Syllabus

FOOD 3210: FOOD ENGINEERING FUNDAMENTALS

(Winter 2021)

Faculty of Agricultural and Food Sciences

University of Manitoba

TABLE OF CONTENTS

COURSE DETAILS

Course Title & Number:	FOOD ENGINEERING FUNDAMENTALS, FOOD 3210
Number of Credit Hours	3
Class Times & Days of Week:	Online Lectures → 1:00 pm - 2:15 pm Tuesdays and Thursdays In-person labs → 2:30-5:25 Thursdays Online labs → 1:30-5:25 Thursdays
Pre-Requisites:	BIOE 3530

Instructor Contact Information

Instructor(s) Name & Preferred Form of Address:	Ali Salimi Khorshidi You may call me Dr. Salimi or Dr. Ali
Office Hours or Availability:	To schedule an online meeting, please send me an email at least 48 hours in advance.
Email:	*ali.salimikhorshidi@umanitoba.ca* Please write "Food 3210" in the subject line and introduce yourself in your message. I will return emails within 2 work days. *Note*: All email communication must conform to the Communicating with Students university policy.
Contact:	You may contact me via email at any time.

TA/GM Contact Information

TA/GM Name:	Siwen Luo
Office Hours or Availability:	To schedule an online meeting, please contact me via email at least 24 hours in advance.
Email:	*luos345@myumanitoba.ca* *Note*: All email communication must conform to the Communicating with Students university policy. I will return emails within 2 work days.

COURSE DESCRIPTION

U of M Course Calendar Description

Applications of engineering fundamentals to unit operations in the food industry.

General Course Description

This course is designed to teach students the fundamentals required for food engineering. Students will acquire knowledge of food engineering principles in food processing, such as flow characteristics of fluids, heat and mass transfer (and their combination), refrigeration, and an introduction to the interaction of electromagnetic radiation with food materials, in order to apply these fundamentals to various unit operations in the food industry.

Course Goals

By the end of this course, students should be able to:

1. Identify the mechanisms by which various unit operations in food processing optimize food quality and extend the shelf life of foods.
2. Apply physical principles to understand why food components are processed in specific ways.
3. Justify the application of basic mathematical principles to food processing issues.
4. Acquire specific success skills to prepare for a career in the food industry.

Course Learning Objectives

By the end of this course, students should be able to:

1. Explain the principles that permit various food technologies to make a food product safe for consumption
2. Understand principles of heat and mass transfer phenomena
3. Explain basic fluid dynamics characteristics of liquid foods
4. Recall the unit operations used to produce a range of food products
5. Describe the theories of refrigeration and freezing
6. Restate the principles and practices of processing techniques and the effects of processing parameters on product yield, quality and safety
7. Understand how various physical processes employed in food processing affect the quality and safety of food
8. Understand the source and variability of raw food material and their impact on food processing operations
9. Manipulate mass and energy balances for a given food processing operation
10. Analyze transport processes and unit operations in food processing as demonstrated both conceptually and in practical laboratory settings
11. Understand the unit operations required to produce a given food product
12. Categorize the principles and current practices of processing techniques and the effects of processing parameters on product quality
13. Employ computers to solve food engineering and food process problems
14. Critique practical, real-world food process situations and problems using food engineering concepts
15. Plan food processing strategies to control and assure the quality of food products
16. Generate process flows to attain specific process strategies
17. Predict the effect of specific heat and mass transfer operations on product quality and safety
18. Demonstrate effective written communication skills
19. Apply critical thinking skills to new situations, especially processing problems.

COURSE MATERIALS AND TECHNOLOGY

Required textbook:
There is no required textbook for the course, but much of the course material is taken from: "Introduction to Food Engineering" (Singh & Heldman). Any edition of this book works (you do not need the latest edition). Full-text version of the textbook is available online through University of Manitoba Libraries.

Required course material will be given as web-pages, electronic hand-outs or class notes.

Supplementary readings:
If required, web links to supplementary readings will be provided on the course UM Learn webpage.

Required materials:
Scientific calculator for lectures, lab sessions and exams. No lab coats are required for lab sessions. Tablets, cellphones and laptops can be used during the lectures and labs to take notes, in a responsible, efficient, ethical and legal manner.

Required materials can be purchased from the University of Manitoba Bookstore.

As this is a remote learning course and you are using UM Learn, please check the home page of the course for Browser requirement statement and UM Learn support. Also check the self-register UM Learn tutorial that prepares you for remote learning called, Learning Online. This self-register course in UM Learn is open to all U of M students and is available in English and Mandarin.

No specific computer software (i.e., operating system, web browser, user programs), hardware (i.e., hard disk drive, graphic card, sound card, memory) & peripherals (i.e., webcam, microphone), subscriptions or plug-ins (i.e., Adobe Flash Player, QuickTime Player, Java) are needed for the course completion.

Using Copyrighted Material

Please respect copyright. We will use copyrighted content in this course. I have ensured that the content I use is appropriately acknowledged and is copied in accordance with copyright laws and university guidelines. Copyrighted works, including those created by me, are made available for private study and research and must not be distributed in any format without permission. Do not upload copyrighted works to a learning management system (such as UM Learn), or any website, unless an exception to the *Copyright Act* applies or written permission has been confirmed. For more information, see the University's Copyright Office website at http://umanitoba.ca/copyright/ or contact um_copyright@umanitoba.ca.

EXPECTATIONS AND POLICIES

I EXPECT YOU TO:

- I will treat you with respect and would appreciate the same courtesy in return. See Respectful Work and Learning Environment Policy.
- A combination of synchronous and asynchronous sessions will be used for this course. Live lectures will be held every Tuesday and Thursday, 1:00- 2:15 PM. Attendance is expected and participation grades will be assigned based on responses to classroom poll questions. Students will be required to participate in class discussions and activities.
- Online labs will be held every Thursday, 2:30- 5:25 PM, while in-person labs will be held on February 4, February 11 and March 18, 2021, 1:30- 5:25 PM. Instructions for in-person lab

activities will be provided in the course UM Learn webpage. Attendance is expected and participation grades will be assigned based on student's participation in lab activities.

- There will be group works for preparation of lab assignments. Students in the same group should effectively communicate with each other to accomplish their group assignments.
- I recommend you use video calls in the group work, but an audio connection should suffice upon discretion of group members.
- I expect you to follow these policies around Class Communication, Academic Integrity, and Recording Class Lectures.

Class Communication:
You are required to obtain and use your University of Manitoba email account for all communication between yourself and the university. All communication must comply with the Electronic Communication with Student Policy:
http://umanitoba.ca/admin/governance/governing_documents/community/electronic_communication_with_students_policy.html

Academic Integrity:
Each student in this course is expected to abide by the University of Manitoba Academic Integrity principles. Always remember to reference the work of others that you have used. Also be advised that you are required to complete your assignments independently unless otherwise specified. If you are encouraged to work in a team, ensure that your project complies with the academic integrity regulations. You must do your own work during exams. Inappropriate collaborative behavior and violation of other Academic Integrity principles, will lead to the serious disciplinary action. Visit the Academic Calendar, Student Advocacy, and Academic Integrity web pages for more information and support. Lab group members must ensure that a group project (during each lab session) adheres to the principles of academic integrity.

Recording Class Lectures:
No audio or video recording of lectures, Q & A sessions or presentations is allowed in any format, openly or surreptitiously, in whole or in part without permission of Dr. Ali Salimi. Course materials (both paper and digital) are for the participant's private study and research, and must not be shared.

Student Accessibility Services:
The University of Manitoba is committed to providing an accessible academic community. Students Accessibility Services (SAS) offers academic accommodation supports and services such as note-taking, interpreting, assistive technology and exam accommodations. Students who have, or think they may have, a disability (e.g. mental illness, learning, medical, hearing, injury-related, visual) are invited to contact SAS to arrange a confidential consultation.

Student Accessibility Services
520 University Centre
Phone: (204) 474-7423
Email: Student_accessibility@umanitoba.ca

Using Copyrighted Material:
The course materials are copyrighted by the University of Manitoba, 2021. Violation of these and other Academic Integrity principles, will lead to serious disciplinary action. For more information, see the University's Copyright Office website at http://umanitoba.ca/copyright/ or contact um_copyright@umanitoba.ca.

EXPECTATIONS:

YOU CAN EXPECT ME TO:

Be available for 15 minutes after the class time to discuss any questions or comments you may have

CLASS SCHEDULE AND COURSE EVALUATION

Course Schedule:
This class schedule is subject to change at the discretion of the instructor and/or based on the learning needs of the students but such changes are subject to Section 2.8 of ROASS.

Date	Class Content	Sync/Async Times	Required Readings or any Pre-class Preparation	Evaluation	
				Type of Assessment	Due Date
19-Jan	Units & Dimensions	Sync. class: 1:00-2:15	Course syllabus	-	-
21-Jan	Mass & Energy Balances	Sync. class: 1:00-2:15	-	-	-
26-Jan	Mass & Energy Balances	Sync. class: 1:00-2:15	Example question	-	-
28-Jan	Fluid mechanics	Sync. class: 1:00-2:15		-	-
2-Feb	Fluid mechanics + Quiz	Sync. class: 1:00-2:15	Example question	Problem solving	9-Feb
4-Feb	Mechanical energy balances	Async. class: 75 min	-	-	-
9-Feb	Mechanical energy balances	Sync. class: 1:00-2:15	Example question	-	-
11-Feb	Steady state heat transfer	Async. class: 75 min	-	-	-
16-Feb	Winter term break	-	-	-	-
18-Feb		-	-	-	-
23-Feb	Steady state heat transfer	Sync. class: 1:00-2:15	-	-	-
25-Feb	Steady state heat transfer	Sync. class: 1:00-2:15	-	-	-
2-Mar	Midterm exam	TBA	-	Problem solving	9-Mar
4-Mar	Unsteady state heat transfer	Sync. class: 1:00-2:15	-	-	-
9-Mar	Unsteady state heat transfer	Sync. class: 1:00-2:15	Example question	-	-

11-Mar	Mass transfer	Sync. class: 1:00-2:15	-	-	-
16-Mar	Mass transfer	Sync. class: 1:00-2:15	-	-	-
18-Mar	Mass transfer + Quiz	Async. class: 75 min	Example question	Problem solving	25-Mar
23-Mar	Refrigeration	Sync. class: 1:00-2:15	-	-	-
25-Mar	Refrigeration	Sync. class: 1:00-2:15	Example question	-	-
30-Mar	Freezing	Sync. class: 1:00-2:15	-	-	-
1-Apr	Freezing + Quiz	Sync. class: 1:00-2:15	Example question	Problem solving	8-Apr
6-Apr	Psychrometry	Sync. class: 1:00-2:15	Required reading	-	-
8-Apr	Psychrometry	Sync. class: 1:00-2:15	-	-	-
13-Apr	Psychrometry	Sync. class: 1:00-2:15	-	-	-
15-Apr	Psychrometry + Quiz	Sync. class: 1:00-2:15	Example question	Problem solving	TBA
TBA	Final exam	TBA	-	Problem solving	TBA

Course evaluation:
Final grades will be assigned based upon the overall performance of the students, and the spread of the grades, in the four areas mentioned below.

Evaluation Method	Value of Final Grade
Mid-term exam	25%
Final Exam	30%
Labs and write-ups	25%
Assignments/Quizzes/Class Presentations	20%

Lab Expectations

- You are expected to follow the lab schedule posted on UMLearn and participate in every lab. If you miss a lab session, there will be no make-ups. Your missed lab session percentage will be added to your final exam only if you have a doctor's note.
- You are expected to arrive to the in-person labs 5-15 min in advance and participate the online labs on time. For every minute you are late, you will lose 1% of your total lab report mark.
- You are expected to carefully read the FHNS Protocols for Undergraduate In-Person Lab Activities in Ellis Bldg. Rm#216 before the in-person labs, and follow the safety protocols strictly.
- Before you use any lab equipment, you need to be trained by your TA (at the beginning of each lab session).

- You are expected to follow the lab procedures from the provided lab manuals, unless otherwise instructed by the TA.
- You are expected to prepare all lab reports independently, unless otherwise specified. Plagiarism is not allowed in any form. If you are not familiar with the student discipline bylaw, please check the link below: http://umanitoba.ca/student/resource/student_advocacy/cheating_plagiarism_fraud.html
- All lab reports should be submitted on UMLearn drop box before midnight on its due date. For every late day, you will lose 20% of the total mark for that lab report.
- You are expected to contact your TA and Grader/Marker through the university email or in-person.

Lab Schedule

Lab session topics include: computer lab, mass and energy balance, viscosity, transport of liquids, thermal properties determination, rate of heat transfer, heat exchanger and psychometric parameters. Due to Covid-19 restrictions, a combination of synchronous and asynchronous lab sessions will be held. The lab schedule and corresponding details will be announced the second week of classes.

Voluntary Withdrawal

Jan 29, 2021: Voluntary Withdrawal deadline with refunds. Mar 31, 2021: Voluntary Withdrawal deadline. Students who do not drop the course by the deadline would be assigned a final grade. The withdrawal courses will be recorded on official transcript. Refer to the Registrar's Office web page for more information.

Grading

Letter Grade	Percentage out of 100	Grade Point Range	Final Grade Point
A+	92-100	4.25-4.5	4.5
A	85-91	3.75-4.24	4.0
B+	78-84	3.25-3.74	3.5
B	72-77	2.75-3.24	3.0
C+	66-71	2.25-2.74	2.5
C	60-65	2.0-2.24	2.0
D	50-59	Less than 2.0	1.0
F	Less than 50		0

Referencing Style

Lab reports should use the reference style of "Journal of Food Engineering" as outlined in: https://www.elsevier.com/journals/journal-of-food-engineering/0260-8774/guide-for-authors. Students are encouraged to go to University of Manitoba Libraries web page to learn about different citation management software packages and citation styles.

Assignment Feedback

Lab report feedback will be provided in the formative (i.e., comments) and summative (i.e., grade) form via UM Learn. You can expect to receive your graded lab reports 2 weeks after you hand them in. You can also expect the feedback for midterm exam and the quizzes 2 weeks after you write them.

Assignment Extension and Late Submission Policy

Lab reports must be received on UM Learn drop box before midnight of their corresponding due date. For every late day, you will lose 20% of the total mark for that lab report. You must attend all the lab sessions to pass the course (unless you miss a lab session and you have a doctor's note). All lab reports need to be submitted to pass the course.

Academic Integrity

Each student in this course is expected to compete their coursework and programs of study with integrity by making a commitment to the six fundamental values of honesty, trust, fairness, respect, responsibility, and courage. http://umanitoba.ca/student-supports/academic-supports/academic-integrity

Academic integrity looks like referencing the work of others that you have used and completing your assignments independently unless otherwise specified

If you are encouraged to work in a team, ensure that your project is completed with integrity. You must also do your own work during exams. Plagiarism, duplicate submission, cheating on quizzes, tests, and exams, inappropriate collaboration, academic fraud, and personation are in violation of the Student Discipline Bylaw and will lead to the serious disciplinary action. Visit the Academic Calendar, Student Advocacy, and Academic Integrity web pages for more information and support.

Some of the course requirements for academic integrity for individual and group work are:

I. Group projects are subject to the rules of academic dishonesty;
II. Group members must ensure that a group project adheres to the principles of academic integrity;
III. All work should be completed independently unless otherwise specified;
IV. Sharing of notes and other materials, such as assignment and exam questions that were provided by the instructor is prohibited, unless otherwise stated. This means that you are not allowed to upload the instructor's intellectual property to a note-sharing or tutoring website without explicit permission.

UNIVERSITY SUPPORT OFFICES & POLICIES

Writing and Learning Support

The Academic Learning Centre (ALC) offers writing and learning supports to help you throughout your academic program. These supports are offered online during the Covid-19 pandemic.

Make an appointment with an ALC writing tutor who can give you feedback at any stage of the writing

process, whether you are just beginning to work on a written assignment or already have a draft. The ALC also has an English as an Additional Language (EAL) specialist available to work with students on improving their English-language academic writing skills.

Consult an ALC learning specialist or attend an academic skills workshop to improve your time management, learning strategies and test-taking strategies. Get support in select courses by making an appointment with an ALC content tutor. The ALC also offers peer-facilitated study groups called Supplemental Instruction (SI) for certain courses that students have typically found difficult. In SI study groups, students ask questions, compare notes, discuss content, solve practice problems, and develop new study strategies in a group-learning format.

In addition to one-to-one and group sessions, you can also find writing and study tip sheets and videos on the ALC website.

Academic Learning Centre services are free for U of M students. For more information, please visit the Academic Learning Centre website at: http://umanitoba.ca/student/academiclearning/

Contact the Academic Learning Centre by calling 204-480-1481 or emailing academic_learning@umanitoba.ca.

University of Manitoba Libraries (UML)

Research begins at UM Libraries. Learn at the Libraries is a great place to start, with information for students on academic writing, how to search the library, evaluating resources, and writing citations. As the primary contact for all research needs, your liaison librarian can play a vital role when completing academic papers and assignments. Liaisons can answer questions about locating appropriate resources or managing citations, and will address any other concerns you may have regarding the research process. Liaisons can be contacted by email or phone, and are also available to meet with you online. When working remotely, students can also receive help online through Ask Us! chat. For further detail about the libraries' services and collections, visit the Libraries' web site. Regularly check our COVID-19 Update page for available library services and access to resources for Fall 2020

For 24/7 mental health support, contact the Mobile Crisis Service at 204-940-1781.

Student Counselling Centre

Contact SCC if you are concerned about any aspect of your mental health, including anxiety, stress, or depression, or for help with relationships or other life concerns. SCC offers crisis services as well as individual, couple, and group counselling. *Student Counselling Centre:* http://umanitoba.ca/student/counselling/index.html

474 UMSU University Centre or S211 Medical Services Building

(204) 474-8592

Student Support Case Management

Contact the Student Support Case Management team if you are concerned about yourself or another student and don't know where to turn. SSCM helps connect students with on and off campus resources, provides safety planning, and offers other supports, including consultation, educational workshops, and referral to the STATIS threat assessment team.

http://umanitoba.ca/student/case-manager/index.html

520 UMSU University Centre

(204) 474-7423 (Student Support Intake Assistant)

University Health Service

Contact UHS for any medical concerns, including mental health problems. UHS offers a full range of medical services to students, including psychiatric consultation. Note that due to fire displacement, UHS is unable to provide in-person medical care on the Fort Garry Campus until October, 2020.

University Health Service http://umanitoba.ca/student/health/

(204) 474-8411 (Business hours or after hours/urgent calls)

Health and Wellness

Contact our Health and Wellness Educator if you are seeking information on health topics, including physical and mental health concerns, alcohol and substance use harms, or sexual violence. You can also access peer support from a *Healthy U* peer health educator.

Health and Wellness Educator

https://umanitoba.ca/student/health-wellness/welcome-about.html

britt.harvey@umanitoba.ca

469 UMSU University Centre

(204) 295-9032

Sexual Violence Resource Centre

Contact SVRC if you have experienced sexual violence or are seeking information about how to help somebody else. SVRC provides inclusive, survivor-centred, trauma-informed services, such as consultation, referrals, safety planning, and a range of on-site supports, including counselling by Klinic.

Sexual Violence Resource Centre

https://umanitoba.ca/student-supports/sexual-violence-support-and-education

svrc@umanitoba.ca
537 UMSU University Centre

(204) 474-6562 (Sexual Violence Intake and Triage Specialist)

Student Services at Bannatyne Campus

Contact SS@BC to access a full range of resources and supports for learners at the Rady Faculty of Health Sciences. Services are provided through a one-stop hub that includes a range of supports for personal and academic success, including counselling, mental health consultation, and spiritual care.

Student Services at Bannatyne Campus

https://umanitoba.ca/student-supports/student-services-bannatyne-campus

bcss@umanitoba.ca

S211 Medical Services Building

(204) 272-3190 (Intake and Triage Specialist

All students are required to respect copyright as per Canada's *Copyright Act*. Staff and students play a key role in the University's copyright compliance as we balance user rights for educational purposes with the rights of content creators from around the world. The Copyright Office provides copyright resources and support for all members of the University of Manitoba community.

Visit http://umanitoba.ca/copyright for more information.

Your rights and responsibilities

As a student of the University of Manitoba you have rights and responsibilities. It is important for you to know what you can expect from the University as a student and to understand what the University expects from you. Become familiar with the policies and procedures of the University and the regulations that are specific to your faculty, college or school.

The Academic Calendar http://umanitoba.ca/student/records/academiccalendar.html is one important source of information. View the sections *University Policies and Procedures* and *General Academic Regulations*.

While all of the information contained in this section is important, the following information is highlighted.

- If you have questions about your grades, talk to your instructor. There is a process for term work and final **grade appeals**. Note that you have the right to access your final examination scripts. See the Registrar's Office website for more information including appeal deadline dates and the appeal form http://umanitoba.ca/registrar/

- You are expected to view the General Academic Regulation section within the Academic Calendar and specifically read the **Academic Integrity** regulation. Consult the course syllabus or ask your instructor for additional information about demonstrating academic integrity in your academic work. Visit the Academic Integrity Site for tools and support http://umanitoba.ca/academicintegrity/ View the **Student Academic Misconduct** procedure for more information.

The University is committed to a respectful work and learning environment. You have the right to be treated with respect and you are expected conduct yourself in an appropriate respectful manner. Policies governing behavior include the:

Respectful Work and Learning Environment

http://umanitoba.ca/admin/governance/governing_documents/community/230.html

Student Discipline
http://umanitoba.ca/admin/governance/governing_documents/students/student_discipline.html and,

Violent or Threatening Behaviour
http://umanitoba.ca/admin/governance/governing_documents/community/669.html

- If you experience **Sexual Assault** or know a member of the University community who has, it is important to know there is a policy that provides information about the supports available to those who disclose and outlines a process for reporting. The **Sexual Assault** policy may be found at: http://umanitoba.ca/admin/governance/governing_documents/community/230.html More information and resources can be found by reviewing the Sexual Assault site http://umanitoba.ca/student/sexual-assault/

- For information about rights and responsibilities regarding **Intellectual Property** view the policy: https://umanitoba.ca/admin/governance/governing_documents/community/235.html

- For information on regulations that are specific to your academic program, read the section in the Academic Calendar and on the respective faculty/college/school web site http://umanitoba.ca/faculties/

Contact an **Academic Advisor** within our faculty/college or school for questions about your academic program and regulations http://umanitoba.ca/academic-advisors/

Student Advocacy

Contact Student Advocacy if you want to know more about your rights and responsibilities as a student, have questions about policies and procedures, and/or want support in dealing with academic or discipline concerns.

http://umanitoba.ca/student/advocacy/

520 University Centre

204 474 7423

student_advocacy@umanitoba.ca