# NUTR*4360 Current Issues in Nutrigenomics - DRAFT

Winter 2019
Section(s): C01

Department of Human Health and Nutritional Sciences
Credit Weight: 0.50
Version 1.00 - November 08, 2018

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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-Requisite(s):** NUTR*3210, (1 of BIOM*3200, HK*3810, HK*3940)

## 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 2:30-5:20pm, MCKN Room 225

## 1.4 Final Exam

Exam time and location is subject to change. Please see WebAdvisor for the latest information.

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# 2 Instructional Support

## 2.1 Instructor(s)

**Marica Bakovic**
**Email:** mbakovic@uoguelph.ca
**Telephone:** +1-519-824-4120 x53764
**Office:** ANNU 346
**Office Hours:** M 9:00 am 12:00 pm; T 1:00 pm-5:00 pm;

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# 3 Learning Resources

## 3.1 Required Resource(s)

**Courselink (Website)**
https://courselink.uoguelph.ca
Required readings will be posted weekly on Courselink

## 3.2 Recommended Resource(s)

**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 Tentative Schedule

| Week/Date | Lecture Topics (Readings and Assignments are posted on Courselink) |
|---|---|
| 1. Jan 9 | 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 16<br><br>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 |

| Week/Date | Lecture Topics (Readings and Assignments are posted on Courselink) |
|---|---|
| 3. Jan 23 | Genomics from nutritional perspective<br>(Principles, tools, polymorphisms, genotypes, phenotypes) |
| 4. Jan 30<br><br>Assignment 1 due date<br><br>Assignment 2 posted | Genetic individuality and dietary responses<br>(Single-nucleotide polymorphisms and Bioinformatics in Nutritional Sciences); posting of Assignment 2 |
| 5. Feb 6 | Methods to study cellular responses to nutritional changes: Functional Nutrigenomics: Transcriptomics and Proteomics (Expression microarrays, data analysis, applications) |
| 6. Feb 13<br><br>Assignment 2 due date | Functional Nutrigenomics II: Epigenetics and Nutritional methyl-group donors |
| Feb 20 | Winter Break Week |
| 7. Feb 27 | Nutrient-gene interaction and complex diseases<br>(Genetic susceptibility to diets, Biomarkers; Evidence-based nutrition) |
| 8. March 6 | Folic acid and choline metabolism; MTHFR polymorphisms |
| 9. March 13 | Nutragenomics of atherosclerosis (polymorphisms of genes involved in lipid/cholesterol biosynthesis and transport) |
| 10. March 20 | Metabolic Syndrome (obesity, diabetes, insulin resistance and dyslipidemia; genetic influences and molecular biomarkers for preventive therapies) |
| 11. March 27 | Genetic and epigenetics of cancer I. (polymorphisms of cancer genes, regulatory enzymes, nutrients as cofactors and antioxidants; DNA methylation, histones and acethylation) |
| 12. April 3<br><br>Term paper due date | Genetics and epigenetics of cancer prevention II (polymorphisms of cancer genes, regulatory enzymes, nutrients as cofactors and antioxidants; DNA methylation, histone modifications) |

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## 5.2 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.

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# 6 Assessments

## 6.1 Marking Schemes & Distributions

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

## 6.2 Assessment Details

**Class Participation (10%)**
**Date:** Weeks 2-12 (at the end of each class)
**Learning Outcomes:** 3,4

- Individual weekly essay on the upcoming topic
- Max 250 words
- Course content: Lectures weeks 2-12

**Assignemtn #1 (10%)**
**Date:** Week 4
**Learning Outcomes:** 1,2,4,7
Course content: Lectures 1-3

**Assignment #2 (10%)**
**Date:** Week 6
**Learning Outcomes:** 1,2,4,7
Course content: Lectures 1-5

**Group Presentation (25%)**
**Date:** As scheduled
**Learning Outcomes:** 4,5,6,7
Course content: Lectures 7-12

**Research Proposal (45%)**
**Date:** Week 12
**Learning Outcomes:** 1,2,3,4,8

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- 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.uoguelph.ca/~ksomers/

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# 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

## 8.3 Drop Date

Courses that are one semester long must be dropped by the end of the fortieth class day; two-semester courses must be dropped by the last day of the add period in the second semester. The regulations and procedures for course registration are available in the Undergraduate and Graduate 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

## 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 book their exams at least 7 days in advance and not later than the 40th Class Day.

More information can be found on the SAS website

https://www.uoguelph.ca/sas

## 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

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