

**University of Guelph**  
**College of Biological Science**  
Human Health & Nutritional Sciences

**COURSE OUTLINE**

NUTR\*3360 LIFESTYLE GENOMICS  
Fall 2017

**COURSE DESCRIPTION**

This course explores how genes and lifestyle choices (in particular diet and exercise) interact to affect cell and tissue function, and impact human health. These concepts will be examined through in-depth discussions of obesity and type-2 diabetes. The course is designed to highlight the integrative and inter-connected cellular, molecular, genetic, and physiological mechanisms underlying these conditions.

*Prerequisite(s): BIOC\*2580, BIOL\*1080, MBG\*2040*

**GENERAL INFORMATION:**

Instructor: Dr. David Mutch  
Department: Human Health and Nutritional Sciences  
Office: Room 308 ANNU  
E-mail: [dmutch@uoguelph.ca](mailto:dmutch@uoguelph.ca)  
Office Hours: In class time (all other times by appointment only)

Teaching Assistant: Barbora Hucik  
TA E-mail: [bhucik@uoguelph.ca](mailto:bhucik@uoguelph.ca)  
TA Office Hours: By appointment only

*\* Only emails sent from an official University of Guelph email account will be answered.*

**COURSE SCHEDULE**

Lectures: Mon / Wed / Fri, 12:30pm-1:20pm, Alexander Hall (ALEX) Room 200

*\* Note that the Monday, October 9<sup>th</sup> class is cancelled for Thanksgiving. The make-up class will be held on Friday, December 1<sup>st</sup>.*

## LEARNING GOALS AND RATIONALE

By the end of the course, students should be able to:

- 1) Understand the principle concepts of genetics, epigenetics and the 'omic' sciences as they are integrated into the emerging scientific discipline of lifestyle genomics, and be able to apply this knowledge to define how nuclear, mitochondrial, and microbial genomes contribute to obesity and diabetes.
- 2) Demonstrate an understanding of how molecular and cellular events can mediate how lifestyle factors influence tissue function, and how this contributes to the development of metabolic diseases.
- 3) Integrate the variables of diet and exercise into problems related to lifestyle genomics.
- 4) Develop problem solving and critical thinking skills by applying and integrating principle concepts in case studies / discussions of different metabolic diseases.
- 5) Effectively communicate ideas and arguments in graphic and written form in class, assignments, and exams.
- 6) Interpret data in class, assignments and exams in order to assess how the body responds to lifestyle challenges.

## COURSE RESOURCES

### Courselink:

Basic course material will be available on the D2L site for this course. I will be adding information in class to supplement the notes provided on D2L. This additional in-class information will be tested on both the midterm and final exams. The PDFs posted on D2L are provided to support the in-class material and facilitate discussions.

## COURSE FORMAT

This course will consist of 12 weeks of lectures (3 lectures per week, each lasting 50 minutes). An overview of the course content will be provided on the course website, accessible via Courselink. However, students should recognize that these notes are provided primarily as a structural draft for the lectures. For students to acquire the necessary information to succeed in this course they will be required to attend all lectures. In addition, review papers from the current scientific literature and popular press articles will provide background reading for the lectures and will be made available as PDFs on the course website. Students are expected to read all papers and any additional background reading they think is necessary to understand course concepts.

## COURSE OVERVIEW

This course is roughly structured into the weekly modules; however, the modules are highly integrative.

Approximate # of Lectures	Module Title
1	<i>Course Introduction – Setting the Stage</i>
4	<i>The Genetics of Obesity</i>
3	<i>Epigenetics and Developmental Origins of Disease</i>
3	<i>Role of the Hypothalamus in Energy Balance</i>
1	<i>IN CLASS DISCUSSION OF CASE STUDY</i>
4	<i>Gut Bacteria: The little guys have a big impact</i>
1	<i>IN CLASS MIDTERM</i>
3	<i>Signals from the Gut</i>
3	<i>Regulating Hepatic Glucose Production</i>
6	<i>Adipose Tissue Dysfunction</i>
3	<i>Skeletal Muscle and Insulin Sensitivity</i>
1	<i>(if time permits) Sleep, Circadian Rhythm, and Obesity</i>
1	<i>Review Class</i>

## METHODS OF ASSESSMENT

	% of Final Grade	Due Date
Case Study Report	5%	October 11 <sup>th</sup>
Midterm Exam	30%	October 16 <sup>th</sup> (in class)
Group Assignment	15%	November 24 <sup>th</sup>
Peer Evaluation of Group Members	5%	December 1 <sup>st</sup>
Final Exam	45%	December 6 <sup>th</sup> (TBD)

CASE STUDY REPORT: On Friday, October 6<sup>th</sup> we will have an in-class discussion about a case study on childhood obesity. Students are expected to read the case study and a related PDF article prior to this class (materials will be posted on D2L). Students will be required to form groups of **four** for the written report. The report will consist of answers to 4 of the 6 questions provided in the case study. The report will be graded for (i) the appropriate use of primary research to support answers (between 5 – 10 PubMed references), (ii) logical presentation of ideas, and (iii) grammar & punctuation. The assignment should not exceed 3 pages (excluding references). Use only single-sided, double-spaced, type-written text with Arial 11-point font, numbered pages and 2cm margins. Make sure the names of the students and student numbers are clearly indicated on the cover page (which is in addition to the 3 page limit) of the Report. Case Study Reports will be **due in class on Wednesday, October 11<sup>th</sup>**. A penalty of 10% will be

applied every 24 hours after this due date and time. The Case Study Report grade will be given per group, not per student. The Case Study Report will comprise 5% of the final grade.

GROUP ASSIGNMENT: Students will form groups of **five**. Student groups will be made directly on Courouselink, which help facilitate Peer Evaluation. If you don't join a group yourself, you will randomly be placed into a group. Groups will be required to develop a mock report for an individual who has undergone genetic testing for personalized nutrition. This report will provide mock results for a genetic variant known to affect metabolism or nutritional status of a specific nutrient or food bioactive. The students must choose the genetic variant and nutrient based on evidence from available peer-reviewed scientific literature. The report can be modeled on the Nutrigenomix® report (which will be provided to you) and will consist of four sections. The chosen variant must not already be part of the Nutrigenomix® panel. The first section will provide background information on the specific nutrient and its relationship with health outcomes or nutritional status. The second section will explain how the genetic variant affects metabolism or nutritional status of the selected nutrient or food bioactive, and provide a table listing common dietary sources of the nutrient. The third section will consist of a chart showing the rs#, the risk variant, frequency of the risk genotype and relative risk of health condition. Finally, the fourth section will consist of a dietary recommendation for each of the possible genotypes. All four sections must cite appropriate sources. The assignment should not exceed 4 pages (excluding references). Use only single-sided, double-spaced, type-written text with Arial 11-point font, numbered pages and 2cm margins. The cover page (which is in addition to the 4 page limit) should show the title of the topic, as well as the names and student numbers for all group members. Assignments will be **due in class on November 24<sup>th</sup>**. A penalty of 10% will be applied every 24 hours after this due date and time. The Group Assignment grade will be given per group, not per student. The Group Assignment will comprise 15% of the final grade.

PEER EVALUATION: Students in a group will evaluate each other with regards to their ability to work effectively within a team. Groups will generally consist of 5 members; therefore each student will be required to complete 4 peer evaluations. Peer evaluations will remain confidential and will not be handed back to students. One evaluation will take ~5 minutes to complete. Peer evaluations will be performed online through PEAR (Peer Evaluation, Assessment, and Review) and must be completed **before midnight on December 1<sup>st</sup>**. Students who do not complete peer evaluations by this time will automatically receive a grade of 0, irrespective of what your group members give you as a grade. The Peer Evaluation grade will correspond to the average grade given by your group members. Grades will be given per student, not per group. The Peer Evaluation will comprise 5% of the final grade.

MIDTERM EXAM: The midterm will cover material in the first half of the course, up to and including Friday, October 13<sup>th</sup>. The midterm will be written in class and could consist

of short answer questions, multiple choice, and/or true/false questions. Any students not writing the midterm (without prior consent from the course instructor) will receive zero on the midterm. The Midterm Exam will comprise 30% of the final grade.

**FINAL EXAM:** The final exam will assess the students understanding of all course content and their ability to integrate and apply the various concepts presented during the semester. The final exam will be composed of true/false, short answer and long answer questions. The Final Exam will comprise 45% of the final grade.

## **ATTENDANCE EXPECTATIONS**

Since lecture content will be assessed in the midterm and final exam, it is strongly encouraged that students attend all lectures. The structural overview of lectures will be made available on the website and students who have missed classes will need to interact with their fellow students to obtain the material. While appointments can be made to discuss course content with the instructor or TA, do not contact us requesting lecture notes for missed lectures. You can use the Discussion board on CourseLink to interact with your classmates for missed notes.

## **IMPORTANT DATES**

- SEPT 8 (Fri): First Lecture (12:30pm – 1:20pm)
- OCT 6 (Fri): In class discussion of Case Study
- OCT 9 (Mon): No class – Thanksgiving Monday
- OCT 11 (Wed): Case Study Report Due (in class)
- OCT 16 (Mon): Midterm Examination (in class)
- NOV 24 (Fri): Group Assignment Due (in class)
- DEC 1 (Fri): Peer Evaluation must be completed before midnight
- DEC 1 (Fri): Last day of class
- DEC 6 (Wed): Final Examination (location to be announced)

## **COURSE AND UNIVERSITY POLICIES**

### 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 in writing, with your name, id#, and e-mail contact, and be prepared to provide supporting documentation. See the undergraduate calendar for information on regulations and procedures for Academic Consideration: [Undergraduate Calendar - Academic Consideration](#)

## Accessibility

The University of Guelph is committed to creating a barrier-free environment. Providing services for students is a shared responsibility among students, faculty and administrators. This relationship is based on respect of individual rights, the dignity of the individual and the University community's shared commitment to an open and supportive learning environment. Students requiring service or accommodation, whether due to an identified, ongoing disability or a short-term disability should contact Student Accessibility Services (formerly the Centre for Students with Disabilities) as soon as possible.

For more information, contact SAS at 519-824-4120 ext. 56208 or email [csd@uoguelph.ca](mailto:csd@uoguelph.ca) or see the SAS website.

## Academic Misconduct

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 discourages misconduct. 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.

The Academic Misconduct Policy is detailed in the Undergraduate: [Undergraduate Calendar - Academic Misconduct](#)

## E-mail Communication

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

### Drop Date

The last date to drop one-semester courses, without academic penalty, is the 40<sup>th</sup> class day. To confirm the actual date please see the schedule of dates in the Undergraduate Calendar. For regulations and procedures for Dropping Courses, see the Undergraduate Calendar: [Undergraduate Calendar - Dropping Courses](#)

### Recording of Materials

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

## **CAMPUS RESOURCES**

The Academic Calendar is the source of information about the University of Guelph's procedures, policies and regulations which apply to undergraduate, graduate and diploma programs: [Academic Calendars](#)

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

Make an appointment with a Program Counsellor in your degree program.

### If you are struggling to succeed academically:

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.

### 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.

Student Health Services is located on campus and is available to provide medical attention.

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.

### If you have a documented disability or think you may have a disability:

Student Accessibility Services (SAS) formerly Centre for Students with Disabilities, can provide services and support for students with a documented learning or physical disability. They can also provide information about how to be tested for a learning disability.