syllabus of their (1) policy regarding class absence and (2) policy, if any, for making up missed assignments. If class attendance is a component of the course grade, the course instructor must clearly communicate this to the class in writing in the syllabus. See NDSU Policy 333 for faculty and student responsibilities related to attendance, including for university-sponsored activities.

Exam Policy:

Quizzes will not be announced ahead of time and make-up quizzed will be given at appropriate time. As for scheduled midterm and final exams, missed exams will receive 0 points unless missed for a valid justification and the instructor is notified prior to the date and time of the exam. Valid justification is a statement indicating illness, obituary notice (death in family or loved one), or co-curricular activities. For such justified reasons, a make-up exam may be given at a mutually acceptable time or the weight of the missed mid-term exam will be shifted to the final exam. Extracurricular activities, weddings, vacations, hunting and fishing trips, work, dentist's appointments, and undocumented car-related incidents are examples of unacceptable reasons for missing the scheduled dates and times for exams. No participation points or make up quiz will be given under unexcused absence. The instructor reserves the right to determine whether the excuse is legitimate or not. The grades for group design projects may be adjusted individually based on group feedback.

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- Students are expected to attend every class and remain in class for the duration of the session when it is safe to do so in accordance with NDSU guidance regarding COVID19.
- In this course students should participate in the course mostly face-to-face. When needed, students are also able to participate virtually in synchronous or asynchronous discussions and activities and submit assignments virtually.

If you will be missing class for a university club or team event or other excusable reason to be determined by the instructor, you must let the instructor know *before* you miss class. Consideration will be given to those students who have a *valid emergency* (severe illness or a death in the family) as their reason for a late assignment.

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Specify steps to take regarding student illness.

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- If you are unable to attend class at the regularly scheduled time due to illness, contact the instructor for alternate arrangements, including recordings of class sessions and assignments as well as accommodations and extensions as needed.

Additional Resources for Students

- As a member of the NDSU community, resources are available for you should you need help in dealing with adverse reactions to things happening in the world today. A variety of resources are listed below:

For students on campus and remotely (telehealth):

Counseling Services: 701-231-7671; <https://www.ndsu.edu/counseling/>

Disability Services: 701-231-8463; <https://www.ndsu.edu/disabilityservices/>

Student Health Service: 701-231-7331; <https://www.ndsu.edu/studenthealthservice/>

Dean of Students Office: 701-231-7701; <https://www.ndsu.edu/deanofstudents/>

In a crisis or emergency situation:

Call University Police: 701-231-8998

Call 9-1-1

Go to a Hospital Emergency Room

Go to Prairie St. Johns for a Needs Assessment: 701-476-7216 (510 4th St. S.)

Call the FirstLink Help Line: 1-800-273- TALK (8255) or 2-1-1

Call Rape and Abuse Crisis Center: 701-293-7273

Tentative Course Topics and Schedule*:

Week	Topics
1	Introduction to college learning experience
1	High school to college transition/How to be a good college student
2	Introduction to precision agriculture
2	NDSU precision ag program update
3	Guest Speaker: Precision Ag student club
3	Basics of GIS
4	Basics of GPS
4	Data in precision agriculture
5	Mapping in precision agriculture
5	Guest lecture: precision agriculture data
6	Yield monitoring and mapping
6	Remote sensing and imagery
7	Variable rate and soil sampling
7	Field tour #1

8	UAV system in precision agriculture
8	Image analysis in precision agriculture
9	Midterm Exam
9	Field tour #2
10	Guest lecture: UAV applications in precision agriculture
10	UAV Filed data Collection
11	Student presentation 1
11	Student presentation 2
12	Livestock management in precision agriculture
12	Guest lecture: precision livestock production
13	Field tour #3
13	Student presentation 3
14	Student presentation 4
14	Student presentation 5
15	Economics in precision farming
15	Guest lecture
16	Final Examinations

*Except for examination dates, the above course schedule is subject to change

Americans with Disabilities Act for Students with Special Needs:

Any students with disabilities or other special needs, who need special accommodations in this course, are invited to share these concerns or requests with the instructor and contact the Disability Services Office (www.ndsu.edu/disabilityservices) as soon as possible. Assistance is also available from Disability Services in lower level of main library, suite 17 (231-8463). <http://www.ndsu.edu/disabilityservices/>

Veterans and Military Personnel:

Veterans or military personnel with special circumstances or who are activated are encouraged to notify the instructor as early as possible.

Academic Honesty:

All students taking any course in the College of Agriculture, Food Systems, and Natural Resources are under the Honor System (<http://www.ag.ndsu.edu/academics/honor-system-1>). The Honor System is a system that is governed by the students and operates on the premise that most students are honest and work best when their honesty, and the honesty of others, is not in question. It functions to prevent cheating as well as penalize those who are dishonest. It is the responsibility of the students to report any violations of the honor pledge to the instructor, honor commission or the Dean of the College of Agriculture, Food Systems, and Natural Resources. The academic community is operated on the basis of honesty, integrity, and fair play.

NDSU Policy 335: *Code of Academic Responsibility and Conduct applies to cases in which cheating, plagiarism, or other academic misconduct have occurred in an instructional context. Students found guilty of academic misconduct are subject to penalties, up to and possibly including suspension and/or expulsion. Student academic misconduct records are maintained by the Office of Registration and Records. Informational resources about academic honesty for students and instructional staff members can be found at www.ndsu.edu/academichonesty.*

Use of Cell Phones, iPods, MP3 Players, and Other Electronic Devices:

All participants in this class are subject to NDSU University Senate Policy 158: Acceptable use of Electronic Communications Devices (<http://www.ndsu.edu/fileadmin/policy/158.pdf>).

As a courtesy to other students and the instructor, all cell phones, iPods, MP3 players, and other electronic devices except handheld calculators should be turned off or placed in a vibrate-only mode during class time. Initiating phone calls, text message, or other types of messages during class time -including those to friends, family, classmates, coworkers, or supervisors—is unacceptable unless there is a genuine emergency. Examples of emergencies include weather-related school closing announcements; fire, bomb, or other threats to public safety and well-being; and other incidents in which the NDSU system is or could be activated to provide broadcast messages to the NDSU community.

Use of cell phones or other portable electronic devices for communication, transmission, retrieval, or storage of information during the administration of a test or quiz may be considered an incident of **academic dishonesty**. One exception to this policy is the use of handheld calculators for computational purposes. Use of cell phones or similar devices as a calculator during tests and quizzes will not be allowed because it is difficult to distinguish such activity from sending and receiving text messages, which could obviously be interpreted as a form of academic dishonesty.

Dead Week Policy:

The NDSU Dead Week policy is available at <http://www.ndsu.edu/registrar/dates/deadweek/>.

Dates & Deadlines

<https://www.ndsu.edu/registrar/dates/>