UM | Faculty of Agricultural and Food Sciences

Syllabus

FOOD 4250: Food Analysis II

(Winter 2021)

Department of Food and Human Nutritional Sciences

University of Manitoba

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COURSE DETAILS

Course Title & Number:	FOOD 4250 Food Analysis II
Number of Credit Hours:	3
Class Times & Days of Week:	Tuesday, Thursday: 8.30 am – 9.45 am Lab Section: Tuesday 2.30 pm-5.25 pm
Location for classes/labs/tutorials:	Virtual classes Labs will be virtual and In-person (Location to be notified)
Pre-Requisites:	FOOD 4160: Food Analysis I

Instructor Contact Information

Instructor(s) Name & Preferred Form of Address:	Dr. Chamila Nimalaratne Instructor will respond to any civil form of address such as first name, last name or Dr. etc
Office Location:	Virtual via UMLearn WebEx meetings
Office Hours or Availability:	Tuesdays and Thursdays 10.00 am – 11.00 am, Other times by appointment.
Office Phone No.	780-966-1320
Email:	Chamila.Nimalaratne@umanitoba.ca (preferred method of communication) All emails should contain FOOD 4250 at the subject line
Contact:	Email is the preferred method of communication. All emails will be answered within 24 hours. For urgent reasons, you can contact by phone.

Course Description

U of M Course Calendar Description

Advanced techniques employed in the physico-chemical analysis of food products as preparation for research, development, and inspection roles in government and in industry.

General Course Description

This course exposes students to the fundamentals of advanced qualitative and quantitative analytical methods to evaluate chemical and, physical properties of foods. Major emphasis is placed on understanding the basic principles of classical and instrumental methods of analysis.

Course Goals

1. Be familiar with the current analytical methods available for food analysis
2. Understand the principles and appropriate use of advanced analytical techniques associated with food component analysis
3. Know methods of selecting appropriate analytical techniques and be able to interpret the results when presented with a practical problem
4. Demonstrate practical proficiency and teamwork in a food analysis laboratory and effective communication of the laboratory results
5. Be able to use and understand the library and internet resources pertaining to advanced food analysis

Course Learning Objectives

At the end of the course, students should:

1. Describe the principles and application of instrumental analytical techniques
    a. Explain the principles behind instrumental analytical techniques including spectrophometry, colorimtery, electrophoresis, chromatography, immunoassays, thermal analysis and rheology
    b. Contrast/compare the principles behind related techniques (e.g. different types of spectroscopy)
2. Determine when a specific analytical technique is required
    a. Compare the outcomes of different analytical techniques
    b. Justify the choice of method for a given application
3. Perform fundamental lab skills including solution preparation, dilution and pH adjustment
    a. Generate data that is reasonable for a given analytical technique
    b. Demonstrate competence in sample handling
4. Perform instrumental techniques used in the evaluation of foods.
    a. Conduct an experiment in a laboratory setting to produce the require data using instrument analytical techniques including spectrophometry, colorimtery, electrophoresis, chromatography, immunoassays, thermal analysis and rheology
5. Evaluate data resulting from instrumental analytical techniques
    a. Interpret data from instrumental analytical techniques including spectrophometry, calorimetry, electrophoresis, chromatography, immunoassays, thermal analysis and rheology
6. Use sensory analysis to evaluate food products
    a. Explain the principles of various sensory techniques
    b. Recommend an appropriate sensory technique for a given situation
    c. Conduct a sensory test for a specified product
7. Use computers to run analytical equipment
    a. Analyze food samples using computer controlled analytical equipment
8. Use computers to evaluate and present data from laboratory exercises
    a. Prepare reports summarizing data from experiments with appropriate interpretation - Reports should be grammatically, technically (format) and ethically (correct use of literature) sound and demonstrate your ability to interpret the data obtained.

Textbook, Readings, and Course Materials

Required textbook:

Food Analysis, 5th Edition. S. Suzanne Nielsen (ed.) 2017. Springer.

There is unlimited access to this book via UofM license agreement with Springer Publishing Co. It can be obtained at the following link: https://link-springer-com.uml.idm.oclc.org/book/10.1007%2F978-3-319-45776-5 Note that the link is also available through UM Learn.

Supplementary readings (Available in University of Manitoba libraries):

Bergmeyer, H.U. 1983. Principles of Enzymatic Analysis, 3rd Ed.. Verlag Chemie, Weinheim.

James, C. S. 1995. Analytical chemistry of foods; Blackie Academic & Professional. Sciences and Technology Library: TX 545 A56)

Joslyn, M.A. 1970. Methods in Food Analysis. Academic Press, NewYork.

Lawless H.T.and Heymann, H. 1998. Sensory Evaluation of Food: Principles and Practices. Springer http://www.springerlink.com.proxy2.lib.umanitoba.ca/content/m6362n/#section=787528&page=1

MacRae, R. 1982. HPLC in Food Analysis. Academic Press, London.

Nollet, L. M.L. (ed) 2004. Handbook of food analysis. v. 3. Methods and instruments in applied food analysis. Marcel Dekker, New York. c2004.

Nollet, L. M.L. (ed). 2000. Food analysis by HPLC. Marcel Dekker, New York, Elizabeth Dafoe Library. TX 548.2 L55 F66 2000

Ötles. S., 2008, Handbook of Food Analysis Instruments. CRC Press Print ISBN: 978-1-4200-4566-6; eBook ISBN: 978-1-4200-4567-3 http://www.crcnetbase.com.proxy2.lib.umanitoba.ca/isbn/9781420045666

Paré, J.R.J. and Bélanger J.M.R. 1997. Instrumental methods in food analysis. Elsevier, New York. Sciences and Technology Library. TX 541 I564 1997

Pomeranz, Y. 1994. Food analysis : theory and practice. Chapman & Hall. Elizabeth Dafoe Library. TX541.P64 1994

Whitaker, .JR., Voragen , .A.G.J. and Wong, D.W.S. (Eds). 2002 Handbook of Food Enzymology, CRC Press Print ISBN: 978-0-8247-0686-9; eBook ISBN: 978-0-203-91045-0

http://www.crcnetbase.com.proxy2.lib.umanitoba.ca/isbn/9780824706869

Using Copyrighted Material

Please respect copyright. Copyrighted content used in this course is appropriately acknowledged and has been used in accordance with copyright laws and University guidelines. Copyrighted works, including those created by the instructor, 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.

Course Technology

The instructor's general policy is that students should refrain from any behaviour that may be distracting to other students. Accordingly, the use of cell phones for personal reasons or frivolous use of personal computer devices (e.g. not for following lecture slides posted to UM Learn) is not permitted. Such use of electronic accessories is invariably a distraction for other students at the very least, and interferes with the effectiveness of the classroom learning environment in general.

Expectations: I Expect You To

Attend the classes regularly and punctually. I will be asking questions during the class and will expect the students respond and actively participate in the class (even though you are not sure if the answer is correct).
I will treat you with respect and would appreciate the same courtesy in return. See Respectful Work and Learning Environment Policy.

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:
https://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.

Specific course requirements for academic integrity for individual and group work:

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. Students will work on assignments with provided lab data (for each group), but need to submit a individual lab reports.
IV. All work should be completed independently unless otherwise specified.

Recording Class Lectures:
The instructor and the University of Manitoba hold copyright over the course materials, presentations and lectures which form part of this course. No audio or video recording of lectures or presentations is

allowed in any format, openly or surreptitiously, in whole or in part without permission from Dr. Chamila Nimalaratne. Course materials (both paper and digital) are for the participant's private study and research only.

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

Expectations: You Can Expect Me To

In-class revisions and reviewing of course work will be conducted as we complete different course sections.
I will be available 5 minutes prior to and after the class time to discuss any questions or comments you may have.
I will respond to your email related to class within 24-48 hr.

CLASS SCHEDULE AND COURSE EVALUATION

The schedule provided below is subject to change at the discretion of the instructor but such changes are subject to Section 2.8 of the – ROASS- Procedure.

Complete Mark Allocation for Course (Students can expect to have marks for 1 quiz, Midterm test, and 5 lab reports before the Voluntary Withdrawal date, March 31, 2021)

Midterm test[a]	25%
10-15 min quizzes[b], 2@5%	10%
Lab Hand-Ins and Reports [c] (7@ ~ 4%)	28%
Final Examination (all lecture sections, 3 hr)[d]	35%
Class attendance/participation	2%
Total	100%

[a]Midterm test is tentatively scheduled on Mar 11th
[b]Quizzes are tentatively scheduled on Feb 11th and Mar 25th
[c]Lab reports are due 2 weeks after laboratory session according to schedule and instructions below. Penalty for late submission is deduction of 10%/day of original mark. Refer to LAB SCHEDULE below for due dates.
[d]Final exam date will be set by the Registrar's Office.

Date	Class Content & Teaching Strategies	Evaluation

		Required Readings or any Pre-class Preparation	Type of Assessment	Due Date	Value of Final Grade
	Major concepts to be covered				
Jan 19	Introductory lecture				
Jan 21	Introduction to spectroscopy UV-Visible spectroscopy	Nielson (2017), pp. 79-100			
Jan 26	Fluorescence spectroscopy	Nielson (2017), pp. 101-106			
Jan 28	Infra-red spectroscopy	Nielson (2017), pp. 107-125			
Feb 02	Atomic absorption spectroscopy	Nielson (2017), pp. 129-149			
Feb 04	Mass spectroscopy	Nielson (2017), pp. 165-180			
Feb 09	Resonance spectroscopy	Nielson (2017), pp. 151-162			
Feb 11	Chromatography part 1 **(Quiz 1 after the class)**	Nielson (2017), pp. 185-209	Quiz 1	11 Feb 2021	5.0%
Feb 16	**Winter break – No classes**				
Feb 18	**Winter break – No classes**				
Feb 23	Chromatography part 2	Nielson (2017), pp. 185-209			
Feb 25	Gas Chromatography	Nielson (2017), pp. 227-251			
Mar 02	Liquid Chromatography	Nielson (2017), pp. 213-225			
Mar 04	Supercritical Fluid Chromatography				
Mar 09	**Revision and Discussion**				
Mar 11	**Midterm exam**		Midterm exam	11 Mar 2021	25%
Mar 16	Color analysis	Nielson (2017), pp. 545-554			
Mar 18	Electrophoresis				
Mar 23	Immunoassays	Nielson (2017), pp. 487-501			
Mar 25	Enzyme analysis, **Quiz 2**	Nielson (2017), pp. 469-485	Quiz 2	25 Mar 2021	5.0%
Mar 30	Rheology	Nielson (2017), pp. 511-527			
Apr 01	Thermal Analysis (Guest lecture)	Nielson (2017), pp. 529-543			
Apr 06	Sensory Analysis -1 (Guest lecture)	Lecture notes			
Apr 08	Sensory Analysis - 1(Guest lecture)	Lecture notes			
Apr 13	**Revision and Discussion**				

TBD	Final Exam (cumulative) (Date will be set by Registrar's office)		Final exam	To be Decided	35.0%
			Lab Reports	See the lab schedule	28.0%
			Class attendance/ participation		2%
			Total		**100%**

Important Information about Evaluation Procedures

- There will be 2% of the final marks for attendance/ active class participation.
- There are no makeup quizzes, if absent for a quiz without a proper physician note or substantiated and compelling personal matter documented in writing, the quiz mark = 0. If a valid excuse is provided within 24hrs after the quiz, the value of the quiz mark to be added to the next following term test or final exam.
- If a student is absent for the midterm test and provides a proper physician note or written explanation of a substantiated and compelling personal matter, a makeup test will be scheduled as soon as possible. Otherwise a mark of 0 will be applied.
- If you are a student with a disability, please contact Student Accessibility Services (SAS) for 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 http://umanitoba.ca/student/saa/accessibility/, 520 University Centre, phone: 204-474 7423, email: Student_accessibility@umanitoba.ca

Lab Expectations

Any communication related to the lab section of the course have to be primarily directed to the lab TA. If you need further clarifications on the lab section, you can reach me using my email (preferred method of communication - Chamila.Nimalaratne@umanitoba.ca)

- Technicians and Lab TAs will treat you with respect and would appreciate the same courtesy in return. You are expected to comply with all lab rules and regulations as stipulated in the Lab Manual which is posted on UM Learn.

***NOTE**: First in-person lab starts on January 26th, 2021. **Prior to the first laboratory, you are required to complete and pass (with a mark of at least 80%) an online WHMIS quiz available through UM Learn. You may take this test as many times as is necessary to pass.**

- The overall goal is to give students a practical experience in the advanced analysis of foods, and for students to learn to effectively work in groups. The labs for this course are group projects that require students to in-person or virtually attend the labs they are registered for. **There will be a total of 28% of the final grade given for labs.** The lab manual is available on UM Learn.

- **Virtual/ in-person lab attendance is mandatory (there are no makeup labs). 100% of mark allocated to a lab will be deducted if absent without a physician note or documentation of a compelling personal matter. Students are not allowed to submit the lab report if absent for the virtual/ in-person labs.**
- For labs, students will work in groups as assigned, but each student will submit his/her own report. Any evidence of plagiarism in lab reports (e.g. whether from another lab partner, or group, or lab report from previous courses) will result in "0" mark and matter will be subject to disciplinary action in accordance with university policy on academic misconduct.

Lab Schedule*

Date	Lab Content & Teaching Strategies	Required Readings or Pre-Class Preparations	Lab report	
			Due Date	Value of Final Grade
Jan 26	Laboratory 1 for Group A In-person	Lab Manual	Feb 09	~4.4%
	Laboratory 3 for Group B - Virtual	Lab Manual	Feb 09	~4.0%
Feb 02	Laboratory 1 for Group B In-person	Lab Manual	Feb 16	~4.4%
	Laboratory 3 for Group A Virtual	Lab Manual	Feb 16	~4.0%
Feb 09	Laboratory 2 Virtual	Lab Manual	Feb 23	~3.5%
Feb 23	Laboratory 4 Virtual	Lab Manual	Mar 09	~3.5%
Mar 02	Laboratory 5 Virtual	Lab Manual	Mar 16	~4.2%
Mar 09	Laboratory 6 Virtual	Lab Manual	Mar 23	~4.2%
Mar 16	In-person laboratory tour for laboratory 5 and 6	Lab Manual	-No report-	
Mar 23	Laboratory 7 Virtual	Lab Manual	Apr 06	~4.2%

* A complete lab schedule with exact times and location of in-person labs for each group will be posted in UMLearn.

Grading

Letter Grade	Percentage out of 100	Final Grade Point
A+	90-100	4.5
A	80-89.9	4.0
B+	75-79.9	3.5
B	66-74.9	3.0
C+	61-65.9	2.5
C	56-60.9	2.0
D	50-55.9	1.0
F	Less than 50	0

Voluntary Withdrawal

The last day to drop the class and receive 100% refund is 29th January 2021. And the last day to withdraw with no refund (voluntary withdrawal) is 31st March 2021. Students who did not drop the course by the VW deadline would be assigned a final grade. However, withdrawal courses will be recorded on official transcript. Please refer to the Registrar's Office web page for more information.

Referencing Style

Assignments should use the APA reference style as outlined in the text: American Psychological Association. (2009). Publication manual of the American Psychological Association (6th ed.). Washington, DC: Author.

Assignment Extension and Late Submission Policy

Lab reports/ Hand-Ins are generally due 2 weeks after laboratory session according to schedule and instructions. Penalty for late submission is deduction of 10% per day of original mark. Refer to LAB SCHEDULE for due dates. UM Learn submission of assignments is the accepted method of handing over assignment.

UNIVERSITY SUPPORT OFFICES & POLICIES

The Schedule "A" provides information on university support offices and policies available for students during the academic terms.

Schedule "A"

Section (a) re: A list of academic supports available to Students, such as the Academic Learning Centre, Libraries, and other supports as may be appropriate:

Writing and Learning Support

The Academic Learning Centre (ALC) offers services that may be helpful to you throughout your academic program. Through the ALC, you can meet with a learning specialist to discuss concerns such as time management, learning strategies, and test-taking strategies. The ALC also offers peer

supported study groups called Supplemental Instruction (SI) for certain courses that students have typically found difficult. In these study groups, students have opportunities to ask questions, compare notes, discuss content, solve practice problems, and develop new study strategies in a group-learning format.

You can also meet one-to-one with a 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. If you are interested in meeting with a writing tutor, reserve your appointment two to three days in advance of the time you would like to meet. Also, plan to meet with a writing tutor a few days before your paper is due so that you have time to work with the tutor's feedback.

These 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/

You can also contact the Academic Learning Centre by calling 204-480-1481 or by visiting 205 Tier Building.

University of Manitoba Libraries (UML)

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 managing citations, or locating appropriate resources, 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 in-person. A complete list of liaison librarians can be found by subject: http://bit.ly/WcEbA1 or name: http://bit.ly/1tJ0bB4. In addition, general library assistance is provided in person at 19 University Libraries, located on both the Fort Garry and Bannatyne campuses, as well as in many Winnipeg hospitals. For a listing of all libraries, please consult the following: http://bit.ly/1sXe6RA. When working remotely, students can also receive help online, via the Ask-a-Librarian chat found on the Libraries' homepage:www.umanitoba.ca/libraries.

Section (b) provides information regarding mental health resources that are available at University of Manitoba:

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 University Centre or S207 Medical Services
(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.
Student Support Intake Assistant http://umanitoba.ca/faculties/education/current/474.html
520 University Centre
(204) 474-7423

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.
University Health Service http://umanitoba.ca/student-supports/health-wellness/university-health-service
104 University Centre, Fort Garry Campus
(204) 474-8411 (Business hours or after hours/urgent calls)

Health and Wellness
Contact our Health and Wellness Educator if you are interested in peer support from *Healthy U* or information on a broad range of health topics, including physical and mental health concerns, alcohol and substance use harms, and sexual assault.
Health and Wellness Educator http://umanitoba.ca/student-supports/health-wellness
Contact Health and Wellness Educator 204-295-9032 or britt.harvey@umanitoba.ca for more information.

Live Well @ UofM
For comprehensive information about the full range of health and wellness resources available on campus, visit the Live Well @ UofM site:
http://umanitoba.ca/student/livewell/index.html

Section (c): A notice with respect to copyright:

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.

Section (d): A statement directing the student to University and Unit policies, procedures, and supplemental information available on-line:

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 these two sections 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/student-supports/academic-supports/academic-integrity. 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-supports/sexual-violence-support-and-education

- 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-supports/academic-supports/academic-advising
520 University Centre
204 474 7423
http://umanitoba.ca/student-supports/academic-supports/student-advocacy