

Agricultural Systems Management 323: Post-Harvest Technology
Fall 2024 Syllabus
Credit: 3; Class #23546

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Teaching Assistants – Laboratory: Niloy Chandra Sarker, niloy.sarker@ndsu.edu, 701-231-8602
Learning: Tuesday and Thursday, 9:30 –10:45 a.m., Peltier Complex Rm 1200
Student Hours: Tuesday 11 a.m. to 12:00 p.m. Peltier Rm 3108D

This course is for students interested in managing or operating grain storage and handling systems, understanding how storage and handling affect grain quality, and understanding factors that affect system performance and efficiency. This course should be useful in your career if you work with a farm, elevator, or processor that handles and manages grain.

Prerequisites: Math 103 or 104 or higher.

Course Description: Principles and management of crop and feed storage, handling, drying, processing, and crop/feed systems siting, planning, and development.

Learning Objectives: Expected outcomes for students are:

1. Apply grain storage fundamentals (e.g., air-moisture relationships, grain quality, and drying, energy use).
2. Illustrate the interaction of grain storage and handling components, management of energy use, and grain quality.
3. Develop the ability to perform basic calculations associated with handling, storing, and processing grain.
4. Review grain handling/storage system planning.
5. Devise grain drying systems.
6. Describe grain and seed processing.
7. Identify safety principles as part of managing a grain storage and handling system.

Required Text:

Maier, D., McNeill, S., Hellevang, K. 2017. Grain drying, handling and storage handbook. 3rd edition. MWPS-13. Iowa State University. Ames, IA.

Other References:

- Grain Quality Care: a Grower's Quick Reference. 2014. John Gnadke, Advanced Grain System, Inc. Printed by DuPont Pioneer.
- On-Farm Drying and Storage Systems. O.J. Loewer, T.C. Bridges, R.A. Bucklin. 1994. ASAE. ISBN 0-929355-53-9.
- Postharvest Technology and Food Process Engineering. 2014. Chakraverty, A. and Singh, R. P. CRC Press, Taylor and Francis Group, New York.
- Managing Stored Grain to Preserve Quality and Value. 2006. Reed, Carl. AACC Int. St. Paul, MN
- Dry Grain Aeration Systems Design Handbook. Midwest Plan Service. 1997. MWPS-29, Edition, Iowa State University, Ames, IA
- Processing Equipment for Agricultural Products. Hall, C. W., and D. C. Davis. 1979. AVI Publishing Company.

Modes of Presentation:

- Lecture with Power Point
- Video Presentation
- Guest Speakers
- Problem-solving

Resources needed by the Students:

- Access Blackboard (BB) for lecture materials. Review slides in BB prior to attending class.
- The course does not follow the required text chapter by chapter but may skip around. Lectures and discussion will clarify where relevant information can be found.
- Notes/slides should be printed/downloaded ahead of class so that you can add to them.
- Some materials may be distributed in class to facilitate discussion.
- Blackboard will be used for announcements, application tasks, quizzes, class presentations, and temporary grades.
- The textbook and a calculator

Attendance: *Your attendance and full participation is expected*, through classroom discussions, volunteering answers to questions, asking appropriate questions, thoughtful evaluation of a team oral presentation, and by helping to create a spirit of cooperation within the class. **You are required to attend lab demonstrations and assessments in-person.**

Attendance Expectations Class attendance is expected in accordance with NDSU University Senate Policy 333: Class Attendance Policy and Procedure (<https://www.ndsu.edu/fileadmin/policy/333.pdf>). All class materials will be posted on the BB.

- Students are expected to attend every class lecture.
- Students are expected to attend the lab and three exams in person.
- While the late participation policy for this course is outlined below, there is flexibility regarding deadlines for students who are experiencing illness. However, I should be notified at the earliest opportunity.

Copyright of Course Materials

Refer to NDSU [Policy 190](#) on Intellectual property.

In this course recording the lectures is prohibited with your own personal devices (without prior express approval from the instructor).

In this course recording the lectures for anything other than personal use is prohibited.

Grading:

You will have the following categories of work in the course. Your final grade in the course will be determined by a grade percentage ranging from 0 to 100%. The weighted grade percentage will be converted to a letter grade using the following straight grading scale.

Item	% of total grade
Assessment #1	15%
Assessment #2	15%
Final Assessment	20%
Group Project (written report and presentation)	10%
Application Tasks	10%
Quizzes and In-Class activities	10%
Discussion Board/Self Assessments	10%
Laboratory Demonstration	10%
Total	100%

The cut off for letter grades are: 90% >= A; 80% >= B; 70% >= C; 60% >= D

Exams, Group Project, HW Assignment, Quizzes, Class Activities and Participation Policies:

There will be two assessments and a final assessment during the semester (see schedule). Assessments will be based on lectures, in-class discussions, application tasks, and other activities. The assessments will be combinations of types of questions, which may include short answers, problem-solving, multiple-choice, and rational, and fill in the blank questions, depending on what works best for the material covered. **All assessments (3 exams) will be in-person @ Peltier Complex Room 1200.**

Group Project: Students will work in groups of three (one Precision Ag student and one ASM student in each group) in post-harvest technology related topics.

Application Tasks are a critical component in learning course concepts, as they provide students the opportunity to apply their knowledge and assess their understanding of the subject matter. These tasks are also meant to evaluate your comprehension, so it is in your best interest to keep up with the schedule. Application Tasks submitted late without the instructor's permission may incur a penalty of approximately 5% per day. Consult the instructor regarding maximum penalties. If you are sick, notify the course instructors as soon as possible to arrange accommodations. All solutions and calculations must be shown in an organized manner. Blackboard will be used for submission and grading.

Quizzes will be executed via Blackboard with set deadlines. The weekly schedule will indicate posting of quizzes.

Discussion Board, groups will be tasked with summarizing the week's lesson and respond to queries from colleagues on specific course content.

Academic Honesty

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.

Students with special requirements

Any students with disabilities who need accommodations in this course are invited to share these concerns or requests with the instructor and contact the [Center for Accessibility and Disability Resources](#) as soon as possible.

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 and are encouraged to provide Activation Orders.

Family Educational Rights and Privacy Act (FERPA)

Your personally identifiable information and educational records as they relate to this course are subject to [FERPA](#).

Important Dates (Full NDSU dates/deadlines can be found [here](#))

Aug 26	Mon	Classes begin at 4:00 p.m.
Aug 27	Tue	First full day of classes
Sep 2	Mon	HOLIDAY — Labor Day (no classes, offices closed)
Sep 2	Mon	Last day to be added to Campus Connection Wait Lists
Sep 4	Wed	Last day to Add classes via Campus Connection* Permit needed after this date.
Sep 4	Wed	Last day for no-record Drop of classes @ 100% refund*(full semester classes only)
Sep 4	Wed	Last day to Withdraw to Zero Credits @ 100% refund*(full semester classes only)
Sep 10	Tue	Financial aid applied to NDSU account balances
Sep 11	Wed	Payments due for NDSU account balances
Oct 4	Fri	Last day to Withdraw to Zero Credits @ 75% refund*(full semester classes only).
Oct 15	Tue	Late fees applied to unpaid account balances (11:59 p.m.)
Oct 21	Mon	2nd half (8-week session) of Fall semester begins
Nov 3	Sun	Last day to Withdraw to Zero Credits @ 50% refund*(full semester classes only). No refunds issued for withdraw to zero credits after this date.
Nov 11	Mon	HOLIDAY — Veterans Day Observed (no classes, offices closed)
Nov 15	Fri	Last day to Drop classes with 'W' record
Nov 15	Fri	Last day to Withdraw to Zero Credits for Fall
Nov 15	Fri	Late fees applied to unpaid account balances (11:59 p.m.)
Nov 27-29	Wed-Fri	HOLIDAY — Thanksgiving (no classes; offices closed Thurs only)
Dec 9-13	Mon-Fri	Dead Week
Dec 13	Fri	Last day of Fall classes
Dec 16-20	Mon-Fri	Final Examinations
Dec 20	Fri	Commencement ceremony

ASM 323 Schedule as of July 5/2024 (subject to change and will be notified ahead of schedule)

Week	Month	-	Date	Topic
1	Aug		27(T)	Course overview, Expectation; Student info & Intro; Syllabus; Grain Handling Facility_Elevator_Planning
			29 (Th)	Grain Moisture and Management; Problem Solving (PS): MC Shrinkage
2	Sept		2 nd	Labor Day
			3 (T)	Pilot Plant Lab 1 (Moisture Determination, Test Weight)
		5 (Th)	Grain Harvesting-Receiving; AT #1: Moisture and Shrinkage Problem Solving_Grain Receiving Capacity	
3			10 (T)	V Lab 1 Report; AT #2: Harvesting and Receiving Grain Handling_Conveying, Grain Handling_Augers @ Feed Mill
			12 (Th)	Problem Solving_Conveying Augers Big Iron
4			17 (T)	AT #3: Augers Belt Conveyors_PS
			19 (Th)	V Bucket Elev_PS
5			24 (T)	V AT #4: Make your own Quiz & Pre-Assessment 1 Review
			26 (Th)	Assessment 1 @ABEN 201 (In-person), class time
6		Oct		1 (T)
	3 (Th)		Problem solving _ Grain drying Basics and Process	
7			8 (T)	AT #5: Drying Basics of Psychrometric, Application of Psychrometric
			10 (Th)	Lab 2: Using Psychrometry and drying
8			15 (T)	Grain drying Economics
			17 (Th)	Facility visit (Superior Grain Bins;TBF)
9			22 (T)	Lab 3: Facility visit report; AT 6: Drying Economics in class
			24 (Th)	Grain Storage Fundamentals & Storage Facilities
10			29 (T)	V AT 7: Storage Capacities; Grain Storage Management_Aeration
			31 (Th)	PS_Grain Storage Management_Air Distribution
11	Nov		5 (T)	AT 8: Air Distribution; Assessment 2 Review
		7 (Th)	Assessment 2@ABEN 201 (In-person), class time	
		11 (M)	Veterans Day	
12			12 (T)	Safety in grain handling facilities (KH, ABEN)
			14 (Th)	V Grain quality and Sampling (Carlos Campabadal, IGP Outreach Specialist, Kansas State University)
13			19 (T)	Seed cleaning and processing (Brian Otteson, Agronomy Seed Farm)
			21 (Th)	Pilot Plant Lab 4 (Grain/seed cleaning)
14			26 (T)	Lab 4 Report Locating and developing grain center; Project contract and checklist (Sean Schmidt, Superior Grain Bins)
			28 (Th)	Thanksgiving
15		Dec		3 (T)
	5 (Th)		V Pest infestation and mold in grains: mitigation measures (Janie Moore, Texas A&M)	
16			10 (T)	Group project presentation (4 groups) and Grain grading locating and development of grain center (Project report due)
			12 (Th)	Review for Final
Final			17 (T)	Final Exam @ Peltier Complex Rm 1200 (In-person), 8-10am