**NUTRITION AND METABOLIC CONTROL OF DISEASE - NUTR*4320 (W17)**
**DEPARTMENT OF HUMAN HEALTH AND NUTRITIONAL SCIENCES**

**INSTRUCTOR: Dr. Jennifer Monk**
Office: ANNU 371B
Email: jmonk02@uoguelph.ca
Office hours: Fridays 3:30-4:30 PM
**additional review sessions will be held prior to the midterm and final exam*

**GRADUATE TEACHING ASSISTANTS (GTAs):**
Adrian Taylor (adrian@uoguelph.ca)
Alison Wilkin (awilkin@uoguelph.ca)

**CLASS LOCATION:** MACN 105 Tues/Thurs 2:30-3:50 PM

**IMPORTANT DATES:**
January 10, 2017 - First Class
February 16, 2017 – Assignment 1 DUE IN CLASS + email a copy to the GTA (**Adrian Taylor**)
February 20-24, 2017 – Winter Break – NO CLASSES
March 2, 2017 – in class MIDTERM examination
March 10, 2017 – 40th day of class. Last day to drop W17 semester courses.
March 28, 2017 – Assignment 3 DUE IN CLASS (printed copy)
March 30, 2017– Assignment 2 DUE IN CLASS + email a copy to the GTA (**Alison Wilkin**)
April 6, 2017 – Last Class
April 17, 2017 – FINAL EXAM – 7:00-9:00pm, Location TBA

**COURSE DESCRIPTION:**

This course deals with metabolic diseases most of which can be described in biochemical terms. These anomalies produce symptoms, or structural abnormalities, which impair the fitness, quality of life or potentially lead to death of the individual. The attention is focused on the mechanism(s) thought to participate in disease development, the affected metabolic pathways and the clinical manifestations which lead to disease symptoms. The role of nutrition both in prevention of disease development and as part of the therapeutic strategy to diminish symptoms or reverse pathology are examined along with classical treatment strategies involving lifestyle modification, drugs, and supplements provided as nutraceuticals or functional foods.

**LEARNING OUTCOMES:**
Upon successful completion of this course, you should be able to:

- Describe and understand how functional defects in metabolism can influence disease development and progression.
- Identify how the microbiota and various nutritional interventions influences gut physiology, immune function and chronic disease susceptibility
- Describe the interrelationship between dietary components, the gut microbiota and the epithelial barrier which influences susceptibility to various chronic diseases.
- Identify the mechanisms through which chronic inflammation influences metabolic signaling and disease progression.
- Compare and contrast different metabolic diseases to identify common mechanisms that could be susceptible to dietary and pharmaceutical interventions

**GRADING SCHEME:**

| Form of Assessment | Weight of Assessment | Due Date of Assessment | Course Content/Activity |
|---|---|---|---|
| Midterm Exam | 35% | March 2, 2017 IN CLASS | First half of the course only |
| Final Exam | 35% | April 17, 2017 | Focus on the last half of the course |
| Assignment 1 | 5% | February 16, 2017 | First half of the course only |
| Assignment 2 | 5% | March 30, 2017 | Last half of the course only |
| Assignment 3 (short paper) | 20% | March 28, 2017 | Content open based on students personal interests |

**ASSIGNMENTS:**

**Assignments 1 and 2: Practice Exam Questions**

Assignment 1 and 2 are designed to achieve the following outcomes:
i) encourage students to begin reviewing the lecture material in advance of the examinations
ii) to promote stronger understanding and retention of critical lecture material
iii) serve as a class generated sample practice exam (posted on courselink)

**Assignment 1** – Due: February 16, 2017
GTA - Adrian Taylor (adrian@uoguelph.ca)

**Assignment 2** – Due: March 30, 2017
GTA - Alison Wilkin (awilkin@uoguelph.ca)

For both **Assignment 1** and **Assignment 2** students are required to review the lecture material and generate **3 multiple choice questions** (with possible answers A, B, C or D). There must be only **ONE** possible correct answer for each question and the answer for each question must be provided. Students must also indicate in point form why the other 3 possible answers provided are incorrect.

Additionally, students must generate **one short answer question** worth 4 possible marks and provide a detailed answer key in response to the short answer question and identify how marks should be awarded for the correct response.

A hard copy of each assignment is due **AT THE START OF CLASS** on the due date above; however, students are encouraged to complete and submit their assignments prior to the due date. Each student is also required to **EMAIL** their assignment to the designated GTA so that their questions can be anonymously posted on courselink to provide sample questions to be utilized for study purposes by the rest of the class.

****Please make sure you put "NUTR4320 Assignment" as the subject line in your email!!**

**Assignment 3: Disease Phenotype and Dietary Intervention Short Paper (worth 20% of final mark)**

Students will select a chronic disease of interest and write a short review paper that describes the disease phenotype and discusses how a dietary component (or bioactive) has been shown to attenuate the disease phenotype with a specific focus on identifying the mechanisms of action (e.g. to say that a dietary component is anti-inflammatory is insufficient, instead explain the mechanism of HOW that dietary component elicits an anti-inflammatory effect).

Part 1 – identify and describe the disease phenotype (key features, clinical symptoms etc.). Students may use review articles published in peer-reviewed journals for this part of the assignment.

Part 2 – discuss how a dietary component of your choice/interest has been shown to modulate critical aspects of the disease phenotype. Indicate if these findings have been shown in cell culture models, animal models or in humans. Use primary literature sources from original research papers only in this section of the paper. Discuss and summarize the key findings (including the experimental design/model) from a minimum of 4 original research papers. If you identify conflicting findings from different research papers you can discuss this aspect in Part 3 of your paper.

Part 3 – to the best of your ability/background experience and understanding, identify what type of experiment or future direction should be pursed in research to further our understanding of how your nutritional component of interest can modulate or attenuate your disease of interest.

The short paper should be a minimum of 2 pages double-spaced, 12 point font, and standard margins. You may include a summary diagram (properly cited) if this is helpful. Students will be graded on organization, clarity and complexity of their explanation of the disease phenotype, explanation of the original research papers used in Part 2 and format of the paper [including proper referencing (APA style)].

The purpose of this assignment is to gain experience accessing and interpreting original research papers, practice and improve your written communication skills and provide an opportunity for students to pursue an area of interest that may not align with the course content.

**OUTLINE OF COURSE CONTENT: ***subject to changes**

**ABNORMALITIES OF CARBOHYDRATE AND AMINO ACID METABOLISM**
- Lactase deficiency/lactose intolerance
  → discussion of osteoporosis
- Celiac disease
- Hyperphenylalaninemia (PKU and non-PKU)

**THE GUT MICROBIOTA**
- Introduction and background
- Effect of the microbiota on host metabolism and immune function
- Introduction to diseases associated with epithelial barrier permeability

**DISEASES WITH MULTIPLE METABOLIC DEFECTS**
- Osteoporosis
- Obesity
- Type 2 Diabetes
- Inflammatory bowel disease
- Cancer
- Obesity-associated cancer

**COURSE RESOURCES:**

Course Readings: There are NO required textbooks for this course, however, students are encouraged to review key concepts from the course pre-requisites or seek out additional background information to understand the course content if needed.

**Outlines of lecture notes will be available on the CourseLink website.** I will do my best lecture notes in a timely manner (i.e. the evening prior to each class). The intention of the lecture notes is NOT to provide the student with a complete set of notes, but to provide a guide or outline of the lecture to provide students with a better opportunity to understand the lecture content as it is presented. **Students are encouraged to review the lecture material prior to class and encouraged to review the course content throughout the semester.**

**Attendance of ALL CLASSES is highly recommended.**

**UNIVERSITY POLICIES**

**Academic Consideration**

When you find yourself unable to meet a course requirement due to illness or compassionate reasons, please advise your course instructor by e-mail; include your name, student ID number, contact information, and any necessary documentation to support your claim. Please consult the Undergraduate Calendar for further information on regulations and procedures for Academic Consideration.

**Drop Date**

The last date to drop one-semester courses, without academic penalty, is **March 10, 2017** (40th day of class). If you are a registered University of Guelph Degree Student, consult the Undergraduate Calendar to confirm the drop-date.

**Accessibility**

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