

Course Syllabus

Vitamin and Mineral Metabolism through the Life-cycle NFS 382H1 (2014)

A. Lectures:

Wednesdays 09:00-12:00

Room 128, Mining Building, 170 College Street

B. Instructor:

Dr. Deborah (Debbie) O'Connor

FitzGerald Building, Room 327

Office Hours: Wednesday 12:00-1p.m. or by appointment arranged through e-mail correspondence.

E-mail: deborah.oconnor@utoronto.ca

Telephone: (416) 946-7366, Fitzgerald Building

Note: Time will be reserved at the beginning and end of each class to ask questions. Due to the size of the class, I will not be able to provide lengthy written responses to questions about course material via email. I will be happy, however, to provide written responses to questions about course material on Blackboard.

C. Prerequisites: NFS 284 Basic Human Nutrition; (BIO 120H1/BIO 130H1)/BIO 150Y1; (CHM 138H1, CHM 139H1)/CHM 151Y1

D. Course Description:

Vitamins and minerals are essential for health throughout the life span. This course examines the metabolism of vitamins and minerals in the context of human development, aging and with some emphasis on disease prevention and pathogenesis.

The function and role of selected vitamins and minerals will be discussed in the following groupings:

- Folate and vitamin B12 during reproduction; Vitamin B12 during aging.
- Growth and development, including cognitive development: iron, zinc, copper and iodine (emphasis on infancy and early childhood)
- Oral health: fluoride
- Hypertension: sodium, potassium and chloride
- Antioxidants and Chronic Disease: vitamins A, C, E and selenium
- Bone Health: calcium, vitamin D, magnesium, phosphorus, vitamin K (emphasis on infancy and aging)

E. Course Objectives:

- To gain knowledge about the metabolism of specific vitamins and minerals and the role that they play in human health.
- To understand what the dietary recommended intakes (DRIs) are for specific vitamins and minerals and how these values are derived.
- To understand the current vitamin and mineral status of Canadians.
- To develop critical appraisal skills and attain a basic understanding of the principles of study design.
- At the end of the course to have a complete set of notes and key citations that can serve as a resource to the student in the future.

F. Course Evaluation:

Best two of three (i.e. Test#1, Test#2 [Take home], Test#3)

Test #1 (30%): The format will be short answer questions in which students are required to integrate their knowledge from lectures and readings with findings taken from the scientific literature. This test will be written during our scheduled class time on **Wednesday, February 5th**. Please note the test will be written in Room 128, Mining Building, 170 College Street. The test will be designed for one hour but you may take up to three hours to complete the test.

Test#2 (Journal Article Critique, 30%): This will be a take-home examination. It will be distributed during class on March 5th and needs to be submitted by **8 a.m. on Wednesday March 12th**. Students will be required to complete a critique of an assigned research article using the strategies reviewed in class and on a vitamin and/or mineral that the instructor has covered during class. Students may work together but the write-up must be completed independently.

“Normally, students will be required to submit Test#2 to Turnitin.com for a review of textual similarity and detection of possible plagiarism. In doing so, students will allow their critiques to be included as source documents in the Turnitin.com reference database, where they will be used solely for the purpose of detecting plagiarism. The terms that apply to the University's use of the Turnitin.com service are described on the Turnitin.com web site”.

Test#2 will normally be submitted through a **direct link** to Turnitin that will be found on the course's Blackboard page.

If you have problems that prevent you from submitting to Turnitin, please contact Dr. O'Connor to discuss alternatives well in advance of distribution of Test#2. All students are expected to submit to Turnitin, which is voluntary, or provide an alternative. Failure to do so could result in a grade of zero for the Test. For those who do not submit to Turnitin, as an alternative you will be expected to meet with Dr O'Connor for a short **oral test** during which you will be asked

questions about the process of writing of the assignment and your knowledge of the content of the assignment. Your test mark may be modified based on how well you answer these questions.

Dr. O'Connor will review the Turnitin submissions and will e-mail students if there are any concerns about their writing. Often this will be no more than a discussion of how to properly paraphrase and/or cite references, but the deduction of marks may also result. Failure to respond to such an e-mail **will** result in the deduction of assignment marks. If a serious case of plagiarism is suspected, the student's assignment will be forwarded to the Office of Academic Integrity for review and possible sanction.

Test #3 (30%): The format will be short answer questions in which students are required to integrate their knowledge from lectures and readings with findings taken from the scientific literature. This test will be written during our schedule class time on **Wednesday, March 19th**. Please note the test will be written in Room 128, Mining Building, 170 College Street. The test will be designed for one hour but you may take up to three hours to complete the test.

Final Examination (40%): Material from throughout the course will be included with emphasis on material not previously covered on tests #1 and 3. The format will be short answer questions. *The date, time and location of the final exam are set by the registrar.*

Important Notes:

You may bring in one letter size sheet of paper with handwritten material on it to each exam. This should help students to stay focused during their preparation for the test on the "big picture" and integration of the material. Typed material will not be allowed. You may bring a calculator.

Students are advised to review the Faculty of Arts and Science 2013-2014 Calendar for the rules and regulations in regard to missed tests.

http://www.artsandscience.utoronto.ca/ofr/calendar/1314_Calendar.pdf

As stated in the rules and regulations, students who miss a term test will be assigned a mark of zero for that test unless they have a compelling reason supported by documentation. If you miss a test due to illness, please use the University of Toronto illness verification form found at:

<http://www.illnessverification.utoronto.ca/getattachment/index/Verification-of-Illness-or-Injury-form-Jan-22-2013.pdf.aspx>

If you miss one of the three terms tests, for whatever reason (compelling reason or not), your in-course grade (i.e. 60% of the total grade for the course) will be calculated using the other two tests. If you miss more than one term test, you will be assigned a mark of zero for the second (and third test if missed also) unless you have a compelling reason supported by documentation. If you miss two term tests for a compelling reason and provide the appropriate documentation for both absences, your final examination will be worth 70% of your final grade. In the unlikely event you miss all three term tests for a compelling reason and provide appropriate

documentation for all three absences, your final examination will be worth 100% of your final grade.

A student may request remarking of a term test. This request must be done in writing, describing the student's specific concerns within two weeks after the test was returned. Please take the time to look over the answer key before formulating your request. Be aware that your mark may go up, down, or stay the same.

G. Accessibility Needs:

The University of Toronto is committed to accessibility. If you require accommodations for a disability, or have any accessibility concerns about the course, the classroom or course materials, please contact Accessibility Services as soon as possible: disability.services@utoronto.ca or <http://studentlife.utoronto.ca/accessibility>

H. Course Materials:

Most required readings are included in this syllabus. Additional assigned readings will be posted on Blackboard a week in advance of each lecture in designated folders. Lecture slides will be posted on the course website (Blackboard) at least 24 hours in advance of each lecture. I recommend the purchase of the text entitled, *Advanced Nutrition and Human Metabolism 2013*, 6th Edition by Sareen S Gropper and Jack L Smith, Wadsworth, CENGAGE Learning. Two copies of this text can be found at the short term loan section of the Gerstein library if you choose not to purchase the text. The assigned reading from the text are recommended but not required. You will not be tested on material from the textbook that is not covered in class.

I. Course Content

For your tests and final examination you will be examined on lecture material and the "required" assigned readings (i.e. scientific articles) as outlined in this syllabus and posted on the course website. It is strongly advised that student attend lectures and complete the "required" assigned reading. These articles have been carefully selected to enhance and reinforce what is taught in the lectures and prepare students for some of the types of questions that will appear on the tests and final examination. Throughout the term, I will use some of these articles to provide students with an opportunity to practice interpreting data as reported in scientific journal articles, and to practice integrating their knowledge when reading and interpreting findings from the scientific literature.

J. Course Outline:

Week 1 (January 8)

- Introduction to the Course.
- What are Dietary Reference Intakes?
- Prevalence of Vitamin and Mineral Inadequacies in Canada?
- How to Assess the Scientific Literature (Nuts and Bolts)

- General Tips: Timelines for applying to graduate school (funding); securing a summer voluntary/paid research or clinical placement.
 - ✓ *Barr S. Introduction to Dietary Reference Intakes. Applied Physiology, Nutrition and Metabolism 31:61-65, 2006. (required)*
 - ✓ *Text Inside Front Cover (recommended)*
 - ✓ *Shakur Y et al. A comparison of the micronutrient inadequacy and risk of high micronutrient intakes among vitamin and mineral supplement users and non-users in Canada. Journal of Nutrition 142(3):534-40, 2012. (required)*
 - ✓ *Young YM and Solomon MJ. How to Critically Appraise an Article. Nature Clinical Practice Gastroenterology and Hepatology 6(2):82-91, 2009. (recommended)*

Week 2 (January 15)

- Review of the Digestive System (Educational Portal Videos: (1) Digestive System I: The Upper Gastrointestinal Tract and (2) Digestive System II: The Lower Gastrointestinal Tract. <http://education-portal.com/academy/lesson/digestive-system-i-the-upper-gastrointestinal-tract.html#lesson>
- Folate, Vitamin B12 with Emphasis on Women of Reproductive age.
 - ✓ *Text Chapter 2. The Digestive System: Mechanisms for Nourishing the Body (recommended)*
 - ✓ *Folate and Vitamin B12, Text pp. 344-360 (recommended)*
 - ✓ *Shakur Y et al. Folic acid fortification over mandated levels results in a low prevalence of folate inadequacy among Canadians. American Journal of Clinical Nutrition 92(4):818-25, 2010. (required)*
 - ✓ *Colapinto C et al. Folate status of the population in the Canadian Health Measures. Canadian Medical Association Journal 183(2):E100-6, 2011(required)*

Week 3 (January 22):

- Vitamin B12 in Aging: Relationship with Cognitive Decline.
- In-class journal article critique (Torsyik I et al Am J Clin Nutr 2013)
- Growth and Development: Iron, Zinc, Copper, Iodine
 - ✓ *Allen LH. Vitamin B12. Advances in Nutrition 3: 54-55, 2012.(required reading)*
 - ✓ *MacFarlane AJ et al. Vitamin B12 and homocysteine status in a folate-replete population: results from the Canadian Health Measures Survey. American Journal of Clinical Nutrition 94(4):1079-1087, 2011. (required)*
 - ✓ *Torsyik I et al. Cobalamin supplementation improves motor development and regurgitations in infants: results from a randomized intervention study. Am J Clin Nutr 98(5):1233-40, 2013. (required)*
 - ✓ *Smith AD. The worldwide challenge of dementias: a role for B vitamins and homocysteine? Food and Nutrition Bulletin 29(2 Supple):S143-72. (not a required reading; for your information only)*

Week 4 (January 29):

- Growth and Development; Iron, Zinc, Copper
 - ✓ *Health Canada Prenatal Nutrition Guidelines for Health Professionals - Iron Contributes to a Healthy Pregnancy.* <http://www.hc-sc.gc.ca/fn-an/pubs/nutrition/iron-fer-eng.php>
 - ✓ *Baker RD et al. Diagnosis and Prevention of Iron Deficiency and Iron-Deficiency Anemia in Infants and Young Children (0–3 Years of Age).* *Pediatrics* 126(5): 1040 -1050. (required)
 - ✓ *Domellof M. Iron requirements, absorpton and metabolism in infancy and childhood.* *Curr Opin Clin Nutr Metab Care* 10:329-335. (required)
 - ✓ *Iron, Zinc and Copper, Text pp. 481-519 (recommended)*

Week 5 (February 5): Test#1 Short Answer

Week 6 (February 12):

- Growth and Development; Iodine
- Iodine Fortification of the Food Supply
 - ✓ *Iodine status of Canadians, 2009 to 2011* <http://www.statcan.gc.ca/pub/82-625-x/2012001/article/11733-eng.htm> (required)
 - ✓ *Iodine: Text pp. 530-535. (recommended)*
- Oral Health: Fluoride and Vitamin C
 - ✓ *Health Canada: Fluoride in Drinking Water* http://www.hc-sc.gc.ca/ewh-semt/water-eau/drink-potab/health-sante/faq_fluoride-fluorure-eng.php (required)
 - ✓ *Fluoride and Vitamin C: Text pp. 547-550;310-318. (recommended)*

Week 7 (February 19): READING WEEK

Week 8 (February 26):

- Bone Metabolism during Development and Aging: Calcium, vitamin D, phosphorus, magnesium, vitamin K
 - ✓ *Health Canada: Vitamin D Levels of Canadians.* <http://www.statcan.gc.ca/pub/82-624-x/2013001/article/11727-eng.htm> (required)
 - ✓ *Calcium, Vitamin D, Phosphorus, Magnesium and Vitamin K: Text pp. 371-400; 409-415; 425-449. (recommended)*

Week 9 (March 5):

- Bone Metabolism during Development and Aging: Calcium, vitamin D, phosphorus, magnesium, vitamin K (continued)
- *Author Video Podcast: Connie M Weaver, Wayne W Campbell, Dorothy Teegarden, Bruce A Craig, Berdine R Martin, Rajni Singh, Michelle M Braun, John W Apolzan, Tamara S Hannon, Dale A Schoeller, Linda A DiMeglio, Yvonne Hickey, and Munro Peacock*

Am J Clin Nutr 2011 94 (5): 1163-1170
http://pubs.nutrition.org/site//2011_Author_videos.xhtml

- **Distribute Test #2 (Take-home) in class**

Week 10 (March 12):

- Anti-oxidants and Chronic Disease: Vitamins A and C, E and Selenium
 - ✓ *NPR: In a Grain of Golden Rice—A World of Controversy Over GMO Foods.*
<http://www.npr.org/player/v2/mediaPlayer.html?action=1&t=1&islist=false&id=173611461&m=173687766> (required)
 - ✓ *Vitamin A, C and E: Text pp. 310-319, 371-390, 400-407; 519-526. (recommended)*

Week 11 (March 19): **TEST #2** – Short answer

Week 12 (March 26):

- Hypertension; Sodium, Potassium and Chloride
 - ✓ *CBC Market Place (March 2013): The Great Salt Shakedown*
<http://www.cbc.ca/marketplace/episodes/2012-2013/the-great-salt-shakedown> (required)
 - ✓ *Sodium, Potassium and Chloride: Text pp. 462-469. (recommended)*

Week 13 (April 2):

- Completion of course material
 - ✓ *CTV News (July 30, 2013): Healthy Alternative or False Advertising?*
<http://www.theglobeandmail.com/news/news-video/vitamin-water-healthy-alternative-or-false-advertising/article13498215/?from=16001734>
- Final Review