

**COURSE OUTLINE**

NUTR\*3210 FUNDAMENTALS OF NUTRITION  
FALL 2016

**COURSE DESCRIPTION**

This is the foundational course for the study of nutrition. The occurrence, uptake and metabolic roles of essential and key non-essential nutrients will be discussed in relation to growth, reproduction, and health in human subjects, domestic animals and other species. (Prerequisite BIOC\*2580).

**INSTRUCTOR**

Dr. Jennifer Monk

Email: [jmonk02@uoguelph.ca](mailto:jmonk02@uoguelph.ca)

Office Hours: Tuesdays between 3:00 & 4:30pm, ANNU room 317B.

or Immediately after class

or Email me for appointment

**COURSE SCHEDULE**

Lectures

Tuesdays and Thursday, 11:30am-12:50pm, Thornbrough (THRN) 1200

**COURSE LEVEL LEARNING OUTCOMES**

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

- 1) Define the compounds and elements of nutritional importance to human beings and animals and to show how they are digested and absorbed;
- 2) Document the metabolic fate of absorbed nutrients and describe the metabolic basis of their essentiality;
- 3) Illustrate the role of nutrients in integrated physiological and metabolic processes of intact humans and animals, and;
- 4) Describe the abnormalities exhibited by humans or animals ingesting diets containing either deficient or excessive quantities of specific nutrients or energy.

**COURSE RESOURCES**

CourseLink:

Basic course material will be available on the CourseLink site for this course. I will be adding information in class to supplement the notes provided on CourseLink. This additional in-class information will be tested on both the midterm and final exams.

Reserve Materials:

(in McLaughlin Library)

Title: Advanced Nutrition and Human Metabolism

Authors: James L. Groff and Sareen S. Gropper

There will be copies of this text on reserve. It is not essential to buy this text and you will find that it goes beyond the level of detail that I teach in lecture and require you to know for examinations. If you want to purchase a copy of this textbook, then the 5<sup>th</sup> or 6<sup>th</sup> editions would be suitable and may be found used or ordered on Amazon. All the material

required for the course will be presented in lecture and in the lecture notes, but the text may prove useful to further understand the lecture material. It will also be helpful for students continuing on to more advanced nutrition courses. The lectures follow the sequence of chapters in this text book, with chapters 1-3 covering material from prerequisite biochemistry (which you will need to remember!), chapters 4-8 covering macronutrients and energy metabolism, and chapters 9-13 covering micronutrients. If you find areas of disagreement between the text and lecture (which can happen), please email me for clarification.

## **COURSE CONTENT**

### **Unit 01 – Introduction to Nutrition**

- Discussion of course objectives, organization and method of assessment
- Classes of nutrients and concept of dietary essentiality
- The importance of water

### **Unit 02 - Food/Feeds Composition Analysis & Digestive Systems**

- Proximate analysis: Modern techniques applied to a longstanding scheme
- Overview of digestive systems
- Digestibility

### **Unit 03 – Energy**

- Partitioning of feed energy for maintenance and production: gross energy (heat of combustion), digestible energy, metabolizable energy
- Physiological fuel values and the chemical basis for the differences among macronutrients in terms of energy density
- Calorimetry (direct and indirect)

### **Unit 04 – Review of Intermediary Metabolism**

- Glycogenesis/lysis, glycolysis, CAC, ETC, gluconeogenesis, HMP Shunt, Cori Cycle

### **Unit 05 - Carbohydrates**

- Classification and structure
- Digestion and absorption in monogastric and ruminant animals
- Metabolism and function, importance of carbohydrates in metabolism

### **Unit 06 - Lipids**

- Chemical structure of dietary lipids
- Essential fatty acids
- Digestion and intestinal absorption
- Metabolism, including the problem of transporting lipids in an aqueous medium

### **Unit 07 - Proteins**

- Classification and properties
- Dietary essential amino acids
- Protein quality
- Digestion and absorption
- Nitrogen metabolism

### **Unit 08 – Metabolic Integration**

- Metabolism under different conditions (fed, post-absorptive, fasted, starvation, exercise)
- Hormones involved in metabolism
- Activities of different tissues/organs

### Unit 09 – Micronutrients that bind to type II SHR and have global health implications

- Iodine, Vitamin A, Vitamin D, Calcium, Phosphorus, Fluoride
- Dietary sources, known biochemical and physiological functions, deficiency and toxicity signs/symptoms

### Unit 10 – Micronutrients involved in oxidant defense

- Vitamin E, Selenium, Vitamin C
- Dietary sources, known biochemical and physiological functions, deficiency and toxicity signs/symptoms

### Unit 11 – Micronutrients that act as enzyme cofactors

- Niacin, Thiamin, Riboflavin, Biotin, Folate, B12, Pantothenic Acid
- Dietary sources, known biochemical and physiological functions, deficiency and toxicity signs/symptoms

### Unit 12 – Minerals

- Fe, Cu, Zn, Mg, Mn, Mo
- Dietary sources, known biochemical and physiological functions, deficiency and toxicity signs/symptoms

## METHODS OF ASSESSMENT

Form of Assessment	Weight of Assessment	Due Date of Assessment	Location
Case Study Assignment	10%	Tuesday November 22 <sup>nd</sup>	THRN 1200
Midterm Exam	30%	Thursday October 27 <sup>th</sup> (in class)	THRN 1200
Final Exam	60%	December 8 <sup>th</sup> 2016 (11:30-1:30 pm)	TBD

- **If you miss the midterm exam, the final exam will be worth 90% of your final mark.**
- **Whatever exam (midterm or final) that you earn the highest mark will automatically be worth 60% of your final grade and the other exam will default to 30%.**

### Format and Material to be Covered in Examinations:

Format: The midterm and final exam will be multiple-choice format with some short answer questions. The questions will be designed to probe understanding of mechanisms and will present some scenarios for interpretation.

Midterm exam coverage: Hopefully to the end of the Lipids section, will announce in class.

Final examination coverage: Entire course, but weighted so that approximately 75% of the exam is on material covered after the midterm exam.

## RESEARCH PARTICIPATION BONUS

Students enrolled in this course will be invited during the first week of classes (September 12-16<sup>th</sup> 2016) to participate in a research study associated with the Case Study Assignment in this course. Participation is voluntary; however, students who participate and complete Survey 1 will receive a 1% bonus mark on the midterm exam and complete Survey 2 will receive a 1% bonus mark on their final exam. An alternative assignment will be offered for students who wish to abstain from the research project but who wish to receive the 1% bonus mark on their midterm exam and the 1% bonus mark on the final exam. Results from these two surveys will be used in the study but will not be accessed by Dr. Newton and Dr. Monk until after the submission of final course grades. Students will be invited to participate in the study by Dr. Genevieve Newton, Associate Professor, Department of Human Health and Nutritional Sciences, University of Guelph ([newton@uoguelph.ca](mailto:newton@uoguelph.ca)) via a Courselink posting and email sent to all students registered in the course with more details.

**Scaffolded Case Study Assignment:** Worth 10% of your final grade.

**All information about case study exemplars and rubrics are posted on Courselink.**

**Week 1 (September 12-16<sup>th</sup>, 2016)**

Students will watch a 5 minute video created by Dr. Newton that describes the use of case studies in science education and the requirements of the NUTR 3210 case study assignment. As well, students will be directed to read the article “Using Case Studies to Teach Science” (<http://actionbioscience.org/education/herreid.html>), as well as the article “A Guide to Using Case-Based Learning in Biochemistry Education” (Kulak & Newton, 2014, *Biochemistry and Molecular Biology Education*).

**Week 4 (October 3-7<sup>th</sup>, 2016)**

First case study exemplar, which is linked to the Review of Intermediary Metabolism. This case study describes Baby Chloe, a baby with a glycogen storage disease. Students are reminded to review the description of the case study assignment and the associated rubric as they go through the first exemplar case study. A discussion board will be set up to address questions related to the Baby Chloe case study.

**Week 7 (October 24-28<sup>th</sup>, 2016)**

Second case study exemplar, which is linked to Protein Metabolism. This case study describes Timothy, an adult male with an ornithine transcarbomylase deficiency. Students will be reminded to review the description of the case study assignment and the associated rubric as they go through the second exemplar case study. A discussion board will be set up to address questions related to the Timothy case study.

**Weeks 8-11 (October 31 – November 18<sup>th</sup>, 2016)**

Students are randomly assigned by the course instructor to their assignment groups using Courselink (4 students/group, with group members visible in Courselink using the Navbar). Students are reminded to review the description of the case study assignment and the associated rubric on Courselink.

Detailed explanation of the case study assignment is provided on Courselink, however in brief, students will identify five to ten learning outcomes related to the case study to be developed. Then, they will work with their group to create a vignette that describes the case. They will be referred back to the papers read in Week 1 (*Procedure 1*, “Using Case Studies to Teach Science” and “A Guide to Using Case-Based Learning in Biochemistry Education” to facilitate this process. Next, students will be instructed to work together to identify and collect data in the form of tables and/or figures that will help provide a solution to the case. Additionally, they will translate their case study learning outcomes into specific questions and solutions that relate to the case and prepare a final draft according to the formatting specifications.

**Week 12 (November 22, 2016)**

Group case study assignment is due at the start of class. Late penalties will be assigned for late assignments. Loss of 5% for each day that the assignment is late (as of 5pm).

**RESEARCH PARTICIPATION BONUS**

Students enrolled in this course will be invited during the first week of classes (September 12-16<sup>th</sup> 2016) to participate in a research study assessing the use of scaffolded case studies in nutritional science education to impact scientific literacy

skills. Participation will involve the completion of a short survey (5-7 minutes) and students who complete the survey will be awarded a 1% bonus mark on the midterm exam. Participation and completion of the survey is voluntary, and an alternative assignment will be offered for students who wish to abstain from the research project but who wish to receive the 1% bonus mark on their midterm exam.

At the end of the course students will be invited to continue their research participation by completing a second survey assessing their perceptions of their scientific literacy skills and their learning approach. This second survey will take 10-15 minutes to complete and students who complete the survey will be awarded a 1% bonus mark on their final exam. Participation and completion of the survey is voluntary, and an alternative assignment will be offered for students who wish to abstain from the research project but who wish to receive the 1% bonus mark on their final exam.

Students will be invited to participate in the study by Dr. Genevieve Newton, Associate Professor, Department of Human Health and Nutritional Sciences, University of Guelph ([newton@uoguelph.ca](mailto:newton@uoguelph.ca)) via a Courselink posting and email sent to all students registered in the course with more details.

### **IMPORTANT DATES**

**SEPT 8** (Thursday): First Lecture in THRN 1200 (11:30am – 12:50pm)

**OCT 11** (Tuesday): Fall Study Break Day - NO CLASSES SCHEDULED -- classes rescheduled to Thursday, December 1, 2016

**OCT 27** (Thursday): Midterm Exam – during regularly scheduled class time (11:30am – 12:50pm, THRN 1200)

**NOV 4** (Friday): 40<sup>th</sup> day of class – Last day to drop one-semester courses

**NOV 21** (Tuesday): Group Case Study Assignment is Due – at the start of class

**DEC 1** (Thursday): Classes rescheduled from Tuesday, October 11<sup>th</sup>. Regular Lecture Scheduled in THRN 1200 (11:30am – 12:50pm)

**FINAL EXAM – date and time 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 (or designated person, such as a teaching assistant) 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: <http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml>

### 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 the Centre for Students with Disabilities as soon as possible.

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

### 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 Calendar: <http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml>

### 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: <http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml>

### 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: <http://www.uoguelph.ca/registrar/calendars/index.cfm?index>

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

- make an appointment with a program counsellor in your degree program. <http://www.bsc.uoguelph.ca/index.shtml> or <https://www.uoguelph.ca/uaic/programcounsellors>

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. <http://www.learningcommons.uoguelph.ca/>

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/>

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

- The Centre for Students with Disabilities (CSD) 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. For more information, including how to register with the centre please see: <https://www.uoguelph.ca/csd/>