



# **NUTR\*4510 Toxicology, Nutrition and Food**

Fall 2020  
Section(s): C01

Department of Human Health and Nutritional Sciences

Credit Weight: 0.50

Version 1.00 - September 09, 2020

---

## **1 Course Details**

### **1.1 Calendar Description**

This course examines the role of foods, herbals and nutraceuticals as sources of antinutrients, natural toxins and environmental contaminants. The impact of toxic exposures on nutritional status, the impact of nutritional status on safe metabolism of toxins, and the use of this knowledge in the design of functional foods are also examined. Assessing the risk of genetically modified foods and radioactive contamination of a food supply.

**Pre-Requisites:** NUTR\*3210

### **1.2 Timetable**

Classes are Tuesday and Thursdays from 11:30am - 12:50 pm. Lectures are pre-recorded in Zoom and each lecture video along with lecture notes will be posted on Courselink before 11am on Tuesdays/Thursdays. Office hours will be held Friday afternoons from 2-4 pm using Zoom and the link to office hours will be posted weekly as an announcement on Courselink.

Important dates and assessment information is provided elsewhere in the Course Outline.

### **1.3 Final Exam**

Online final exam using Respondus on December 10, 2020 @ 8:30 - 10:30am.

---

## **2 Instructional Support**

### **2.1 Instructional Support Team**

|                    |                        |
|--------------------|------------------------|
| <b>Instructor:</b> | Jennifer Monk PhD      |
| <b>Email:</b>      | jmonk02@uoguelph.ca    |
| <b>Telephone:</b>  | +1-519-824-4120 x56805 |

**Office:** ANNU 330B  
**Office Hours:** **Online office hours will be held Friday afternoons from 2-4pm using Zoom. Links to the weekly Zoom office hours will be posted in CourseLink.**

Office Hours Details:

- Students wishing to have a one-on-one meeting to discuss confidential matters will occur during the regular weekly office hours using a private break-out meeting.
- Course content questions will be answered first (with the entire group to benefit from the answers) and private discussions will be conducted afterward. **Students with course content questions are encouraged to attend at the start of the office hours period to ensure their questions are addressed, prior to any confidential requested meetings.**
- Please use the "chat" function to indicate that you would like an individual meeting and wait to be invited to the break-out meeting.
- Please mute your microphones and use the chat function to ask your question. When I answer your question please unmute your microphone and we'll discuss!!

## 2.2 Teaching Assistants

**Teaching Assistant:** David Beauchamp  
**Email:** dbeauch@uoguelph.ca  
**Office Hours:** Please use the Discussion Board in CourseLink with your course content questions and/or assignment questions and both David and Dr. Monk will respond.

## 3 Learning Resources

### 3.1 Required Resources

**CourseLink (Website)**

<https://courselink.uoguelph.ca>

The course outline, a tentative lecture schedule, readings and handouts for specific lectures can be found at the CourseLink site for the course, where students can also submit questions on the course discussion board, and the TA or Dr. Monk will provide guidance.

## 4 Learning Outcomes

**Course philosophy:**

The fields of nutrition and toxicology both elicit strong feelings in the popular press and in the

general public. People with little expertise express strong viewpoints on nutrition and toxicology, and the spread of misinformation is enabled by the internet.

This course is designed to provide students with some fact-based knowledge, but also the tools to assess common forms of research in the fields of nutrition and toxicology, and to make critical judgements and accurate interpretations of research results.

## 4.1 Course Learning Outcomes

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

1. the principle concepts of nutritional sciences and toxicology, and the ways that these two disciplines interact
  2. that nutritional status may alter the absorption, metabolism and excretion of xenobiotic compounds.
  3. that xenobiotic and drug exposure may impact on nutritional status.
  4. to assess the diet as a vector for the delivery of natural and synthetic xenobiotics
  5. to assess the relationships between diet and the risk of various cancers
  6. to recognize different forms of research models, and to characterize their strengths and weaknesses
  7. problem solving and critical thinking skills
  8. to effectively communicate ideas and arguments in graphic and written form
  9. interpret data in class, in homework assignments and on exams
  10. to work in a group environment to practice scientific literature critiques and discuss current topics in nutritional toxicology of interest
- 

## 5 Teaching and Learning Activities

### 5.1 Lecture

**Topics:**

Lectures will be provided online and posted weekly in Courselink prior to the scheduled lecture time (Tuesdays/Thursdays 11:30am - 12:50pm). The lecture format will be Zoom pre-recorded lectures.

Weekly activities and reminders will be posted on Courselink as an Announcement every Monday.

Links to live office hours every Friday from 2-4pm in Zoom will be posted weekly.

## 5.2 Course Concepts

There are 3 main concepts that summarize the interaction between nutrition and toxicology. These include:

- 1) The role of the diet as a source ("vector") of natural or man-made toxins.

While most people are aware, and perhaps worried, about the occurrence of toxic substances in foods, there are a number of misconceptions about the source of these risks. The greatest fears of the general public are of artificial or imposed risks, like pesticide residues and genetically modified foods. In reality, the bulk of toxic substances in our diet are natural plant or animal products, or are formed during the cooking of foods. Plants raised for pest resistance and grown without artificial pesticides may produce high levels of natural products that pose risk, or benefits, to consumers. Even essential nutrients may act as xenobiotics if consumed unwisely. The expanding and poorly regulated nutraceutical and herbal industries are creating new opportunities for diet-related poisonings.

- 2) The effect of nutritional status on toxin metabolism and pathology.

Our ability to metabolise dietary xenobiotics is often dependent on our nutritional status, and our exposure to other dietary compounds. Diets high in fruits and vegetables are known to decrease cancer risk, and much attention has been focused on nutrients like vitamin C and beta-carotene. Current knowledge, however, is pointing towards non-nutrient phytochemicals as the most potent anti-carcinogenic components of fruits and vegetables. While many plant products that appear to decrease the risk of cancer or CVD are marketed as "antioxidants", we find that the phytochemicals are likely functioning through modulation of xenobiotic metabolism.

- 3) The effect of toxin exposure on nutritional status.

Chronic exposure to xenobiotics such as ethanol, or other drugs, will also have a direct effect on nutritional status. This creates a very complex interaction between the

nutrients and toxins that are present in our diet and impact on our short and long term health.

### **5.3 Course Content**

1. Nutrition and Xenobiotic Metabolism (includes content on Research Study Designs)
2. Phase I Metabolism/"Functionalization"
3. Phase II Metabolism/"Conjugation"
4. Chemical Carcinogens in the Diet
5. Nutritional Status, Dietary Bioactives and Drug Toxicity
6. Nutritional Status and Alcohol
7. Toxic Factors in Fish
8. Natural Toxins in Plant Products
9. Pesticides: Natural and Man Made

### **5.4 Important Dates**

| <b>Form of Assessment</b>               | <b>Weight of Assessment</b> | <b>Due Date of Assessment</b>  |
|---|-----------------------------|--|
| Abstract Critique Assignments           | 2 x 5%                      | #1 Submit: Sept 29 <sup>th</sup><br><br>Peer Review Sept 30 - Oct 7 <sup>th</sup><br><br>#2 Submit: Nov 3<br><br>Peer Review: Nov 4 - 11 <sup>th</sup> |
| Midterm Exam                            | 25%                         | Oct 20 <sup>th</sup>   |
| Abstract Critique Test                  | 20%                         | Nov 17 <sup>th</sup>   |
| Learning Group Discussion Participation | 4 x 2.5%                    | Throughout the course<br><br>(see Dates posted in Courselink)  |
| Final Exam                              | 35%                         | December 10, 2020<br><br>8:30 - 10:30am  |

## 5.5 Optional Research Study Participation

Students in NUTR\*4510 will be invited to participate (by email and by an announcement posted on Courselink) in a research study about scientific literacy (comprised of two online surveys to be completed at the start and end of the semester). Participation is voluntary and Dr. Monk will not be involved with the research study until after the submission of the final grades in the course.

Students who complete the first online survey will be awarded 2% bonus marks added to their midterm exam grade. Alternatively, students who do not wish to participate in the research project but would still like to receive the 2% bonus marks added to their midterm grade can complete Alternate Assignment #1, which is as follows: find a peer reviewed primary article that describes any aspect of the relationship between an essential nutrient and P450 bioactivation and email a pdf copy of the article (with the subject line: Alternative Assignment #1) to Danyelle Liddle (dliddle@uoguelph.ca) on or before September 18<sup>th</sup>, 2020.

Students who complete the second online survey will be awarded 2% bonus marks added to their final exam grade. Alternatively, students who do not wish to participate in the research project but would still like to receive the 2% bonus marks added to their final grade can

complete Alternate Assignment #2, which is as follows: read the article by **Mold et al., Journal of Trace Elements in Medicine and Biology, 2018; 46:76-82** and write a short paragraph that identifies two strengths and two limitations of the study design. The alternate assignment must be returned by email (with the subject line: Alternate Assignment #2) as a pdf to Danyelle Liddle (dliddle@uoguelph.ca) on or before December 7, 2020.

REB#20-05-016

## 6 Assessments

### 6.1 Marking Schemes & Distributions

| <b>Form of Assessment</b>                            | <b>Weight of Assessment</b> | <b>Due Date of Assessment</b>  | <b>Course Content/Activity</b> | <b>Learning Outcome Addressed</b> |
|--|-----------------------------|--|--------------------------------|-----------------------------------|
| Abstract Critique, Peer Evaluation and Reflection #1 | 5%                          | Sept 29 – Submit online<br><br>Sept 30- Oct 7th - Peer Review/Reflection | Research interpretation        | 6,7,8                             |
| Abstract Critique, Peer Evaluation and Reflection #2 | 5%                          | Nov 3 – Submit online<br><br>Nov 4 - Nov 11<br><br>Review/Reflection     | Research interpretation        | 6,7,8                             |
| Abstract Critique Test                               | 20%                         | Nov 17th   | Research interpretation        | 6,7,8                             |
| Midterm Exam   | 25%                         | Oct 20th   | Lecture content                | 1,2,3,6,7,8,9                     |
| Online Learning                                      | 4 x 2.5%                    | All semester,  | Group Literature               | 6,7,8,9,10                        |

|                                |     |   |   |                   |
|--------------------------------|-----|---|---|-------------------|
| Group Discussion Participation |     | posts to specific discussion board topics.<br><br>Graded and total marks updated at the end of the semester | Critique and Research Interpretation            |                   |
| Final Exam                     | 35% | December 10th @ 8:30am<br><br>Online exam using Respondus   | Lecture content,<br><br>Research interpretation | 1,2,3,4,5,6,7,8,9 |

## 6.2 Assessment Details

### Abstract Critique Assignment #1 (5%)

**Date:** Tue, Sep 29 - Wed, Oct 7

Part 1: Students will read and critique a scientific abstract by answering the provided questions and using their knowledge of the course content. **Due September 29th at 11:59 PM, submit online (submission details will be provided in Courselink as an Announcement)**

Part 2: Students will anonymously review the assignments from two classmates and provide feedback regarding the i) communication of the ideas expressed, ii) the proposed follow-up research study design, and iii) identification of specific strengths and weaknesses of the assigned scientific abstract. **Due anytime between September 30th - October 7th at 11:59 PM (submission details will be provided in Courselink as an Announcement)**

Part 3: Students will reflect on the feedback provided by their peers and update their responses to the abstract critique questions and an answer key will be provided to help improve their interpretation and critique skills.

Both Part 1 and Part 2 must be completed to receive full marks on the assignment.

**Students who do not complete the assignment on the due dates (both Part 1 AND Part 2) will automatically have the value of the missed assignment added to the value of the Abstract Critique Test.** All students will have access to the assigned abstract, critique



questions and instructor-provided answer key.

### **Abstract Critique Assignment #2 (5%)**

**Date:** Tue, Nov 3 - Wed, Nov 11

Part 1: Students will read and critique a scientific abstract by answering the provided questions and using their knowledge of the course content. **Due November 3, 2020 at 11:59 PM, submit online (submission details will be provided in Courselink as an Announcement)**

Part 2: Students will anonymously review the assignments from two classmates and provide feedback regarding the i) communication of the ideas expressed, ii) the proposed follow-up research study design, and iii) identification of specific strengths and weaknesses of the assigned scientific abstract. **Due anytime between November 4 - 11th, 2020 at 11:59 PM, submit online (submission details will be provided in Courselink as an Announcement)**

Part 3: Students will reflect on the feedback provided by their peers and update their responses to the abstract critique questions and an answer key will be provided to help improve their interpretation and critique skills.

Both Part 1 and Part 2 must be completed to receive full marks on the assignment. **Students who do not complete the assignment (BOTH Part 1 AND Part 2) on the due dates will automatically have the value of the missed assignment added to the value of the Abstract Critique Test.** All students will have access to the assigned abstract, critique questions and instructor-provided answer key.

### **Abstract Critique Test (20%)**

**Date:** Tue, Nov 17

Test will be completed online in Courselink. Students will answer literature interpretation and abstract critique short answer questions that are similar to the questions and format of the Abstract Critique Assignments and abstract critique discussions from the online learning groups and course notes.

### **Midterm Exam (25%)**

**Date:** Tue, Oct 20

Online midterm exam in Courselink using Respondus lock-down browser. Students are encouraged to access the practice test in advance of the midterm exam to ensure they are comfortable with using Respondus.

The midterm exam will cover units 1-3 of the course content.

**Online Learning Group Discussion (10%)**

4 assessments of group participation, each worth 2.5% = total 10% of the final grade

Each student will be assigned to an Online Learning Group and each "topic" will have a dedicated discussion board for each online learning group in Courselink. Students will have 7 days to interact with each other on each assigned topic and their discussion board posts and level of engagement will be graded. No late submissions will be accepted.

The purpose of this assignment is to encourage you to engage in discussion with your online learning group about scientific abstracts related to the course content and current topics in nutritional toxicology that are relevant but outside the content of the course.

Each post should be a **minimum** of 150 words and should contribute to the discussion in a meaningful way. For example, original postings should encourage critical discussion or problem-solving, or attempt to clarify a misconception related to the topic, while replies should present a critical and thoughtful response to the original threads. For scientific abstracts students should focus on identifying strengths and limitations of the study design or designing follow up research questions and experimental study designs. Students can post their original ideas or reply to posts with suggestions on how to improve what has been proposed in the original students post or by sharing alternative approaches. This is similar to the literature critique/interpretation questions that are part of the abstract critique assignments and test in the course. For current topics in nutritional toxicology students can post their reflections about what they have learned about the assigned topic and/or use an evidence-based approach to inform their ideas by sharing related literature to the topic that they have found and discuss its relevance or scientific merit. **Discussions about potential toxicities must be evidence-based.**

You will be graded on your participation and on the quality of your posts, and will receive your grade at the end of the semester. If you fail to make a post to an assigned discussion board topic you will receive a grade of 0/2.5 for that post. Remember that you are expected to make posts of sufficient length and critical quality in each unit; if you do this, you should receive full marks on this assignment. This assignment is meant to be opportunity for you to be engaged in the course and to interact with and learn from your peers within your online learning group. **The online learning group is intended to help build a sense of community in the course and help you connect with other students while learning online.**

**Final Exam (35%)**

**Date:** Thu, Dec 10, 8:30 AM, Online Exam in Courselink

Online final exam will use Respondus. The final exam is cumulative but will **focus on course content not tested on the midterm exam**. It is important to note that units 1-3 (tested on the midterm exam) represent the foundation of the course, and therefore, are required for understanding of the remainder of the course. The final exam will include multiple choice and literature interpretation short answer questions.

**6.3 Final Exam**

Online final exam using Respondus. The final exam is cumulative but will focus on course content not tested on the midterm exam (approximately 80% of questions on the final exam). This will include multiple choice and literature interpretation short answer questions.

December 10, 2020 @ 8:30am.

**7 Course Statements****7.1 Grading**

Missed assessment deadlines should be discussed with Dr. Monk and accommodations will be made that could involve an alternate assessment date, an extension of a deadline or shifting the value of a missed assessment onto another assessment or the final exam.

**Decisions will be made based on assessing the course learning outcomes and at the instructors discretion.** A missed final exam should be addressed with the students Academic Counselor.

**7.2 Communication with Students**

I will communicate with the class weekly during office hours (Fridays 2-4 pm), which will be held online using Zoom. This is an opportunity for students to ask questions about the course content and get clarification about concepts. Students can also request (using the chat function) a confidential meeting during the second hour of the weekly office hours session and they will be invited to a private break out room.

Lectures will be recorded using Zoom and will be posted on Tuesday and Thursday mornings on Courselink.

Students are encouraged to use the Discussion Board for course content questions and to attend the live Zoom office hours Fridays from 2-4pm.

## 8 Department of Human Health and Nutritional Sciences Statements

### 8.1 Academic Advisors

If you are concerned about any aspect of your academic program:

- Make an appointment with a program counsellor in your degree program. [B.Sc. Academic Advising](#) or [Program Counsellors](#)

### 8.2 Academic Support

If you are struggling to succeed academically:

- Learning Commons: There are numerous academic resources offered by the Learning Commons including, Supported Learning Groups for a variety of courses, workshops related to time management, taking multiple choice exams, and general study skills. You can also set up individualized appointments with a learning specialist.  
<http://www.learningcommons.uoguelph.ca/>
- Science Commons: Located in the library, the Science Commons provides support for physics, mathematic/statistics, and chemistry. Details on their hours of operations can be found at: <http://www.lib.uoguelph.ca/get-assistance/studying/chemistry-physics-help> and <http://www.lib.uoguelph.ca/get-assistance/studying/math-stats-help>

### 8.3 Wellness

If you are struggling with personal or health issues:

- Counselling services offers individualized appointments to help students work through personal struggles that may be impacting their academic performance.  
<https://www.uoguelph.ca/counselling/>
- Student Health Services is located on campus and is available to provide medical attention. <https://www.uoguelph.ca/studenthealthservices/clinic>
- For support related to stress and anxiety, besides Health Services and Counselling Services, Kathy Somers runs training workshops and one-on-one sessions related to stress management and high performance situations.  
<http://www.selfregulationskills.ca/>

### 8.4 Personal information

Personal information is collected under the authority of the University of Guelph Act (1964), and in accordance with Ontario's Freedom of Information and Protection of Privacy Act

(FIPPA) <http://www.e-laws.gov.on.ca/index.html>. This information is used by University officials in order to carry out their authorized academic and administrative responsibilities and also to establish a relationship for alumni and development purposes.

For more information regarding the Collection, Use and Disclosure of Personal Information policies please see the Undergraduate Calendar.  
(<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/intro/index.shtml>)

## 9 University Statements

### 9.1 Email Communication

As per university regulations, all students are required to check their e-mail account regularly: e-mail is the official route of communication between the University and its students.

### 9.2 When You Cannot Meet a Course Requirement

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons please advise the course instructor (or designated person, such as a teaching assistant) in writing, with your name, id#, and e-mail contact. The grounds for Academic Consideration are detailed in the Undergraduate and Graduate Calendars.

Undergraduate Calendar - Academic Consideration and Appeals  
<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml>

Graduate Calendar - Grounds for Academic Consideration  
<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml>

Associate Diploma Calendar - Academic Consideration, Appeals and Petitions  
<https://www.uoguelph.ca/registrar/calendars/diploma/current/index.shtml>

### 9.3 Drop Date

Students will have until the last day of classes to drop courses without academic penalty. The deadline to drop two-semester courses will be the last day of classes in the second semester. This applies to all students (undergraduate, graduate and diploma) except for Doctor of Veterinary Medicine and Associate Diploma in Veterinary Technology (conventional and alternative delivery) students. The regulations and procedures for course registration are available in their respective Academic Calendars.

Undergraduate Calendar - Dropping Courses  
<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml>

Graduate Calendar - Registration Changes  
<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/genreg-reg-regchg.shtml>

Associate Diploma Calendar - Dropping Courses  
<https://www.uoguelph.ca/registrar/calendars/diploma/current/c08/c08-drop.shtml>

## 9.4 Copies of Out-of-class Assignments

Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

## 9.5 Accessibility

The University promotes the full participation of students who experience disabilities in their academic programs. To that end, the provision of academic accommodation is a shared responsibility between the University and the student.

When accommodations are needed, the student is required to first register with Student Accessibility Services (SAS). Documentation to substantiate the existence of a disability is required; however, interim accommodations may be possible while that process is underway.

Accommodations are available for both permanent and temporary disabilities. It should be noted that common illnesses such as a cold or the flu do not constitute a disability.

Use of the SAS Exam Centre requires students to book their exams at least 7 days in advance and not later than the 40th Class Day.

For Guelph students, information can be found on the SAS website  
<https://www.uoguelph.ca/sas>

For Ridgetown students, information can be found on the Ridgetown SAS website  
<https://www.ridgetownc.com/services/accessibilityservices.cfm>

## 9.6 Academic Integrity

The University of Guelph is committed to upholding the highest standards of academic integrity, and it is the responsibility of all members of the University community—faculty, staff, and students—to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff, and students have the responsibility of supporting an environment that encourages academic integrity. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.

Undergraduate Calendar - Academic Misconduct  
<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml>

Graduate Calendar - Academic Misconduct

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml>

## 9.7 Recording of Materials

Presentations that are made in relation to course work - including lectures - cannot be recorded or copied without the permission of the presenter, whether the instructor, a student, or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

## 9.8 Resources

The Academic Calendars are the source of information about the University of Guelph's procedures, policies, and regulations that apply to undergraduate, graduate, and diploma programs.

Academic Calendars

<https://www.uoguelph.ca/academics/calendars>

## 9.9 Disclaimer

Please note that the ongoing COVID-19 pandemic may necessitate a revision of the format of course offerings and academic schedules. Any such changes will be announced via CourseLink and/or class email. All University-wide decisions will be posted on the COVID-19 website (<https://news.uoguelph.ca/2019-novel-coronavirus-information/>) and circulated by email.

## 9.10 Illness

The University will not normally require verification of illness (doctor's notes) for fall 2020 or winter 2021 semester courses. However, requests for Academic Consideration may still require medical documentation as appropriate.

---