ABEN 452/652 – Bioenvironmental Systems Design – Fall 2018

BASIC INFORMATION

Class information:	Instructor information:
3 Credits	Dr. Halis Simsek
Fall 2018	Office: ABEN 205
Classroom: ABEN 208	Phone: 701-231-6107
Time: 10:00 – 10:50 am; MWF	E-mail: halis.simsek@ndsu.edu

Textbook: MidWest Plan Service (MWPS) Ventilation Package (MWPS 32, 33, 34) and MWPS Manure Package (MWPS 18-S1, 18-S2, and 18-S3)

References: Managing Livestock Wastes by James A. Merkel. Others as found appropriate.

Prerequisites: ABEN 263 or CE309 or ME 350

Office hours: 11:00 – 12:00 a.m. M, W, & F; or by appointment or drop in.

Web pages: Blackboard gateway at bb.ndsu.nodak.edu

BULLETIN DESCRIPTION

The course covers fundamental principles of animal agriculture, animal housing and environment. The students will learn how to control and maintain ideal indoor environment in animal housing under different conditions. In addition, outdoor air quality and manure management subjects will be covered.

ABEN EDUCATIONAL OBJECTIVES AND ABET STUDENT OUTCOMES

The ABEN program is accredited by the Accreditation Board for Engineering and Technology (ABET). The ABEN program has educational objectives and student outcomes and the ABET criteria developed for this course are listed below:

Educational Objective: Provide students with technical knowledge, design, and problem solving skills that are foundational to their engineering careers by ensuring that graduates have ability to:
a. Apply knowledge of mathematics, science, and engineering.
b. Design and conduct experiments, as well as to analyze and interpret data.
c. Design a system, component, or process to meet desired needs.
e. Identify, formulate, and solve engineering problems.

COURSE OBJECTIVES

After completing this course, students should:

1. Be familiar with animal-environment interactions and have a basic understanding of heat transfer and psychometrics (ABET a, c, and e).

2. Be able to use techniques for analyzing thermal conditions, balances, and total heat load in buildings (ABET a).
3. Understand properties and characteristics of various insulating materials and how to calculate overall thermal resistance (ABET a).
4. Be able to determine required ventilation rates and supplemental heat needs (ABET c).
5. Understand the principles of air movement, distribution and control, natural ventilation, effects of building design, and know how to design ventilation systems (ABET a, c, e).
6. Understand the fundamentals of livestock waste management (ABET c).
7. In addition to all of the above, graduate students will be required to write a term paper and do a presentation in the classroom. A detailed guideline on how to complete the term paper will be provided separately.

EVALUATION PROCEDURES AND GRADING CRITERIA

Assignment Policy: Due dates for the homework and the term paper will be given with the assignments. Late assignments will be accepted with a 10% penalty per NDSU class day. Assignments must be submitted in hardcopy 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 3 NDSU class days from the date they are due.

Exam Policy: Missed exams will receive zero 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 unjustifiable reasons for missing the scheduled dates and times for exams. The instructor reserves the right to determine whether the excuse is legitimate or not.

Grading Policy: All students (undergraduate and graduate) will have to complete the following four categories of work in this course: homework assignments, quizzes, one midterm exam, and one comprehensive final exam. Graduate students will be required to write a term paper in addition to the above course work. The term paper will be subject to approval from the instructor to ensure appropriate scope and content. The total of the possible points which can be earned for a student is 100 (100%). The grading procedure planned for the course is as follows:

	Undergraduate	**Graduate**
Homework	10%	10%
Quizzes	10%	10%
1 hour exams	30%	20%
Research project	N/A	20%
Final exam	50%	40%
Total	100%	100%

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

90% ≤ A ≤ 100%
80% ≤ B < 90%
70% ≤ C < 80%
60% ≤ D < 70%
0% ≤ F < 60%

COURSE SCHEDULE / OUTLINE / CALENDAR of EVENTS

Aug 22	Wed	First day of class – Introduction to ABEN 452/652
Aug 24	Fri	Biological treatment of wastewaters and solid wastes
Aug 26	Mon	
Aug 29	Wed	Manure management introduction
Aug 31	Fri	
Sep 3	Mon	**HOLIDAY** — Labor Day *(no classes, offices closed)*
Sep 5	Wed	Manure storage
Sep 7	Fri	
Sep 10	Mon	
Sep 12	Wed	Biological treatment of manure, environmental fundamentals
Sep 14	Fri	
Sep 17	Mon	Manure storage facility selection, sizing the storage
Sep 19	Wed	
Sep 21	Fri	Significance of water in air by Adnan Akyuz
Sep 24	Mon	Monitoring and managing the storage facilities, managing livestock wastes
Sep 26	Wed	
Sep 28	Fri	
Oct 1	Mon	Composting
Oct 3	Wed	Indoor and outdoor air quality, livestock operations
Oct 5	Fri	
Oct 8	Mon	
Oct 10	Wed	Odor estimation
Oct 12	Fri	
Oct 15	Mon	Biofiltration
Oct 17	Wed	

Oct 19	Fri	Ventilation
Oct 22	Mon	
Oct 24	Wed	Mechanical ventilation
Oct 26	Fri	
Oct 29	Mon	Midterm 1
Oct 31	Wed	Livestock heat and moisture balance
Nov 2	Fri	
Nov 5	Mon	Negative and positive pressure, inlet design
Nov 7	Wed	
Nov 9	Fri	Emergency ventilation, insulation, vapor barrier
Nov 12	Mon	**HOLIDAY** — Veterans Day *(no classes, offices closed)*
Nov 14	Wed	Psychrometry – Dry-bulb and wet-bulb temperature, dew point, moisture
Nov 16	Fri	
Nov 19	Mon	
Nov 21	Wed	Field Trip - Animal Feedlot
Nov 23	Fri	**HOLIDAY** — Thanksgiving *(no classes, offices are open)*
Nov 26	Mon	Psychrometry – Heating, cooling
Nov 28	Wed	Midterm 2
Nov 30	Fri	Natural ventilating
Dec 3	Mon	Dead Week Animal waste systems and other engineering projects by Erica Althoff
Dec 5	Wed	Dead Week Field trip - Composting
Dec 7	Fri	Dead Week Indoor air quality by Kenneth Hellevang
Dec 10	Mon	Final Examinations
Dec 12	Wed	
Dec 14	Fri	

(The schedule is subject to change and students will be notified of any changes.)

ATTENDANCE

According to NDSU Policy 333 (www.ndsu.edu/fileadmin/policy/333.pdf), attendance in classes is expected. Veterans and student service members with special circumstances or who are activated are encouraged to notify the instructor as soon as possible and are encouraged to provide Activation Orders.

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.

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.

College of Engineering (CoE) Honor System: All work in this course must be completed in a manner consistent with NDSU University Senate Policy, Section 335: Code of Academic Responsibility and Conduct (http://www.ndsu.nodak.edu/policy/335.htm) and the CoE Honor System available at https://www.ndsu.edu/coe/undergraduate_students/honor_code/.

Penalties for violations can range from assigned seating, failure of quiz/exam, failure of the course, to expulsion from the university depending on the severity of the offence and the instructor's discretion and the honor code jurisdiction.

Last updated: 20 August, 2018.