

UNIVERSITY OF MANITOBA
Faculty of Agricultural and Food Sciences
Department of Biosystems Engineering

BIOE 0700 BUILDINGS AND ENVIRONMENTS

INSTRUCTOR(S):

D. Inglis, Biosystems Engineering
Rm. A206 Agricultural Engineering Building, 474-7964

OBJECTIVE:

Know the components of farm buildings, including materials and construction techniques, contracting details and site planning. To provide instruction in the principles of environmental control within agricultural confinement structures. Topics include ideal environmental control within agricultural confinement structures. Topics include ideal control determination, heat loss, occurrence of condensation, the effects of various construction techniques, and the intended goals of forced ventilation.

LECTURES AND LABS:

Lecture: 8:30 – 9:45, Tuesday and Thursday, Room A205 Agriculture Engineering Building
Lab: 10:00 - 11:15, Tuesday, Room A205 Agriculture Engineering Building

EVALUATION:

The basis of evaluation is established by agreement at the beginning of each term. Weights assigned to various components of the work are:

Labs.....25%
Midterm Exam.....25%
Final Exam.....50%

In general late submission is penalized by 10% per (academic) day. Assignments that are more than 5 (academic) days late will not be accepted. Some evaluative feedback will be provided before the VW date (November 16).

LECTURES AND LABS GENERAL ACADEMIC RULES AND REGULATIONS:

Assignments and laboratory reports are expected to be the independent work of each student. All regulations and policies apply as stated in the University of Manitoba 2008-2009 Undergraduate Calendar and in particular section 6: Attendance and Withdrawal, 6.1 Attendance at class and Debarment and section 7: Academic Integrity 7.1 Plagiarism and Cheating.

References and Sources:

Required class notes available at the Campus Copy Centre (UMSU)

Agricultural Buildings and Structures
James H. Whitaker (Reston 1979)

Building and Renovating Building Guide
John A. Banfield, Landmark Publications

Canadian Farm Buildings Handbook
Agriculture Canada Research Branch (1988)
Publication 1822E

Construction Principles, Materials & Methods
Harold B. Olin, John L. Schmidt, Walter H. Lewis
Van Nostrand Reinhold 1983

Environmental Management in Animal Agriculture
Stanley E. Curtis, The Iowa State University Press 1983
Ames, Iowa 50010

Farm Animal Welfare: Cattle, Pigs and Poultry
David Sainsbury, 1986
William Collins Sons & Co. Ltd. London England

Midwest Plan Service (USA)
Structures and Environment Handbook 1976

Plywood Manufacturers Association of British Columbia

Central Mortgage and Housing

Manitoba Plan Service
Manitoba Agriculture
1129 Queens Avenue
Brandon, MB, R7A 1L9

Canadian Wood Council

Vic West (metal roofing)

Westeel Rosco

Inland Cement

Rural Builder (monthly publication)

Lectures: three hours per week for one term

Tentative Schedule and Outline

Week 1	Introduction Why should we build? Basic considerations Basic considerations - loads, size, suitability
Week 2	Concrete Concrete estimating, Building materials, wood, steel plastic Construction, standard footings and foundations
Week 3	Construction, standard fabrication and fasteners Insulation and vapor barriers Estimating
Week 4	Contracts, responsibilities and liabilities Building site considerations and planning Paints, painting and caulking
Week 5	Fire and lightning protection Security
Week 6	The problem of organizations against factory farming of animals Homeostasis and thermoneutrality/optimum confinement/storage
October 28	Mid-Term Exam
Week 7	Sensible and latent heat Heat flow Calculating heat loss
Week 8	Reducing heat loss from a building Psychrometrics Ventilation rates determination
Week 9	Supplemental heat calculations Correcting for winter heat deficiency Heat exchanger/inlets
Week 10	Fans and fan selection Ventilating controls and instrumentation Evaporative cooling
Week 11	Ventilation system configuration Vapor barriers and condensation

Lab Schedule and Outline

Labs are intended to reinforce the material given in lectures in a practical manner and will include hands on application of theory, demonstration and paper labs. Attendance is mandatory and marks for the lab component are separate from the course.