

MSYM 342 – Animal Housing Systems

Fall Semester 2021

General course information:

Class discussions: M W 11:00 – 11:50 a.m. Room 149, L.W. Chase Hall
Lab. section: M 3:00 – 4:40 p.m. Power Lab, 102 Splinter Lab

Credit hours: 3 credits

Course description:

Facilities for livestock and poultry production are described with emphasis on building and feedlot layout; animal environment; ventilation, heating and cooling systems; energy utilization; manure and waste management; and construction materials and methods.

Prerequisites: General physics course (MSYM 109 or PHYS 141 or PHYS 151 or PHYS 211)

Course objectives:

Students will develop a working knowledge of the types of animal production facilities used in practice, and interactions between facilities and environment. The course will enhance student understanding of planning criteria, basic environmental needs for healthy animals and efficient animal production, and broader issues that should be considered when planning production facilities. Upon completion of the course, students will be able to define planning needs and identify information needed to properly develop and evaluate preliminary facility plans.

Instructor: Dr. Richard Stowell 472-3912
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Office hours: Making an appointment via MyPlan is preferred and encouraged.
M&W: 9:30-10:30 a.m. Office hours ('soft hold')
W 1:30-3:30 p.m. Advising hours
In-person or Zoom options available.

Course listserv and website:

Announcements, course materials, grades, etc. will be posted on Canvas <https://canvas.unl.edu/>.

Course text and reference materials:

Required: *Structures and Environment Handbook, MWPS-1*, Eleventh Edition. 1987. MWPS, Ames, IA.

Optional: *Agricultural Buildings and Structures*, Revised edition. Lindley, J.A., and J.H. Whitaker. 1996. ASABE, St. Joseph, MI. (For student reference only.)

Other: Online resource materials will be used throughout the semester.

Supplies:

Required: Paper (lined and graph), pens/pencils, a calculator, ruler/straight-edge

Suggested: Three-ring binder, engineering paper, drawing templates

COURSEWORK, GRADING AND RELEVANT POLICIES
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In this course, students will complete homework and laboratory assignments, take exams, complete a [team] project, and participate in activities. Points earned will be weighted by category as follows:

Homework assignments*	20%
Laboratory assignments*	20%
Exams*	30%
Project	25%
Participation	<u>5%</u>
Total:	100%

* Lowest scores on homework, lab assignments and exams will be dropped prior to calculating final grades.

Final grades will be assigned based upon student performance. Minimum grades, based upon the percentage of weighted points counting toward the total, will be:

A+	98-100%	B+	88-90%	C+	78-80%	D+	68-70%
A	93-97%	B	83-87%	C	73-77%	D	63-67%
A-	90-92%	B-	80-82%	C-	70-72%	D-	60-62%
						F	below 60%

Homework assignments (4-6):

In completing homework assignments, students use and expand upon material that is presented in class. These assignments generally entail setting up a problem or situation, finding reference information, making calculations, presenting sufficient work to show the approach and whole process employed to obtain results, and discussing the results. It is acceptable for students to interact with classmates while completing homework assignments. However, each student is responsible for presenting his/her own work and interpretation of the information presented.

Laboratory assignments (3-5):

A variety of activities will occur in the laboratory section, including project work, a tour, most of the exams, and traditional lab experiences, which expand upon material that is presented in class. Written reports are assigned for a subset of the laboratory periods. These reports are to present requested information (i.e., observations, data, calculations, descriptions, drawings, results, etc.) clearly and in sufficient detail to make it easy for a reader to follow and understand. Raw data that is collected in the laboratory exercises should be shared with participating team members (sharing photocopies, scans or other digital images of raw data collected during an exercise is appropriate). Students are encouraged to interact with other students while completing laboratory assignments, but each student is responsible for presenting his/her own work (e.g., analyzing data) and providing all requested information in their own write-up.

Due dates and late work:

Laboratory and homework assignments are due on the date noted – typically 1 week from the date they are assigned. Assignments are due at the **beginning** of the class or laboratory period unless otherwise noted. Points may be deducted on assignments that are turned in late. When a student has a valid reason for not being able to meet the due date, he/she needs to communicate with the instructor – before the assignment is due (whenever that is possible) – and negotiate a new time to turn in the assignment to minimize loss of points. Otherwise, loss of points for late work may be as follows:

- Prior to solutions being posted or the graded assignment being returned (whichever occurs first): Subtract 20% of full value [for example, minus 4 points for late homework worth 20 pts]; or
- After solutions are posted or graded work is returned: Subtract an additional 30% of full value for every partial week thereafter [no credit 2 weeks after solutions are available].

Exams:

Four mid-term exams are planned. Exams typically consist of a combination of multiple-choice / short-answer questions and problems to solve. Exams are open-book, open-note. Exam dates will be finalized in conjunction with student feedback and will be announced at least one week in advance. Make-up exams will not be given as a standard practice; communicate with the instructor regarding extenuating circumstances that might exist. No final exam will be given, although the last mid-term exam might be given during finals week.

Projects:

Students will complete a term project as a member of a small team (2-3 students each). The projects are to emphasize aspects of facility planning that are covered in class. Ideas for projects will be solicited from students, so students should prepare to propose a facility-planning project a few weeks into the semester.

Once projects and project teams are selected, students are expected to work on their projects throughout the semester, with most of the work occurring outside of class time. Each team will prepare written reports and give an oral presentation for their respective project. Students will be asked to assess the contributions of team members toward project success at the end of the semester via a confidential form. Additional information about the project will be presented throughout the semester.

Participation:

The instructor will use discretionary points to reward students for regular attendance, responding to questionnaires, and active involvement in classroom activities. When you experience constraints on your participation in class that are beyond your control, try to keep the instructor updated on your situation. {Life happens; it's how we deal with situations that makes the difference.}

Students with disabilities:

The University strives to make all learning experiences as accessible as possible. If you anticipate or experience barriers based on your disability (including mental health, chronic or temporary medical conditions), please let me know immediately so that we can discuss options privately. To establish reasonable accommodations, I may request that you register with Services for Students with Disabilities (SSD). If you are eligible for services and register with their office, make arrangements with me as soon as possible to discuss your accommodations so they can be implemented in a timely manner. SSD contact information: 117 Louise Pound Hall Bldg.; 402-472-3787

Academic integrity:

Students are expected to adhere to guidelines outlined in Section 4.2 of the University's Student Code of Conduct (<http://stuaafs.unl.edu/ja/code/>). As a student at UNL, you enjoy rights and protections under the code and need to conduct yourself in compliance with the code. The BSE Department process for grade and academic dishonesty appeals can be found at

https://engineering.unl.edu/downloads/files/AcademicDishonesty_Appeals_1.pdf. Students are encouraged to contact the instructor for clarification of these guidelines if they have questions or concerns.

As the Student Code of Conduct indicates, academic sanctions for misconduct are at the discretion of the instructor and may include giving the student a failing grade for the course. Students occasionally have some confusion regarding plagiarism, which is misrepresenting the work of another as one's own. In the past, students in this course have turned in assignments in which multiple sentences were worded the same or the same graph was presented, which is simply not acceptable. With computer-generated write-ups, graphics, spreadsheets, etc. becoming commonplace, it's also become very easy to copy and paste a portion or all of another's work and submit it as your own. When such situations occur, the instructor reserves the right to penalize all parties involved – in lieu of determining intent or who copied who – with the penalty based upon the frequency and extent of the misrepresentation.

To help clarify whether something is appropriate, examples of academic dishonesty are provided at https://engineering.unl.edu/downloads/files/AcademicDishonesty_Examples_1.pdf.

Mental health and wellbeing resources:

UNL offers a variety of options to students to aid them in dealing with stress and adversity. Counseling and Psychological & Services (CAPS) is a multidisciplinary team of psychologists and counselors that works collaboratively with Nebraska students to help them explore their feelings and thoughts and learn helpful ways to improve their mental, psychological and emotional well-being when issues arise. CAPS can be reached by calling 402-472-7450. Big Red Resilience & Well-Being provides one-on-one well-being coaching to any student who wants to enhance their well-being. Trained well-being coaches help students create and be grateful for positive experiences, practice resilience and self-compassion, and find support as they need it. BRRWB can be reached by calling 402-472-8770.

Emergency procedures:

Consult UNL emergency planning site for current emergency procedures for fire, severe weather, tornado, flooding, winter weather, earthquake, gas leak, hazardous material, shooting, or bomb threat:

<https://emergency.unl.edu/>.

Covid-19:

All faculty, staff, and students on campus are expected to follow all campus policies and procedures related to Covid-19 which can be found at <https://covid19.unl.edu/>. Please visit this website which includes information about testing, face coverings, vaccinations, and use of the Safer Community App for access to campus buildings and activities.

In this course, the following practices meet university requirements in place at the start of the semester:

- *Masks are to be worn during all laboratory activities that involve extended, close interaction with other students.* Students will be informed in advance when such activities are expected to occur, and some masks will be maintained for backup.

Students in this course must work in close physical proximity to one another for extended periods of time in order to achieve the academic goals of the course. For this reason, the Department of Biological Systems Engineering and the College of Agricultural Sciences and Natural Resources have determined that face coverings will be required in this course. If you are unwilling to comply with this requirement, please visit with your advisor about possible alternative courses that you might take in lieu of this one.

- *The Safer App will be checked for your participation.*

Student participation in course experiences that take place outside of our classroom will entail the use of the Safer Community app. All participants will need to have "Access Granted" status on the app in order to travel to and participate in such experiences.

- *Wearing face-coverings is voluntary for other course activities.* All students are encouraged to maintain healthy and safe practices, which include proper sanitation, vaccination, and minimized unnecessary exposure to the virus causing Covid-19. You should assume that a wide range of situations and views likely exists that influences what practices individuals perceive as reasonable and necessary, so the expectation in this class is that students will be tolerant, kind and respectful regarding choices others make. A student with a well-defined need may submit a request to the CASNR Dean's Office to require masks in their courses.

Any student who has an exceptional situation needs to request an alternative and/or support by contacting the Office of Services for Students with Disabilities.

Experiences from the past 18 months suggest that behaviors before, after and outside of class will likely be more important to limiting the spread of the virus than in-class activities, so *do your part* to maintain a healthy UNL campus.

If you feel ill or test positive, stay home and seek/follow directions from a health professional. If you believe you have been exposed to someone who tested positive, follow health directions recommended for your situation. Contact [me] the instructor to discuss your situation relative to the course.

TENTATIVE COURSE SCHEDULE
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<u>Week:</u>	<u>Date:</u>	<u>Topic(s) covered:</u>	<u>Related reading</u> <u>MWPS</u>	<u>Assigned</u> <u>work</u>
1	8/23 Lab: 8/25	Course introduction Concepts intro, Project intro Beef and sheep facilities	Sec. 501 Sec. 511 & 513	Survey Project idea
2	8/30 9/1	Beef and sheep facilities (cont.) Lab: Scaled drawings Swine facilities	 Handout Sec. 510	Lab #1 HW #1
3	9/6 9/8	Labor Day holiday – no class or Lab Swine facilities (cont.)		
4	9/13 9/15	Poultry facilities Lab: Project selection, Intro material Dairy facilities	Sec. 515 Sec. 512	Project intro
5	9/20 9/22	Farmstead planning Lab: Feedlot tour System capacities, facility sizing	Sec. 510-515 Sec. 603	Lab #2 HW #2
6	9/27 Own time 9/29	Animal environment Lab: Exam #1 Heat transfer mechanisms Insulation, conductive heat loss	 Sec. 601 Sec. 631	Exam #1
7	10/4 10/6	Insulation, conductive heat loss Lab: Insulation materials, vapor barriers Heat & moisture production	 Sec. 631 Sec. 604	HW #3
8	10/11 10/13	Ventilation basics Lab: Project feedback and work time Natural ventilation systems	Sec. 633 Sec. 636	Project update HW #4
9	10/18 10/20	Semester Break – no class or Lab Mechanical ventilation systems	 Sec. 634	HW #5

<u>Week:</u>	<u>Date:</u>	<u>Topic(s) covered:</u>	<u>MWPS</u>	<u>Assignment</u>
10	10/25	Ventilation fans Lab: Exam #2	Sec. 634	Exam #2
	10/37	Ventilation inlets		Project update
11	11/1	Hot-weather ventilation systems Lab: Fan systems	Handout Sec. 633	Lab #3
	11/3	Cooling systems	Sec. 635	
12	11/8	Heating systems & fuel usage	Sec. 651, 674	
	Own time	Review air properties, psychrometrics Lab: Heat & moisture exchange	Sec. 602	Lab #4
	11/10	Alternative heating systems	Sec. 672-673	
13	11/15	Manure collection and management Lab: Virtual tour of dairy operation	Sec. 701-702	Lab #5
	11/17	Manure storage and settling basins	Sec. 703	Draft report
14	11/22	Environmental regulations Lab: Exam #3	Sec. 707	Exam #3
	11/24	No class - Thanksgiving break		
15	11/29	Manure separation and treatment Lab: Nutrient balance calculations, work time	Sec. 704	
	12/1	Odor concerns	Handout	Exam #4
16	12/6	Odor control options Lab: Project work time		
	12/8	Optional topic		
Finals week				
R	12/16	10:00-noon	Project presentations	
<u>Optional topics:</u>				
		Companion animal facilities	Sec. 514	Ch. 28
		Feed storage & handling	Sec. 534-535	Ch. 22
		Building frame types	Sec. 304	Ch. 8 & 9
		Loads on structures	Sec. 101-102	Ch. 6
		Construction elements and bracing	Sec. 202	Ch. 7
		Digesters		