



## Course Outline

### Instruction Team

- Dr. Keith Duhaime, P.Eng.

[Keith.Duhaime@umanitoba.ca](mailto:Keith.Duhaime@umanitoba.ca)

### Student Hours

- Individual assistance is available by appointment.

### Teaching Assistant

- Hunter Slobodian  
[slobodih@myumanitoba.ca](mailto:slobodih@myumanitoba.ca)

### Location

- **E2-351 EITC**  
TR 8:30 - 9:45 am
- **245 Ellis Bldg**  
M 2:30-4:30 pm

### Contact Hours

- 4 credit hours
- Lectures:  
3 hours x 12.3 weeks = 37 hours
- Labs/Tutorials:  
2 hours x 12 weeks = 24 hours

### Prerequisites:

- CIVL 2790 or MECH 2262

### Course Website:

<http://umanitoba.ca/umlearn>

## BIOE 4590 Management of By-Products from Animal Production Systems

Winter 2025

### Course Description

Topics covered include solid and liquid manure, manure characteristics, manure collection, storage, land application and utilization, biological treatment, design of equipment and facilities for manure handling. Environment issues, such as odour and water pollution associated with manure management will also be discussed.

### Course Goals

This course provides an introduction to the principles in the design of equipment and facilities for handling by-products from livestock operations. The primary objectives are:

- to increase the student's ability to apply fluid mechanics to engineering design of liquid waste handling equipment;
- to discuss the design of collection and storage facilities, and field applicators of by-products;
- to provide an introduction to physical and biological treatments of liquid and solid wastes.

### Course Content

- Lecture and tutorial contents are as following:

Chapter	Class Content	Reading	Evaluation
1	Introduction	Yes	Assignments and Tutorial reports
2	Waste consistency	Yes	
3	Waste management functions	Yes	
4	Livestock management systems	Yes	
5	Production	Yes	
6	Collection	Yes	
7	Transfer	Yes	
8	Storage	Yes	
9	Treatment	Yes	
10	Utilisation	Yes	
11	Mortality management	Yes	
12	Safety	Yes	

## Traditional Territories Acknowledgement

The University of Manitoba campuses are located on the original lands of Anishinaabeg, Ininiwak, Anisninewuk, Dakota Oyate and Dene, and on the National Homeland of the Red River Métis.

We respect the Treaties that were made on these territories, we acknowledge the harms and mistakes of the past, and we dedicate ourselves to move forward in partnership with Indigenous communities in a spirit of reconciliation and collaboration.

## Recommended Reading

The instructor will supply materials through the course website ([www.umlearn.com](http://www.umlearn.com)).

Chapters 9 and 10. Agricultural Waste Management Field Handbook, United States Department of Agriculture, Natural Resources Conservation Service.

## Accreditation Details

### Accreditation Units

- Mathematics: 0%
- Natural Science: 0%
- Complementary Studies: 0%
- Engineering Science: 75%
- Engineering Design: 25%

### Graduate Attributes

KB: A knowledge base for engineering

PA: Problem analysis

IN: Investigation

DE: Design

ET: Use of engineering tools

IT: Individual and team-work

CS: Communication skills

PR: Professionalism

IE: Impact of engineering on society/environment

EE: Ethics and equity

EP: Economics and project management

LL: Life-long learning

### Competency Levels

I - Introduced

D – Intermediate (Developing)

A - Advanced

## Learning Outcomes

By the end of this course, you will be able to:

No.	Learning Outcome
1	Select the most suitable management system for a given livestock operation.
2	Evaluate the performance of equipment and facilities for handling by-products from livestock operations.
3	Design equipment and facilities for different applications.

## Evaluation

Component	Value (%)	Assessor	Method of Feedback*	Learning Outcomes Evaluated	I/T**
Midterm Exams	30	KD	S	1, 2, 3	I
Term Assignments	17	TA	F,S	1, 2, 3	I
Tour Attendance	3	TA	S		I
Final Exam	50	KD	F,S	1, 2, 3	I

\* Method of Feedback: F - Formative (written comments / oral discussion), S - summative (numerical grade)

\*\* I/T: I – Individual effort, T – A team effort

**Late Submission Policy:** Deadlines are a reality in the world of engineering. We expect assignments to be completed on time. Assignments submitted after the due date will be docked 10% per day. If students know in advance that they need more time, they are encouraged to speak with instructors, and we will work to accommodate you.

## Grading Scale

Note: These boundaries represent a guide for the instructor and class alike. Provided that no individual student is disadvantaged, the instructor may vary any of these boundaries to ensure consistency of grading from year-to-year.

Letter	Mark
A+	90–100
A	85–89
B+	80–84
B	75–79
C+	65–74
C	60–64
D	50–59
F	< 50

## CEAB Graduate Attributes Assessed

This course will assess the following CEAB graduate attribute indicators shown below:

Indicator (Level)	Indicator Description	Assessment Point
KB.4 (I, D, A)	Recalls and defines, and/or comprehends and applies, first principles and concepts in specialized engineering science.	Midterm exam, final exam
DE.3 (D)	Develops possible solutions to an open-ended design problem, leading to an appropriate recommendation.	Assignments
ET.1A (D)	Uses analytical tools to complete engineering activities.	Assignments

## Important Dates

<b>Winter Term Break</b> February 17-21, 2025	<b>Midterm Exam</b> March 3, 2025
<b>Voluntary Withdrawal Date</b> March 19, 2025	<b>Poultry Facility Tour</b> TBD
<b>Last Day of Classes</b> April 9, 2025	<b>Glenlea Swine/Dairy Tour</b> TBD
	<b>Final Exam</b> Scheduled by Registrar's Office

## Academic Integrity

Students are expected to conduct themselves in accordance with the highest ethical standards of the Profession of Engineering and evince academic integrity in all their pursuits and activities at the university. As such, in accordance with the *General Academic Regulations on Academic Integrity*, students are reminded that plagiarism or any other form of cheating in examinations, term tests, assignments, projects, or laboratory reports is subject to serious academic penalty (e.g., suspension or expulsion from the faculty or university). A student found guilty of contributing to cheating by another student is also subject to serious academic penalty.

## Requirements/Regulations

- Please copy the Instruction Team in all emails (Instructors and Teaching Assistants). All email communication must conform to the Communicating with Students university policy.

[!\[\]\(cbe80b694ebd74fcfe136a095b608235\_img.jpg\) Communicating with Students](#)

- As the Instruction Team, we will do our best to respond to all emails **within 48 hours during working hours** (8:30 AM – 5:30 PM Monday thru Friday). Ex. A Friday night email may not be responded to until the following Tuesday.
- Self-declaration forms may be completed for missed tests, exams, or assignments during short-term absences ( $\leq 72$  hours) for extenuating circumstances. This form cannot be used for planned absences like vacations. It is also not to be used for longer-term absences, or ongoing circumstances (e.g., Authorized Withdrawals, Leaves of Absence, or other accommodations), which will still require additional documentation.

[!\[\]\(cbe2492b119e39e02a1dab2af4a4b296\_img.jpg\) Self-Declaration Form for Brief or Temporary Absence](#)

[!\[\]\(e474458956c9a37fbf9586ddb60a7fa1\_img.jpg\) Self-Declaration Policy for Brief or Temporary Absences](#)

- It is the responsibility of each student to contact the instructor in a timely manner if he or she is uncertain about his or her standing in the course and about his or her potential for receiving a failing grade. Students should familiarize themselves with the University's *General Academic Regulations*.

[!\[\]\(5361750c22c4e047a52f4eac1ec2d4cc\_img.jpg\) General Academic Regulations](#)

[!\[\]\(870f5d5e9c0d57485634be3ecf52f3ca\_img.jpg\) Engineering Academic Regulations](#)

- Students should be aware that they have access to an extensive range of resources and support organizations. These include Academic Resources, Counselling, Advocacy and Accessibility Offices as well as documentation of key University policies e.g., Academic Integrity, Respectful Behaviour, Examinations, and related matters.
- [!\[\]\(1e63609ed98a835f4eb8c01936fe5abe\_img.jpg\) Supplemental Resources](#)

## Deferred Final Examinations

Students who miss the regularly scheduled writing of a final examination for valid medical or compassionate reasons will only be allowed to write a deferred exam if the Associate Dean (Undergraduate) approves the request. All requests for a deferred examination *must* be made within 48 hours of the missed exam and follow the procedure described on the Faculty [website](#) without exception. Course Instructors *do not have the discretion* to grant deferred final examinations.

[!\[\]\(7d1d6890825e83a6a4a51febe2dcc7f3\_img.jpg\) Deferred Exam Policy \(student experience website\)](#)

## Retention of Student Work

Students are advised that copies of their work submitted in completing course requirements (i.e., assignments, laboratory reports, project reports, test papers, examination papers, etc.) may be retained by the Instructor and the Department for the purpose of student assessment and grading, and to support the ongoing accreditation of each Engineering program. This material shall be handled in accordance with the University's *Intellectual Property Policy* and the protection of privacy provisions of *The Freedom of Information and Protection of Privacy Act (Manitoba)*. Students who do not wish to have their work retained must inform the Head of Department, in writing, at their earliest opportunity.

## Copyright Notice

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[!\[\]\(5d954b3e270654ad8ab0d5913161c03c\_img.jpg\) Copyright Office](#)