

AGRONOMY 370
NO-TILLAGE FARMING
Spring 2020

I. General Information

AGRN 370 (NO-TILL FARM) is a 2 credit hour course that explores environmental benefits from no-tillage crop production, the influence of microclimatic factors on the success of crop plants in no-tillage fields, and management tactics to increase the productivity and environmental benefits of no-tillage farming.

Lecture: MW 3:00-3:50 p.m., Knoblauch 226

Prerequisites: AGRN 176 – Principles of Crop Science.
AGRN 278 – Introduction to Soil Science

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Office Hours: M 12:00-12:50 p.m.; T 10:00-10:50 a.m., W 10:00-10:50 a.m., Th 1:00-1:50 p.m. or by appointment.

Required Texts:

1. Baker CJ Saxton KE Ritchie WR Chamen WCT Reicosky DC Ribeiro MFS Justice SE Hobbs PR (2007) No-tillage Seeding in Conservation Agriculture, 2nd Edition. Food and Agriculture Organization of the United Nations and CABI, Wallingford, OX, United Kingdom. (*PDF downloadable from Western Online*).
2. Brown G (2018) Dirt to Soil. One Family's Journey into Regenerative Agriculture. Chelsea Green, White River Junction, Vermont.
3. Montgomery DR (2012) Dirt: The Erosion of Civilizations. University of California Press, Los Angeles, California.

Reference Texts:

4. Reeder R et al. (2000) Conservation tillage systems and management, MWPS-45, 2nd edition.
5. Coughenour CM Chamala S (2000) Conservation tillage and cropping innovation. Iowa State University Press, Ames, IA.

II. University Policies and Expectations

Student rights and responsibilities: A complete description is available at www.wiu.edu/provost/students.

Disruptive Student Policy: Students who interfere with normal class function or the ability of other students to learn may be asked to leave the class for the day. For repeated offenses, a student may be removed from the course. Details may be found at: <http://www.wiu.edu/vpas/policies/disrupst.php>

Academic Integrity: <http://www.wiu.edu/policies/acintegrity.php> Western Illinois University, like all communities, functions best when its members treat one another with honesty, fairness, respect, and trust. . . It is the student's responsibility to be informed and to abide by all University regulations and policies on Academic Integrity. Plagiarism, cheating, and other forms of academic dishonesty constitute a serious violation of University conduct regulations. Students who engage in dishonesty in any form shall be charged with academic dishonesty. . . Any student, faculty member, or staff person who has witnessed an apparent act of student academic dishonesty, or has information that reasonably leads to the conclusion that such an act has occurred or has been attempted, has an ethical responsibility for

reporting said act(s).

The policy for AGRN 370: Any confirmed act of academic dishonesty (especially plagiarism, cheating, copying another person's assignment or allowing someone to copy yours) will result in the loss of all points associated with that assignment, and may result in an "F" for the course.

Equal Opportunity: <http://www.wiu.edu/policies/affirmact.php> Western Illinois University complies fully with all applicable federal and state nondiscrimination laws, orders, and regulations. The University is committed to providing equal opportunity and an educational and work environment for its students, faculty, and staff that is free from discrimination based on sex, race, color, sexual orientation, gender identity and gender expression, religion, age, marital status, national origin, disability, or veteran status.

Sex-Discrimination and Misconduct: University values, Title IX, and other federal and state laws prohibit sex discrimination, including sexual assault/misconduct, dating/domestic violence, and stalking. If you, or someone you know, has been the victim of any of these offenses, we encourage you to report this to the Title IX Coordinator at 309-298-1977 or anonymously online at: http://www.wiu.edu/equal_opportunity_and_access/request_form/index.php. If you disclose an incident to a faculty member, the faculty member must notify the Title IX Coordinator. The complete Title IX policy is available at: <http://www.wiu.edu/vpas/policies/titleIX.php>

Disabilities: Students with disabilities: In accordance with University values and disability law, students with disabilities may request academic accommodations where there are aspects of a course that result in barriers to inclusion or accurate assessment of achievement. To file an official request for disability-related accommodations, please contact the Disability Resource Center at 309-298-2512, disability@wiu.edu or in 143 Memorial Hall. Please notify the instructor as soon as possible to ensure that this course is accessible to you in a timely manner.

Education Majors: The Illinois State Teaching License requires all education majors to receive a grade of a "C-" or better in this course to meet its requirements.

III. Course Expectations and Policies

1. Live the Golden Rule. Treat others with respect and courtesy in your conversation and actions. Turn off and put away electronic devices (smartwatches, phones, tablet computers, laptop computers, etc.) during the class period unless directed to use them for class activities. Inappropriate use of an electronic device will result in loss of participation points for that day.
2. Show up. Attendance and punctuality is expected. Notify the instructor in advance if you have any reason to miss a class period through the O.A.R.S system (<http://wiu.edu/oars>). A minimum of 24 h notice (email or phone) is required if there is any cause to miss a quiz or exam. If you do miss a class, do not ask the instructor "Did I miss anything important?" It is your responsibility to make arrangements to get the information you missed and to make up any missed assignments.
3. Participate. Be prepared for class discussions by completing readings and engage by taking notes, answering questions, asking questions, and working effectively with other students on activities.
4. Study. You should plan to spend 4 hours outside of class each week to master the material. Reading assignments relating to each lecture will be particularly beneficial.
5. Complete assignments. Assignments not turned in on the assigned date may have 10% of the total potential points deducted for each day after the due date. The instructor will generally return exams and assignments within 1 week.
6. The use of tobacco is prohibited in Knoblauch Hall, nor is it allowed during sessions at the AFL.
7. Students must wear sturdy, close-toed to participate at the AFL. The wearing of long pants is highly recommended.

Two dismissals due to disruptive or unprofessional behavior will result in a permanent disbarment from the course and a final grade of "F" will be assigned.

IV. Course Objectives

Foundational Knowledge

1. Define the causes, types and consequences of soil erosion.
2. Describe the range of practices popularly referenced as “no-tillage.”
3. Describe the economic and environmental benefits of no-tillage.
4. Explain the economic and environmental risks associated with no-tillage.

Application

5. Measure how the physical characteristics of a no-tillage field differ from a tilled field.
6. Develop guidelines to manage soil fertility in no-tillage fields.
7. Identify weed, disease, insect and vertebrate management challenges unique to no-tillage and suggest practices to minimize those risks.

Integration

8. Critique different planter systems for sowing seed in no-tillage fields.
9. Devise practices that complement no-tillage to increase soil health.

Human Dimension

8. Identify characteristics of farmers willing to implement and maintain no-tillage practices.
9. Explain social factors that influence the adoption of new and radical technologies.

Caring

10. Articulate the importance of healthy soils in a sustainable agroecosystem and become a lifelong advocate for practices that improve the quality of soils.

Learning to Learn

11. Interpret data measuring the effects of management practices on soil properties and crop growth.
12. Become familiar with peer review, Extension, and commercial media resources promoting no-tillage farming,

V. Grading

<u>Probable Grade components</u>	<u>Portion</u>
Attendance	10%
Participation	3%
Assignments	30%
Quizzes/Exams	57%

Grading Scale

<u>Percentage</u>	<u>Grade</u>	<u>Percentage</u>	<u>Grade</u>
93.0-100	A	73.0-76.9	C
90.0-92.9	A-	70.0-72.9	C-
87.0-89.9	B+	67.0-69.9	D+
83.0-86.9	B	63.0-66.9	D
80.0-82.9	B-	60.0-62.9	D-
77.0-79.9	C+	<59.9	F

VI. Learning Assessment

Attendance: Attending class is expected and will improve your ability to learn the material and to contribute to the classroom community. Each student will be allowed 2 “vacation” days (for funerals, interviews, etc). More than 2 “vacation” absences will result in the loss of attendance percentage points (2 points per absence). Absence for WIU-sanctioned activities (i.e., team travel, presenting at conferences, etc.) will not count against “vacation” days. Absence due to illness will be evaluated on a

case-by-case basis and will not count against the vacation days. Students who accumulate 7 or more “vacation days” will NOT receive a passing grade.

Participation: Participation means that you engage in class by paying attention, offering comments or asking questions.

Assignments:

1. The major project for the semester will be to interview a farmer who has practiced long-term no-till. You are to learn from them what has worked well, what challenges they have confronted and how they have addressed those challenges, and what aspects of their system they would like to have improved. You will prepare a presentation based on your interview findings that will be presented to the class early in the semester. Near the end of the semester you will prepare a plan with appropriate technologies or practices to address the shortcomings in the system and share it with the class and the farmer.
2. The second major project will be to read portions of *Dirt: The Erosion of Civilizations* and *Dirt to Soil: One Family’s Journey into Regenerative Agriculture*. There will be reading quizzes at Western Online and class discussions on the chapters.
3. There will be occasional quizzes at the beginning of class to assess your understanding of assigned reading for the class period.
4. There will be other assignments associated with lecture topics that will be designed to help you better understand the material and benefit from resources you can use after you graduate from WIU.

Quizzes/Exams:

1. Lecture quizzes: Quizzes will be given approximately every four weeks and will review material covered in the lectures. The quizzes will include multiple choice, true-false, fill in the blank, and short essay questions.
2. Final exam.

VII. Probable Course Calendar

Date	Topic (Location of Lab)	Reading
Jan 13	Lec 1. What is your no-till story?	No-till: the quiet revolution
Jan 15	Lec 2. What is the role of tillage?	Gruver article
Jan 20	<i>Martin Luther King, Jr. holiday. No class</i>	
Jan 22	Lec 3. A brief history of agriculture, tillage and erosion. <i>Lowdermilk 7000 years quiz and discussion.</i>	Lowdermilk Derpsch, Montgomery Ch 3-8
Jan 27	Lec 4. What drives innovation? <i>Montgomery Preface/Ch. 1, Brown Ch 1 quiz and discussion.</i>	Montgomery preface, ch 1, Brown ch. 1
Jan 29	Lec 5 Characteristics of no-tillage innovators. <i>Student reports on different no-tillage innovators.</i>	Chapters from book
Feb 3	Lec 6. Social drivers and no-tillage adoption.)	No-tillage Farmer, EIB 147 Conservation Practice Adoption, Transect surveys
Feb 5	<i>Quiz 1.</i>	
Feb 10	<i>Quiz 1 review.</i> Lec 7. Wind and Water Erosion: Is zero-tillage the solution?	Montgomery 2007
Feb 12	<i>Lincoln's Birthday. No class.</i>	
Feb 17	Lec 8. Regenerative Agriculture and Soil Health. <i>Montgomery Ch. 2 / Brown Ch 7 quiz and discussion.</i>	Montgomery Ch 2, Brown Ch 7, ISU Extension
Feb 19	Lec 9. No-tillage and soil carbon	Olson article
Feb 24	Lec 10. No-tillage and soil biology	
Feb 26	Lec 11. No-tillage and soil structure	
Mar 2	Lec 12. No-tillage and soil water	online
Mar 4	<i>Quiz 2.</i>	
Mar 9-13	<i>Spring Break!</i>	
Mar 16	<i>Review Quiz 2.</i> Lec 13. No-tillage yields and profitability	
Mar 18	Lec 14. Summary of interview findings	
Mar 23	Lec 15. Residue Management	Andy, Yetter
Mar 25	Lec 16. Seed placement	
Mar 30	Lec 17. Nutrient placement	Mark, MonTag
Apr 1	<i>Quiz 3.</i>	
Apr 6	<i>Review Quiz 3.</i> Lec 18. Compaction zones and gypsum	Joel
Apr 8	Lec 19. Nitrogen management for No-till	Joel
Apr 13	Lec 20. pH and nutrient stratification	Joel
Apr 15	Lec 21. Weed management	
Apr 20	Lec 22. Insect, disease and vertebrate management	
Apr 22	Lec 23. Enhancing no-till <i>Montgomery Ch. 10, Brown Ch. 2-4 quiz and discussion</i>	Montgomery Ch. 10, Brown Ch 2-4
Apr 27	Lec 24. No-till summary: risks, benefits and challenges	Baker Ch 1-3
Apr 29	<i>Quiz 4.</i>	
May 6	<i>Review Quiz 4. Final Exam, 3-4:50</i>	