

# NUTB 305 NUTRITIONAL BIOCHEMISTRY WITH COMMUNITY/CLINICAL APPLICATIONS: MICRONUTRIENTS

MSNP | Tufts University, Friedman School of Nutrition Science and Policy

*January 18 – April 26, 2018*

**Class Meetings: Residency Jan 29 – Jan 31. This is a blended class.**

## Instructors

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## Guest Instructors

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## Teaching Assistant

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**Graduate Credit:** 1.0

**Prerequisites:** Standard introductory biochemistry, physiology, and nutrition courses

## Course Description and Goals

Students will explore the fundamental roles of nutrients in biological systems and the implications of nutrient biological functions on food and nutrition policy. Particular emphasis will be placed on the function of nutrients as defined by their chemistry, interrelations among nutrient functions, mechanistic approaches in the analysis of nutrient-disease relationships, and recent advances in the basic sciences related to nutrition and nutrient function. The course will integrate examples of community, clinical and public health policy applications throughout the term. Published journal articles from the peer reviewed literature, case histories, and public policy documents will form the basis for critical review and discussion. This course is the second course of a two-course sequence (NUTB 205 and NUTB 305).

## Course Objectives/Outcomes

By the end of this course, students will be able to:

- describe and explain the following fundamentals for the micronutrients (water-soluble vitamins, fat soluble vitamins, and minerals) in a biological system including:
  - scientific and common name
  - digestion, absorption, transport, metabolism
  - biochemical role

- diet sources
- methods by which nutritional status is assessed and DRIs established.
- deficiency and toxicity symptoms and the prevalence of each in the general population.
- use this knowledge to comprehend and critique published journal articles that represent both seminal and recent state of our knowledge for each nutrient.
- explain the role of nutrition components in causing or alleviating the major chronic diseases in the selected regions in the world.
- discuss the results of nutrition intervention trials to prevent/cure the disease and critique the successes and failures of each of these trials.

**Text or Materials:** *Advanced Nutrition and Human Metabolism*. Sixth Edition, by Sareen S.Gropper and Jack L. Smith. ISBN10: 1133104053 and ISBN 13: 9781133104056. Wadsworth.Cengage Learning, USA, 2013

**Academic Conduct:** Each student is responsible for upholding the highest standards of academic integrity, as specified in the Friedman School's Policies and Procedures manual (<http://nutrition.tufts.edu/student/documents>) and Tufts University policies ([http://uss.tufts.edu/studentaffairs/judicialaffairs/Academic\\_Integrity.pdf](http://uss.tufts.edu/studentaffairs/judicialaffairs/Academic_Integrity.pdf)). It is the responsibility of each student to understand and comply with these standards, as violations will be sanctioned by penalties ranging from failure on an assignment and the course to dismissal from the school.

### **Classroom Conduct and Attendance Policy**

Upon joining this Master of Nutrition Science and Policy degree program, you become a member of a cohort, a learning group. Hopefully you will find the group experience provides you with a tremendous support system, a rich learning environment, and a long lasting network of colleagues to learn with and from. As a member of a cohort in an intensive experiential learning community, your consistent and complete participation is an essential and necessary component to the group's success. Absences jeopardize the academic integrity of the program as well as the quality of your and your colleague's learning experiences.

Therefore, please arrange to be present at all residency sessions during this third term. If you miss any time, documentation in writing is required in advance. Every hour of missed residency time may lower your final grade by 2%.

Time extensions, make-up work, and a grade of Incomplete will only be given under the most extreme circumstances. Requests for these items must be made in advance, in writing, to the Dean for Academic Affairs and must have prior approval, in writing, of the academic adviser and the instructor.

### **Communication Policy**

Students should seek out information themselves, from your peers, as well as on the "Question Board" in the class site. If you do not find your answer contact the instructor as soon as possible. Please do not wait. Faculty will answer within 48 hours. It is your responsibility to contact the instructor immediately if you have, suspect or anticipate any issues or questions regarding course content, assignments and due dates. If you have, suspect or anticipate technical difficulties, it is your responsibility to contact technical support immediately. Communication and anticipation of issues is vital due to the distance nature of this course.

### **Assessment and Grading:**

The following guidelines are used in evaluating course performance:

1. Class assignments will be evaluated on the basis of completeness, originality, scientific soundness and relevance to the assigned topic, as well as participation as deemed appropriate by the course instructors.

2. Written work will be evaluated on the quality of thought, completeness, adherence to guidelines, scientific integrity, and ability to incorporate and communicate ideas and information effectively.
3. Adherence to instructions and guidelines of the assignments.
4. Attendance at all class sessions. Please see the Attendance Policy. Missed time will affect your grade unless prior arrangements were requested and approved in writing by the instructors for make-up work.
5. On-line discussions will be evaluated according to the matrix found here:

### Simple Rubric for Online Discussions

Discussion Assignments Grading Criteria				
	<b>0 Does not meet requirements</b>	<b>1 Meets Requirements</b>	<b>2 Exceeds Requirements</b>	Student's Rating
<b>Quality of posting</b>	Postings are not relevant to the questions posed, or too simplistic/not thorough, or no posting at all.	Postings reflect the reading and some outside source material but outside source material not cited.	Postings reflect the readings and outside information with proper outside source material informal citation.	
<b>Quality of reply</b>	Response not relevant to original posting, or no reply at all.	Response relevant to posting but fails to support position.	Response relevant to posting and supports position with factual information.	
<b>Understanding of reading and outside source material</b>	Responds to the question posted but does not mention materials from the readings.	Responds to the question posted and makes reference to readings.	Responds to question posted & demonstrates understanding of material and outside source material and properly cites information.	
<b>Timeliness of Posting</b>	Posting or response was not completed on time.	Posting and response were completed on time.		

### Assignments, Exams and Grade Evaluation

The overall grade for the course will be based on the following breakdown:

One proctored, online exam @ 15% of grade	15%
Two on-line, timed, essay style exams @ 15% of grade	30%
One take-home final exam (one week to write it)	15%
Ten online discussion/assignments (see grading matrix below)	25%

Presentation during residency 10%  
 In-class attendance and preparedness 5%

A grade of A is excellent, and is defined as far and above the stated requirements for the given assignment. B is defined such that the student met the basic requirements. Grades less than B- are considered a failure. You must have a grade average of 3.0 (B) to receive a degree from the Friedman School. Grades will be posted in Gradebook in Canvas throughout the semester.

**Technical Support**

All technical support questions should be directed to [canvas@tufts.edu](mailto:canvas@tufts.edu) (<https://sites.tufts.edu/canvas/help-and-support/>) or asked via Skype. Students should contact technical support for technical issues. Monday through Friday 9 am - 5pm (Eastern Time). Faculty should not be contacted for technical support.

**Assignments and Submission Instructions**

Assignments received after their deadline will not be accepted or graded unless extension is approved in advance. Students who are unable to complete an assignment exam on time for any reason should notify the instructor by email, text message or phone call prior to the deadline, with a brief explanation for why the extension is needed.

**Accommodation of Disabilities:** Tufts University is committed to providing equal access and support to all students through the provision of reasonable accommodations so that each student may access their curricula and achieve their person and academic potential. If you have a disability that required reasonable accommodations please contact the Friedman School Assistant Dean of Student Affairs at 617-636-6719 to make arrangements of determination of appropriate accommodations. Please be aware that accommodations cannot be enacted retroactively, making timeline4ss a critical aspect for their provision.

**Course Schedule:**

DATE	WEEK	TOPIC	Instructor	Guest Lecturer
Jan 18 - 24, 2018	1	Phosphorus and Magnesium; Nutrition and Hematopoiesis	Ausman	
Jan 25 – 28, 2018		Prepare for residency		
Jan 29, 2018	Residency (Weeks 2 & 3)	8-9:00 am Vitamin A 9-10 am Carotenoid 10:15 – 11:15 Molecular Biology of Carotenoids  11:15 - 12:15 – Carotenoids and Brain	Ausman Ausman Wang  Johnson	
Jan 30, 2018	Residency (Weeks 2 & 3)	1 – 2 pm Folate 2 – 3 pm Vitamin B12  3-5 pm Time to work on student presentations for Feb 1	Paul- Pottenplackel	

Jan 31, 2018	Residency (Weeks 2 & 3)	8 – 10 am – Vitamin A and Carotenoids 10:15 – 12:00 am Folate and Vitamin B12	Ausman Ausman	Johnson Paul-Pottenplackel
<b>Feb 9 – 11, 2018</b>		<b>Proctored Exam #1 (Phosphorus, Magnesium, Folate, Vitamin B12, Vitamin A, Carotenoids)</b>		
Feb 12 – 18, 2018	4	Calcium and Vitamin D	Ausman	
Feb 19 - 25, 2018	5	Iron	Ausman	
Feb 26 – Mar 4, 2018	6	Zinc, Copper, Manganese, Molybdenum, and Fluoride	Ausman	
<b>Mar 9 – 11, 2018</b>	<b>Exam between Fri 3/9 - 8am and Sun 3/11 11:59pm</b>	<b><i>Exam on Calcium, Vitamin D, Iron, Copper, Zinc, Manganese, Molybdenum, and Fluoride,</i></b>		
Mar 5 - 11, 2018	7	Electrolytes – Sodium, Potassium, Chloride	Ausman	
Mar 12 - 18, 2018	8	Selenium, Chromium, Iodine, Ultratrace Elements (Arsenic, Boron, Nickel, Silicon, Vanadium, Cobalt)	Ausman	
Mar 19 – 25, 2018		Spring Break Week		
Mar 26- Apr 1, 2018	9	Ascorbic Acid, Biotin, and Pantothenic Acid	Ausman	
<b>Mar 30- Apr 1, 2018</b>	<b>Exam between Fri 4/6- 8am and Sun 4/8 11:59pm</b>	<b><i>Quiz on Electrolytes, Selenium, Chromium, Iodine, Ultratrace Minerals, Ascorbin Acid, Biotin, and Pantothenic Acid</i></b>		
Apr 2 - 8, 2018	10	Niacin and Pyridoxine	Ausman	
Apr 9 -15, 2018	11	Thiamin and Riboflavin	Ausman	
Apr 16 - 22, 2018	12	Vitamin K	Ausman	Booth
Apr 23 - 29, 2018	13	Vitamin E	Ausman	Wu
April 30 – May 3, 2018		Reading Days		
<b>May 4 – 8, 2018</b>		<b>Exam on Niacin, Pyridoxine, Thiamin, Riboflavin, Vitamin K, and Vitamin E</b>		
<b>Take Home Final exam</b>				

#### Course Requirements:

1. Attend all residency sessions (arrive on time and remain for the entire scheduled session).
2. Contribute with positive participation and involvement in all in-class and on-line activities.
3. Complete all in-class and group assignments.
4. Contribute constructively to all on-line discussions.

5. Complete all exams

**Readings, Activities & Discussions**

Specific information and directions on required text/book/pdf reading, assignments, and discussions for each week of the course are in the Weekly Overview of the class on Canvas.