



# NUTR\*4360 Current Issues in Nutrigenomics

Winter 2023

Section(s): C01

Department of Human Health and Nutritional Sciences

Credit Weight: 0.50

Version 1.00 - January 11, 2023

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## 1 Course Details

### 1.1 Calendar Description

This course discusses controversial and/or emerging topics in Human Health and Nutritional and Nutraceutical Sciences as it relates to nutrigenomics.

**Pre-Requisites:** NUTR\*3210, (BIOM\*3200 or HK\*3810)

### 1.2 Course Description

Goals: To familiarize students with basic concepts in NUTRITIONAL GENOMICS, to develop an understanding of GENOMICS AND GENE REGULATION WITH RESPECT TO DIET and to obtain an appreciation for the role and importance of nutrition in prevention of POLYGENIC DISEASES.

### 1.3 Timetable

Wednesday, 2:30-5:20 in MINS 106

Students who have not submitted their vaccination status to the university portal or have not received an exemption (with regular testing) to be on campus are not eligible to register in any course with a required in-person component or assessment.

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.

## 1.4 Final Exam

Take-Home Exam: Research Proposal

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## 2 Instructional Support

Graduate Teaching Assistant:

**Melissa Gonzalez Soto : [gonza08@uoguelph.ca](mailto:gonza08@uoguelph.ca)**

## 2.1 Instuctor

MARICA BAKOVIC

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OFFICE: ANNU 346

OFFICE HOURS: T 1:00 pm-5:00 pm; W 10:00 am 1:00 pm

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## 3 Learning Resources

### 3.1 Required Resources

Courselink (Website)

<https://courselink.uoguelph.ca>

Required readings will be posted weekly on Courselink

## 3.2 Recommended Resources

### **Nutrigenomics and Nutrigenetics in Functional Foods and Personalized Nutrition (Textbook)**

Lynnette R Ferguson: "Nutrigenomics and Nutrigenetics in Functional Foods and Personalized Nutrition" 2014 Taylor and Francis Group LLC, CRC Press, ISBN 978-1-4398-7680-0

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## 4 Learning Outcomes

### 4.1 Course Learning Outcomes

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

1. Gain some practical knowledge to apply NUTRAGENOMICS in laboratory and clinical settings (bioinformatics, single-nucleotide polymorphisms, microarrays, proteomics, and metabolomics)
  2. Design nutritional strategies for prevention of chronic diseases such as cardiovascular disease, obesity, type-2 diabetes and cancer
  3. Search literature and learn how to use genomic databases
  4. Read relevant original research papers
  5. Actively participate in preparing specific lecture topics
  6. Discuss concepts and ideas with other students in the class
  7. Work in groups and/or individually on several class/home assignments
  8. Write a research grant application
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## 5 Teaching and Learning Activities

### 5.1 Method of Presentation

In the 2nd half of the course students are expected to present the course material using the posted materials for the specific topics. During the 1st half of the semester (before the winter break) the assigned readings will complement what is taught in lecture, and during the 2nd half of the semester readings should be reviewed in advance of lecture as class time will be used for case studies and discussions.

### 5.2 Tentative Schedule

1. Tentative Schedule

<b>Week/Date</b>	<b>Lecture Topics (Readings and Assignments are posted on Courselink)</b>
1. Jan 11	Course Outline, Introduction to Nutrigenomics (Implications of the Human Genome Project for understanding gene –diet interactions; Genetic variations, nutrition, preventive medicine and personalized diets)
2. Jan 18  Assignment 1 posted	Nutrient sensors (regulation of gene expression; lipids as ligands for nuclear receptors-PPAR, RXR, SREBP; glucose and insulin signaling; gene–diet and gene –gene interactions); posting of Assignment 1
3. Jan 25  Assay 1	Genomics from nutritional perspective  (Principles, tools, genotypes, phenotypes)
4. Feb 1  Assignment 1 due date  Assignment 2 posted	Genetic individuality and dietary responses  (Single-nucleotide polymorphisms; Bioinformatics in Nutritional Sciences); posting of Assignment 2
5. Feb 8  Assay 2	Methods to study cellular responses to nutritional changes: <b>Functional Nutrigenomics I: Transcriptomics and Proteomics</b> (Expression <b>microarrays, data analysis, applications</b> )

1. Feb15 Assignment 2 due date	<b>Nutrigenomics II: Epigenetics and Nutritional methyl-group donors</b>
Feb 22	<b>Winter break</b>

7. March 1 Assay 3	<b>Nutrient-gene interaction and complex diseases</b>  (Genetic susceptibility to diets, Biomarkers; Evidence-based nutrition)	
8. March 8	<b>Folic acid and choline metabolism; MTHFR polymorphisms</b>	
9. March 15 Assay 4	<b>Nutrigenomics of atherosclerosis</b> (polymorphisms of genes involved in lipid/cholesterol biosynthesis and transport)	
10. March 22	<b>Metabolic Syndrome</b> (obesity, diabetes, insulin resistance and dyslipidemia; genetic influences and molecular biomarkers for preventive therapies)	
11. March 29 Assay 5	<b>Genetic and epigenetics of cancer I.</b> (polymorphisms of cancer genes, regulatory enzymes, nutrients as cofactors and antioxidants; DNA methylation, histones and acetylation)	
12. April 5	<b>Genetics and epigenetics of cancer prevention II</b> (polymorphisms of cancer genes, regulatory enzymes, nutrients as cofactors and antioxidants; DNA methylation, histone modifications)	

Term paper due date Apr 13	
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## 6 Assessments

### 6.1 Marking Schemes & Distributions

Name	Scheme A (%)
Class Participation	10
Assignment #1	10
Assignment #2	10
Group Presentation	25
Research Proposal	45
Total	100

### 6.2 Assessment Details

#### Class Participation (10%)

**Date:** After lectures: 2, 4, 6, 8, 10

**Learning Outcome:** 3, 4

- **Individual BI-weekly essay on the previous 2 weeks posted readings**
- Max 250 words
- Course content: Lectures

#### Assignment #1 (10%)

**Date:** Week 4

**Learning Outcome:** 1, 2, 4, 7

Course content: Lectures 1-3

#### Assignment #2 (10%)

**Date:** Week 6

**Learning Outcome:** 1, 2, 4, 7

Course content: Lectures 1-5

#### Group Presentation (25%)

**Date:** As scheduled

**Learning Outcome:** 4, 5, 6, 7

Course content: Lectures 7-12

#### Research Proposal (45%)

**Date:** Week 12

**Learning Outcome:** 1, 2, 3, 4, 8

- Course content: Lectures 1-12
  - A guidance for Individual Research Proposals regarding the length, style, topics, assessment, etc., will be posted on Courselink during the Reading Week
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## 7 Department of Human Health and Nutritional Sciences Statements

### 7.1 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](#)

### 7.2 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>

### 7.3 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/>

## 7.4 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>)

## 7.5 Course Offering Information Disclaimer

Please note that course delivery format (face-to-face vs online) is subject to change up to the first-class day depending on requirements placed on the University and its employees by public health bodies, and local, provincial and federal governments. Any changes to course format prior to the first class will be posted on WebAdvisor/Student Planning as they become available.

# 8 University Statements

## 8.1 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.

## 8.2 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>



### 8.3 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>

### 8.4 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.

### 8.5 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 make a booking at least 14 days in advance, and no later than November 1 (fall), March 1 (winter) or July 1 (summer). Similarly, new or changed accommodations for online quizzes, tests and exams must be approved at least a week ahead of time.

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>

## 8.6 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>

## 8.7 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.

## 8.8 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>

## 8.9 Disclaimer

Please note that the ongoing COVID-19 pandemic may necessitate a revision of the format of course offerings, changes in classroom protocols, and academic schedules. Any such changes will be announced via CourseLink and/or class email.

This includes on-campus scheduling during the semester, mid-terms and final examination schedules. All University-wide decisions will be posted on the COVID-19 website

(<https://news.uoguelph.ca/2019-novel-coronavirus-information/>) and circulated by email.

## **8.10 Illness**

Medical notes will not normally be required for singular instances of academic consideration, although students may be required to provide supporting documentation for multiple missed assessments or when involving a large part of a course (e.g.. final exam or major assignment).

## **8.11 Covid-19 Safety Protocols**

For information on current safety protocols, follow these links:

- <https://news.uoguelph.ca/return-to-campusess/how-u-of-g-is-preparing-for-your-safe-return/>
- <https://news.uoguelph.ca/return-to-campusess/spaces/#ClassroomSpaces>

Please note, these guidelines may be updated as required in response to evolving University, Public Health or government directives.

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