

# FNH 325 Food Science Laboratory I Syllabus

## Course Details

Course	FNH 325 [0-3-0]
Prerequisites	All of FNH 300, FNH 301, FNH 302. These courses can be taken as co-requisites
Term/year	Winter term 1 (Sept – Dec 2020)
Class day/time	Tuesdays 1 – 4 pm synchronous or asynchronous
Class location	Online
Instructor	Dr. Patricia Hingston
Email	<a href="mailto:Patricia.hingston@ubc.ca">Patricia.hingston@ubc.ca</a> however, please contact through Canvas mail
Office	Room 223, MacMillan Building
Office hours	FNH 325: Thursdays 1 – 3 pm (virtual through zoom)
TAs	Lennie Cheung, Linda Lu, Angela Rutakomoziwa
TA contact	Please contact through Canvas mail
Syllabus version	Aug 20, 2020

## Course Instructor Welcome

Hello! My name is Patricia Hingston and I am an Assistant Professor of Teaching in Food Science at UBC. I teach the upper-level laboratory courses in Food Science as well as Food Microbiology which is my area of expertise. Teaching is my passion. I thoroughly enjoy mentoring students and observing their growth throughout their program. My main goal in this course is to help you develop the skills that you will need to be successful in your future careers and/or graduate studies. I am a very friendly and approachable person so please feel welcome to connect with me regarding the course or any other matters. Originally from Owen Sound, Ontario, I lived in Halifax (Nova Scotia, Canada) and Copenhagen (Denmark) before moving to Vancouver for my PhD. I loved Vancouver so much that I decided to stay. In my free time you can find me painting, cooking, riding my bike, or doing yoga. Feel free to following me on Instagram **@phingst88** to see what I get up to when I'm not teaching.

## Course Objectives

Laboratory I will provide you with the opportunity to integrate your Food Science knowledge to obtain a better understanding of food as a complete entity. The lab exercises have been designed to reinforce the theoretical concepts covered in the core Food Science courses (food microbiology, chemistry, analysis, quality control, processing) and to give you the opportunity to develop practical skills that will be useful in the food industry. Due to the pandemic, the course has been redesigned to be delivered online this year so unfortunately we will not be conducting in-person lab sessions; however, you will still be learning how to design experiments, analyze data, and write scientific reports as well as communicate scientific information to an audience and work in a team.

## Learning Outcomes

Upon completion of this course you should be able to:

1. Explain principles of food analysis techniques
2. Use raw data to calculate experimental results
3. Select and use statistical tools to analyze experimental data
4. Construct visual representations of experimental data that meet scientific journal standards
5. Compose technical reports that disseminate experimental findings to a variety of audiences
6. Locate, evaluate and incorporate scientific literature into written and oral forms of communication
7. Create oral presentations that communicate scientific findings in an organized and clear manner
8. Work effectively both individually and in teams

## Institute of Food Technologists (IFT)



UBC's Food Science Program is one of few in Canada that are approved by the Institute of Food Technologists (IFT), an internationally recognized leader in undergraduate education standards for degrees in Food Science. Programs with this approval badge are recognized as delivering a comprehensive Food Science education that covers 55 essential learning outcomes (ELOs) established by the IFT organization. Further information about the IFT ELOs is available as a [brief report](#). The highlighted ELOs below are covered in this course.

## Institute of Food Technologists Essential Learning Objectives (IFT ELOs)

### Food Chemistry (FC)

- FC.1. Discuss the major chemical reactions that limit shelf life of foods.
- FC.2. Explain the chemistry underlying the properties and reactions of various food components.
- FC.3. Apply food chemistry principles used to control reactions in foods.
- FC.4. Demonstrate laboratory techniques common to basic and applied food chemistry.
- FC.5. Demonstrate practical proficiency in a food analysis laboratory.
- FC.6. Explain the principles behind analytical techniques associated with food.
- FC.7. Evaluate the appropriate analytical technique when presented with a practical problem.
- FC.8. Design an appropriate analytical approach to solve a practical problem.

### Food Microbiology (FM)

- FM.1. Identify relevant beneficial, pathogenic, and spoilage microorganisms in foods and the conditions under which they grow.
- FM.2. Describe the conditions under which relevant pathogens are destroyed or controlled in foods.
- FM.3. Apply laboratory techniques to identify microorganisms in foods.
- FM.4. Explain the principles involved in food preservation via fermentation processes.
- FM.5. Discuss the role and significance of adaptation and environmental factors (e.g., water activity, pH, temperature) on growth response and inactivation of microorganisms in various environments.
- FM.6. Choose relevant laboratory techniques to identify microorganisms in foods.

**Food Safety (FS)**

- FS.1. Identify potential hazards and food safety issues in specific foods.
- FS.2. Describe routes of physical, chemical, and biological contamination of foods.
- FS.3. Discuss methods for controlling physical, chemical and biological hazards.
- FS.4. Evaluate the conditions, including sanitation practices, under which relevant pathogenic microorganisms are commonly controlled in foods.
- FS.5. Select appropriate environmental sampling techniques.
- FS.6. Design a food safety plan for the manufacture of a specific food.

**Food Engineering and Processing (FE)**

- FE.1. Define principles of food engineering (mass and heat transfer, fluid flow, thermodynamics).
- FE.2. Formulate mass and energy balances for a given food manufacturing process.
- FE.3. Explain the source and variability of raw food materials and their impact on food processing operations.
- FE.4. Design processing methods that make safe, high-quality foods.
- FE.5. Use unit operations to produce a given food product in a laboratory or pilot plant.
- FE.6. Explain the effects of preservation and processing methods on product quality.
- FE.7. List properties and uses of various packaging materials and methods.
- FE.8. Describe principles and practices of cleaning and sanitation in food processing facilities.
- FE.9. Define principles and methods of water and waste management.

**Sensory Science (SS)**

- SS.1. Discuss the physiological and psychological basis for sensory evaluation.
- SS.2. Apply experimental designs and statistical methods to sensory studies.
- SS.3. Select sensory methodologies to solve specific problems in food.

**Quality Assurance (QA)**

- QA.1. Define food quality and food safety terms.
- QA.2. Apply principles of quality assurance and control.
- QA.3. Develop standards and specifications for a given food product.
- QA.4. Evaluate food quality assessment systems (e.g. statistical process control).

**Food Laws and Regulations (FL)**

- FL.1. Recall government regulatory frameworks required for the manufacture and sale of food products.
- FL.2. Describe the processes involved in formulating food policy.
- FL.3. Locate sources of food laws and regulations.
- FL.4. Examine issues related to food laws and regulations.

**Data and Statistical Analysis (DS)**

- DS.1. Use statistical principles in food science applications.
- DS.2. Employ appropriate data collection and analysis technologies.
- DS.3. Construct visual representation of data.

**Critical Thinking and Problem Solving (CT)**

- CT.1. Locate evidence-based scientific information resources.
- CT.2. Apply critical thinking skills to solve problems.
- CT.3. Apply principles of food science in practical, real-world situations and problems.
- CT.4. Select appropriate analytical techniques when presented with a practical problem.
- CT.5. Evaluate scientific information.

**Food Science Communication (CM)**

- CM.1. Write relevant technical documents.
- CM.2. Create oral presentations.
- CM.3. Assemble food science information for a variety of audiences.

**Professionalism and Leadership (PL)**

- PL.1. Demonstrate the ability to work independently and in teams.
- PL.2. Discriminate tasks to achieve a given outcome.
- PL.3. Describe social and cultural competence relative to diversity and inclusion.
- PL.4. Discuss examples of ethical issues in food science

## Course Format

This year's course is going to look much different than past years but the learning outcomes will remain the same. Instead of students first attending weekly laboratory sessions and later writing up their results, students will instead watch an introductory video for a lab, analyze a mock data set, write the corresponding laboratory report, and later conduct the laboratory experiment in-person when it is safe to do so. The course will also include synchronous tutorial sessions to introduce students to sourcing and citing literature, experimental design, data and statistical analysis, and scientific writing. These will be recorded for students who are unable to attend the synchronous sessions. Lastly, this course will include a virtual oral presentation to help students enhance their ability to communicate scientific content in a professional, clear and concise, and engaging manner.

## Checklist for Course Preparation

The online portion of this course will require you to use the following software:

- Canvas
- Zoom
- Google Docs, Sheets, and Slides
- Microsoft Word, PowerPoint, and Excel + Analysis ToolPak add-on

## Learning Activities

Course activity	Description
<b>Quizzes</b>	Quizzes in this course will not count towards your grade, instead, you will be required to obtain 100% (unlimited tries) in order to submit your next assignment. The purpose of the quizzes is to ensure you correctly understand the concepts taught in class or displayed in a video before you complete an assignment where you may make errors and lose unnecessary marks.
<b>Lab calculations</b>	Calculations related to each lab are <b>due the Friday following each Tuesday lab session</b> and must be completed <b>individually</b> . Mock data and templates for submitting each set of calculations can be found under the appropriate session modules on Canvas. The grading rubric and checklist for calculation submissions is also available on Canvas.
<b>Laboratory reports, and assignments</b>	At the beginning of the term there will be assignments due one week after each synchronous class session. Later on, a laboratory report will be due for each lab session. You will have the opportunity to submit your first laboratory report for feedback prior to submitting where you will be graded. Some reports are individual assignments while others are to be completed in groups. <b>Individual assignment grades are weighted heavier than group assignment grades.</b> A template for your laboratory reports is available on Canvas and the <b>assignments must be submitted to both Canvas and Turnitin.com</b> . The due date for each laboratory report will be three Fridays following the Tuesday lab session. Overdue assignments will be penalized at the rate of 20% per day, for

	the first three days, after which a mark of 0 will be assigned. <b>See late submission tokens below.</b>
<b>Late submission tokens</b>	Each term you will be given two virtual late submission tokens that you can use to turn in an assignment (includes assignments, calculations, and lab reports) up to 4 days late without any late penalty. These can be used for individual or group assignments. If you wish to apply a token to a group assignment, it is important to <b>ensure that all group members agree to use up a token.</b> You must also inform the instructor before the due date of an assignment, that you intend to use a late token. At the end of each term, any unused tokens will be rewarded by a 0.5% grade increase/token.
<b>Discussion posts</b>	There will be a few different discussion board assignments where students will be required to post their thoughts on a topic and comment on those posted by other students.
<b>Reflections</b>	It is scientifically proven that learning is enhanced when we reflect on what we have learned, how far we have come, and how we can improve. Accordingly, there will be a few occasions where you will be asked to reflect on your performance and growth in the course.
<b>Group presentations</b>	Near the end of the term you will give a <b>15 min</b> group presentation on a current hot topic or trend in Food Science. The presentations will be performed live in breakout groups during a synchronous class session and students will be required to ask questions and evaluate the presentations in their breakout groups. The instructor- and TA-assigned grades will account for 70% of each group's presentation grade and student-assigned grades will account for the remaining 30%. Presentation topics must be confirmed by the instructor. Groups will also be required to submit a presentation outline and a copy of their slides for review in advance to their presentation.
<b>Professional development bonus marks</b>	Networking is extremely important for undergraduate students. This is how you make connections with people in the food industry, government, and academia who can provide you with valuable advice and assist you in applying for graduate school or finding employment. Networking and professional development are also great ways to expand your food science knowledge and help you become familiar with different work cultures and career opportunities. To encourage you to step outside of your comfort zone, form new connections, and expand your mind, I will add 0.5% to your course grade for attending up to two networking or knowledge acquisition events (total grade increase of 1% possible). To obtain these bonus marks, you must submit a one-page summary for each event you attend that describes how it has helped you expand your network and/or increased your food science knowledge. A template is posted to the course Canvas page for you to use as are links to some upcoming opportunities.
<b>Final examination</b>	An online open-book exam will take place at the end of each term. The final exams are designed to assess your knowledge and critical thinking skills accumulated throughout the course related to laboratory procedures, scientific principles, calculations, and statistics.

## Course Readings

There is no required textbook for this course. However, there are several resource materials listed below that contain information relevant to this course.

### Useful References: Books and Websites (links on Canvas)

1. The UBC library resource page for FNH 325/326. This site has many links that are useful for finding relevant information and writing reports.
2. Jay, J.M. Modern Food Microbiology 5th edition (ebook). Springer US, 1995.
3. Nielsen, S.S., ed. Food Analysis. 5th edition (ebook), New York: Kluwer Academic/Plenum Publishers, 2010. It is highly recommended that you read this book for this course and FNH 302.
4. Poste, L., Mackie, D.A., Butler, G., Larmond, E. Laboratory Methods for Sensory Analysis of Foods. Agriculture Canada Publication 1864/E, Ottawa, 1991.
5. US Department of Agriculture. Food Composition Database. This site contains the nutrient breakdown for a wide range of food items and will be extremely helpful when writing your lab reports.

## Learning Resources

If you require assistance gaining access to or navigating one of the online learning resources or would like additional support regarding online learning in general, the UBC Keep Learning website is a great resource for students: <https://keeplearning.ubc.ca/>

## Course Schedule

Week	FNH 325 activities
1	Introductions; Literature searching
2	Experimental design and data analysis
3	Statistical analysis
4	Scientific writing
5	Sugar analysis lab
6	Sugar analysis lab cont'd
7	Microbial analysis of food
8	Microbial analysis of food cont'd
9	Group presentations
10	Yogurt formulation and production lab
11	Yogurt formulation and production lab cont'd
12	Course reflection and wrap up

## Course Assessment

Course activity I = Individual; G = Group	FNH 325	
	#	Weight (%)
Quizzes	5	0
Lab calculations (I)	3	7
Lab reports (G)	2	20
Lab reports (I)	1	15
Assignments (I)	4	20
Discussion posts (I)	2	2
Reflections (I)	3	0
Presentation outline (G)	1	2
Presentation slides review (G)	1	2
Presentation (G)	1	10
Peer feedback on presentations (I)	1	2
Final exam (I)	1	20
<b>BONUS MARKS</b>		
Professional development (I)	2	1
Unused late submissions tokens (I)	2	1

Most assessments will be graded using **rubrics**. I like to use rubrics in my courses because they provide students with more information regarding their level of competency on a task, than key-word or point-based marking where many unnecessary marks can be lost. All rubrics can be found attached to the assignment submission portals on Canvas, or by viewing the Rubrics tab on the left hand side on Canvas. Please respect your assigned grades, the teaching team for this course always does their best to ensure they grade fairly and a great deal of time is spent marking each assignment and report in order to provide you with thorough feedback on how to improve for next time.

## Course Communication

The instructor will answer e-mails and discussion board posts between 9 am – 5 pm Mon – Fri. Please post questions pertaining to course activities on the designated discussion boards on Piazza available on the Canvas course page. Here, you can post questions anonymously and the instructor or a TA will answer usually within the same day, excluding weekends. It is beneficial to use the discussion boards as much as possible as other students often have similar questions, so your inquiry can help the whole class learn.

## Learning Analytics

Learning analytics includes the collection and analysis of data about learners to improve teaching and learning. This course will be using the following learning technologies: Canvas including programs embedded within Canvas. Many of these tools capture data about your activity and provide information that can be used to improve the quality of teaching and learning. In this course, I plan to use analytics data to:

- View overall class progress
- Track your progress in order to provide you with personalized feedback
- Review statistics on course content being accessed to support improvements in the course
- Track participation in discussion forums

## Academic Integrity

The academic enterprise is founded on honesty, civility, and integrity. All UBC students are expected to behave as honest and responsible members of an academic community. At the most basic level, this **means submitting only original work done by you and acknowledging all sources** of information or ideas and attributing them to others as required. This also means **you should not cheat, copy, or mislead others about what is your work.**

**It is the student's obligation to learn, understand and follow the standards for academic honesty.** Students must be aware that standards at the University of British Columbia may be different from those in secondary schools or at other institutions.

Violations of academic integrity lead to the breakdown of the academic enterprise, and therefore serious actions are taken. Plagiarism or cheating may result in a mark of zero on an assignment, exam, or course. More serious consequences may apply if the matter is referred to the President's Advisory Committee on Student Discipline. Academic misconduct may result in a one-year suspension from the University and a notation of academic discipline on the student's record.

The [UBC library](#) has a useful Academic Integrity website that explains what plagiarism is and how to avoid it. If a student is in any doubt as to the standard of academic honesty in a particular course or assignment, then the student must consult with the instructor as soon as possible. A more detailed description of academic integrity, including the University's policies and procedures, may be found in the [Academic Calendar](#). All course work is required to be submitted to Turnitin.com for review.

## University Policies

UBC provides resources to support student learning and to maintain healthy lifestyles but recognizes that sometimes crises arise and so there are additional resources to access including those for survivors of sexual violence. UBC values respect for the person and ideas of all members of the academic community. Harassment and discrimination are not tolerated nor is suppression of academic freedom. UBC provides appropriate accommodation for students with disabilities



and for religious observances. UBC values academic honesty and students are expected to acknowledge the ideas generated by others and to uphold the highest academic standards in all of their actions.

Details of the policies and how to access support are available on [the UBC Senate website](#).

### Copyright

All materials of this course (course handouts, lecture slides, assessments, course readings, etc.) are the intellectual property of the Course Instructor or licensed to be used in this course by the copyright owner. Redistribution of these materials by any means without permission of the copyright holder(s) constitutes a breach of copyright and may lead to academic discipline.