



Course Outline

Instruction Team

- Dr. Chyngyz Erkinbaev (he/him)
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Student Hours

- Individual assistance is available by appointment.

Teaching Assistants

- Maheshika Jayasinghe (she/her)
• jayasinm@myumanitoba.ca

Location

- Lecture **HELEN GLASS CENTRE 350**
Tue 8:30 AM -9:45 AM
Thur 8:30 AM- 9:45 AM

Contact Hours

- 3 credit hours
- Lectures:
2.5 hours x 12 weeks = 36 hours

Prerequisites:

- None

Course Website:

Traditional Territories Acknowledgement

The University of Manitoba campuses are located on the original lands of the Anishinaabeg, Cree, Oji-Cree, Dakota, and Dene peoples, and on the homeland of the Métis Nation.

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.

Updated: July 11, 2022

BIOE 7300 Food Process Engineering

Fall 2024

Course Objectives

This course allows students with a background in either biological sciences or engineering to gain an understanding of food engineering processes. Topics include unit operations in food engineering, fluid flow, heat and mass transfer, thermal and non-thermal food processing, canning, drying, filtration, evaporation, fermentation, food packaging, advanced food processing technologies, quality and safety control methods.

Course Content

This course deals with main unit operations and processing conditions that aim to analyze, design, and optimize various food processing operations. The course has three major blocks of food engineering: thermal, non-thermal processing, and novel processing methods. The principles of this course are built based on chemistry, physics, transport phenomena, thermodynamics, and computer modelling. The course will assist students in understanding the principles involved in food processing and help in the designing aspect of handling of various food matrices in providing healthy, safe and nutritious foods. The following topics will be covered in lectures and tutorials.

LECTURES:

- Week 1 Introduction, unit operations
- Week 2 Fluid flow in food processing, heat transfer in food matrices
- Week 3 Heat transfer, thermal food preservation
- Week 4 Thermal food preservation, Assignment tutorial
- Week 5 Ultrahigh short time processing
- Week 6 Drying processes, drying kinetics, modeling
- Week 7 Evaporation (factors effecting evaporation, multiple-effect, energy efficiency)
- Week 8 Size reduction (milling, cutting, slicing)
- Week 9 Solid separation (sieving, sizing, air classification, sorting, grading, imaging)
- Week 10 Extraction, advanced technologies, Assignment tutorial
- Week 11 Advanced food quality control, smart food packaging
- Week 12 Filtration, (membrane, reverse osmosis), industrial visit
- Week 13 Project presentation, course recap

Tutorials/Assignments:

Tutorials will include numerical experiments and determination of process-design parameters. Assignments will be posted on the UM Learn website:
<https://universityofmanitoba.desire2learn.com/d2l/login> assigned to the course.

- A1: Fluid Flow/Heat Transfer
- A2: Preservation/UHT/Drying
- A3: Size reduction/mixing
- A4: Filtration/mixing/evaporation

Important Dates

- **Thanksgiving**
Mon. Oct. 14, 2024
No classes or examinations
- **Midterm**
Thursday, Oct. 24, 2024
- **Remembrance Day**
Mon. Nov. 11, 2024
No classes or examinations
- **Fall Term Break**
Nov. 12-15, 2024
No classes or examinations
- **Voluntary Withdrawal Deadline**
November 21, 2023
- **Presentations**
Tuesday, Dec. 3, 2024
- **Final Reports due**
Thursday, Dec 5, 2024
- **Last Day of Classes**
Mon. Dec. 9, 2024

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+	95–100
A	87–94
B+	78–86
B	72–77
C+	66–71
C	60–65
D	50–59
F	< 50

Textbook

There are several textbooks available on food processing. Students will be provided lecture series developed by Dr. Erkinbaev.

Evaluation

The basis of the final grade is agreed upon with the students at the beginning of the term. The usual weighting is:

- 25% midterm test
- 20% assignments
- 20% major project (presentation: 50% and written report: 50%)
- 35% on written final examination

Late submission of assignments and reports would result in loss of 20% marks for each working day (5 days after the deadline).

Learning Outcomes

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

No.	Learning Outcome
1	Understand the concept of fluid flow, heat and mass transfer in food processing. Determine design parameters for selected food processing operations such as drying, mixing, fermentation, evaporation, freezing.
2	To be familiar with novel food processing and advanced food quality control methods.
3	Able to hypothesize, identify the research gaps, analyze and propose solution and prepare a conceptual design of processing food operations.
4	Collaborate with group members in a team setting to manage an engineering design project.
5	Apply laws and theories to practical solutions.
6	Communicate orally and in writing a design solution.

E-mailing rule: Use UM assigned e-mail ONLY with subject line “BIOE 7300”.

Referencing Style: Students are expected to follow the Canadian Biosystems Engineering (CBE) journal reference style when citing references in course assignments. The Instructions for preparing a paper for CBE is available through UM Learn. Please refer to this guide to ensure that you follow the correct referencing style.

Personal mobile device: No programmable devices or systems (such as calculators, PDAs, iPods, iPads, cell phones, smart watches, wireless communication, or data storage devices) are allowed in examinations unless approved by the course instructor.

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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.

[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 (≤ 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.

[Self-Declaration Form for Brief or Temporary Absence](#)

[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*.

[General Academic Regulations](#)

[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.

- [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.

[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.

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