

NFS485H1 F – Diet, Microbiome & Health

OVERVIEW AND LEARNING OUTCOMES

This course provides an integrated approach to how prokaryotes modulate nutrient availability and how they interact with the host to impact human health from a molecular perspective.

The course will provide fundamentals of food microbiology, information on the gut microbiota and its impact on host metabolism and examples of nutritional strategies to modulate its composition.

At the end of this course students will be able to:

1. Discuss the role played by the gut microbiome in body health
2. Understand how gut microbiome alteration relates to gastro-intestinal diseases or influences metabolism
3. Suggest nutritional strategies to modulate the gut microbiome to impact body health
4. Explain which microorganisms can be found in food and are important for its manufacture and spoilage as well as health
5. Understand regulatory issues related to microorganisms in food.

CLASSES AND INFORMATION

Mode of delivery: In Person; Tuesdays, 1-4 pm; MSB 4279.

Instructor: **Dr Elena Comelli**, Dept. of Nutritional Sciences
1 King's College Circle, Medical Sciences Building room 5354A
- email: elena.comelli@utoronto.ca
- office hour: immediately after each lecture or by appointment.

Guest lecturers **Dr Dana Philpott**, Dept of Immunology, UofT
Dr Sabrina Ayoub-Charette, Dept. of Nutritional Sciences, UofT
Dr Robert Bandsma, The Hospital for Sick Children, Toronto
Dr Williams Turpin, Mount Sinai Hospital, Joseph and Wolf Lebovic Health Complex, Zane Cohen Centre for Digestive Diseases
Dr Paraskevi Massara, Dept of Nutritional Sciences, UofT

Teaching Assistant **Jiali (John) Pan, PhD student**
Dept. of Nutritional Sciences
1 King's College Circle, Medical Sciences Building room 5345
email: johnpjl.pan@mail.utoronto.ca

MATERIALS

There are no required or recommended textbooks. Material will be provided during the term and posted on Quercus in "Course materials".

ANNOUNCEMENTS

Announcements are posted on Quercus. Announcements are used to inform students of new course content, due dates, release of grades and other relevant matters. It is the responsibility of the student to check the Announcements regularly.

COMMUNICATION WITH INSTRUCTOR AND TA

Students are expected to communicate with the instructor and the TA electronically. Two discussion boards are available on Quercus, one to be used for questions related to course content and the other to be used for questions related to the assignments. Please post your questions through the appropriate discussion board. Questions related to the course and the course content, including the assignments, will not be answered via email.

The use of email is limited to questions of a personal nature.

COURSE OUTLINE**Week 1. Sept 8.**

Introduction to Diet, Microbiome and Health. Explanation of course goals and expectations. Antonie van Leeuwenhoek and the oral microbiome.

Week 2. Sept 15.

Introduction to microbial ecology. Biochemistry of fermentation. Microorganisms endogenous to the host that modulate nutrient availability and metabolism. The gut microbiome.

Week 3. Sept 22.

Molecular techniques in intestinal microbiology. Gut microbiota: mechanisms of intestinal colonization and establishment. Human milk oligosaccharides. The microbiome and the Developmental Origins of Health and Disease (nutritional programming of the microbiome).

Week 4. Sept 29.

Fermented foods. Prebiotics, probiotics, synbiotics and postbiotics. Regulatory issues, claims.

Week 5. Oct 6.

Guest lecture, Dr Dana Philpott: Intestinal epithelium responses to non-pathogenic bacteria. Role of the gut microbiome in the mucosal barrier.

Week 6. Oct 13. Mid-term test.**Week 7. Oct 20.**

Microbiome, obesity and the metabolic syndrome, a historical perspective.

Guest lecture, Dr Sabrina Ayoub-Charette: Microbiome, obesity and the metabolic syndrome, recent developments. Non-nutritive sweeteners and the microbiome.

Reading week Oct 26 - 30**Week 8. Nov 3.**

Diet and gut microbiome interplay: production of toxic compounds, production of beneficial compounds and cancer. Ultra-processed foods and the microbiome (a focus on emulsifiers).

Week 9. Nov 10.

Guest lecture, Dr Williams Turpin: Inflammatory bowel disease, diet and the microbiome.

Week 10. Nov 17.

Guest lecture, Dr Robert Bandsma: Malnutrition and the microbiome. Gastro-intestinal infections and foodborne diseases.

Week 11. Nov 24.

Guest lecture, Dr Paraskevi Massara: The microbiome and precision nutrition; AI and ethics.

Week 12. Dec 1. End of term test.

EVALUATION

The course will contain the following evaluations:

Evaluation	Due Date	Weight
Mid-term test (weeks 1 - 5)	13 Oct 2026. In class, 1:10-3:10 pm	35%
Written assignment Stage 1	20 Oct 2026, 1 pm ET	2%
Written assignment Stage 2	10 Nov 2026, 1 pm ET	5%
Written assignment Stage 3 (Infographic)	24 Nov 2026, 1 pm ET	18%
End of term test (weeks 1 - 11)	1 Dec 2026. In class, 1:10-3:10 pm	40%
Total		100%

Mid-term (35%) and end of term (40%) tests

These may include definitions, true and false, short answers and essay-type questions.

Written assignment – infographic (25%)

Students will design an infographic that critically evaluates and dismantles a myth, provided by the instructor, related to diet, microbiome and health. The assignment will be completed in three stages; the first two submissions are intended to help students develop the scientific foundation for the final infographic.

- Stage 1. Why the myth sounds convincing (2%). In a maximum of 30 words, explain why the myth may initially appear reasonable or scientifically plausible. Due: Tuesday, October 20, 2026, at 1:00 p.m. ET.
- Stage 2. Key characteristics of the myth components (5%). Identify four key characteristics of each of the main components of the myth and present them in a comparative table. Selected claims must be linked to appropriate peer-reviewed evidence through a brief evidence trace. Due: Tuesday, November 10, 2026, at 1:00 p.m. ET.
- Stage 3. Final infographic (18%). Integrate and refine the earlier submissions into a scientifically accurate infographic. The infographic should explain why the myth is misleading or incorrect, illustrate the relevant mechanisms and scientific nuances, identify an appropriate boundary condition and counterexample, and provide an evidence-based corrected statement. Due: Tuesday, November 24, 2026, at 1:00 p.m. ET.

All components will be submitted through Quercus as a pdf. Total value: 25% of the final course grade. Detailed instructions will be provided after the course has started.

POLICIES**University's plagiarism detection tool (Turnitin Plagiarism Framework)**

"Normally, students will be required to submit their course essays to the University's plagiarism detection tool for a review of textual similarity and detection of possible plagiarism. In doing so, students will allow their essays to be included as source documents in the tool's reference database, where they will be used solely for the purpose of detecting plagiarism. The terms that apply to the University's use of this tool are described on the Centre for Teaching Support & Innovation web site (<https://uoft.me/pdt-faq>)."

The University's plagiarism detection tool is integrated into Quercus. Instructions are provided here:

<https://q.utoronto.ca/courses/46670/pages/student-plagiarism-detection-tool>

Please make sure that you are using your University of Toronto issued email address, as required by the University of Toronto policy concerning email addresses.

If you have problems that prevent you from submitting to the University's plagiarism detection tool, please contact Dr. Comelli to discuss alternatives. All students are expected to either submit to the University's

plagiarism detection tool, which is voluntary, or provide an alternative. Failure to do so could result in a grade of ZERO for the assignment.

Those who do not submit to the University's plagiarism detection tool will be expected to meet with Dr. Comelli for a short oral test during which you will be asked questions about the writing of the assignment and its content. Your assignment grade may be changed based on how well you answer these questions.

Missed term tests

Except for compelling reasons such as illness or personal distress, all students will be given a grade of ZERO if they miss the term test. There are NO MAKE-UPS and NO EXTENSIONS. If you miss a term test for compelling reasons, its respective weight will be redistributed among the other assessments. If you miss both the mid term and the end of term tests, for compelling reasons, you will be required to meet with Dr. Comelli for an oral examination covering the entire course content.

If you miss a term test due to illness, injury, a personal or family emergency, bereavement, or another legitimate circumstance, you must notify the course instructor as soon as possible and request academic consideration. All information is kept confidential. If applicable, you must also submit an ACORN Absence Declaration and send a copy of the declaration to the course instructor. Please follow the University of Toronto procedures for reporting absences and, where required, provide an accepted form of documentation (<https://www.registrar.utoronto.ca/records-academics/absence-declaration/>).

Students dealing with intense or ongoing personal distress or chronic illness, who may need special and continuing accommodation, may be asked for additional documentation and are advised to discuss their situation with their college registrar and consider contacting Accessibility Services (see below).

Late submission of the written assignments

Any assignment of this type submitted later than the due date and time will be considered late and a 10% reduction in the grade will be given every day that it is late (including weekends). No email submissions will be accepted.

Note: Submitting your assignment by e-mail as "proof" of its timely completion is NOT acceptable; timely completion includes the final submission via Quercus.

Regrading of the written assignment: infographic

1. Students must submit a written proposal to the Teaching Assistant explaining why a regrade is warranted. The Teaching Assistant may or may not choose to regrade - it will depend on how well each student presents their case.

NOTE: REGRADE PROPOSALS MUST BE SUBMITTED VIA EMAIL (DEADLINE FOR REGRADE PROPOSAL-TO BE ANNOUNCED)

2. Students accept that their assignment will be regraded by Dr. Comelli. The combined average grade of Dr. Comelli and the TA will be taken as the **final grade**. Thus, **the grade may increase or decrease**. Students requesting that their infographic be regraded are accepting the risk that they may end up with a lower grade if they submit a regrade request.
3. If students want to meet with us to just discuss their infographic or to obtain clarification about the TA's comments, a formal proposal is not required. Students just need to email the Teaching Assistant to request a meeting and an in-person or Zoom meeting will be scheduled.

Use of generative Artificial Intelligence (AI)

In order to support your learning and development of critical abilities, the use of generative AI applications (e.g., ChatGPT, Copilot, Gemini, etc) to complete course assignments is now allowed; students may not copy or paraphrase from any generative AI applications. Please note that uploading course material or

information provided by the speakers into a generative AI tool constitutes breach of Intellectual Property (see below: “**Lecture material and intellectual property**”).

Lecture material and intellectual property

Course materials belong to your instructor and guest lecturers, the University, and/or other sources depending on the specific facts of each situation and are protected by copyright. Do not record, download, copy, re-post, or share any course or student materials without the explicit permission of the instructor.

Academic Integrity

Students are expected to conduct themselves with academic integrity.

Academic misconduct at the University of Toronto is defined by the [Code of Behaviour on Academic Matters](#).

All students, faculty and staff are expected to follow the University's guidelines and policies on academic integrity. For students, this means following the standards of academic honesty when writing assignments, collaborating with fellow students, and writing tests and exams. Ensure that the work you submit for grading represents your own honest efforts. Plagiarism—representing someone else's work as your own or submitting work that you have previously submitted for marks in another class or program—is a serious offence that can result in sanctions. Speak to your instructor for advice on anything that you find unclear. To learn more about how to cite and use source material appropriately and for other writing support, see the U of T writing support website at <http://www.writing.utoronto.ca>. Consult the Code of Behaviour on Academic Matters for a complete outline of the University's policy and expectations. For more information, please see <http://www.artsci.utoronto.ca/osaj> and <http://academicintegrity.utoronto.ca>.

Students: please review “how not to plagiarize” website <https://advice.writing.utoronto.ca/using-sources/how-not-to-plagiarize/>. It is your responsibility to know the rules and that the University expects all work to be completed in accordance with the Code. Please ensure your work complies with the rules before submitting any course assignments.

Accessibility and Accommodations Needs

Students with diverse learning styles and needs are welcome in this course. If you have an acute or ongoing disability issue or accommodation need, you should register with Accessibility Services (AS) at the beginning of the academic year by visiting <http://www.studentlife.utoronto.ca/as/new-registration>. Without registration, you will not be able to verify your situation with your instructors, and instructors will not be advised about your accommodation needs. AS will assess your situation, develop an accommodation plan with you, and support you in requesting accommodation for your course work. Remember that the process of accommodation is private: AS will not share details of your needs or condition with any instructor, and your instructors will not reveal that you are registered with AS.

WRITING AND LANGUAGE SUPPORT IN ARTS AND SCIENCE

A wide range of resources is available at the Faculty of Arts and Science for writing support (www.writing.utoronto.ca). You can find information about college writing centres at: <http://www.writing.utoronto.ca/writing-centres/arts-and-science>. The teaching approach of the college writing centres is described at: <http://www.writing.utoronto.ca/writing-centres/learning>. Many Advice files on all aspects of academic writing are available at: www.writing.utoronto.ca/advice. Printable PDF versions are listed at: <http://www.writing.utoronto.ca/about-this-site/pdf-links-for-students>. Must read: "How Not to Plagiarize" at: www.writing.utoronto.ca/advice/using-sources.

Students interested in the English Language Learning program (ELL) are encouraged to visit their website at: <http://www.artsci.utoronto.ca/current/advising/ell>. A useful activity for this course is “Reading eWriting”, an online program that helps students “to strengthen the speed and ease with which you read, reason, and write”.

Resources & supports

If you or someone you know is in distress and there is an immediate risk, call 911.

The following includes supports available to students on all three campuses:

- [U of T St. George \(Downtown Toronto\)](#)
- [U of T Scarborough](#)
- [U of T Mississauga](#)

Additionally, students have access to [U of T My Student Support Program](#) (My SSP) | 1-844-451-9700 24/7. Outside of North America, call 001-416-380-6578.

Culturally-competent mental health and counseling services in 146 languages for all U of T students.