

Syracuse University
Nutrition Science and Dietetics Programs
NSD 665 Metabolism of Micronutrients
Spring 2021

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Office Hours	Wednesday 1:00 p.m. – 2:00 p.m. Thursday 1:00 p.m. – 2:00 p.m. And by appointment		

Catalog Course Description

Review of the micro-nutrients, their structures, metabolic and/or physiologic functions, requirements, deficiency states and possible toxicities, nutritional assessment, food sources, and interrelationships with other nutrients.

Prerequisite/Corequisite

None

Credits

3

Learning Objectives

After taking this course, students will be able to:

1. Explain the role of micro-nutrients in normal human nutrition and metabolism.
2. Describe the specific functions and characteristics of each micro-nutrient.
3. Understand the mechanisms for absorption, transport, storage, metabolic function, excretion and toxicity for each micro-nutrient discussed.
4. Discuss the role of micronutrients as transcription factors.
5. Explain and discuss the interactions between bioactive food components and the regulation of gene expression in the control of inflammation, the maintenance of health and the prevention of disease.
6. Describe the interactions between various vitamins and minerals.
7. Discuss the complexity of factors that determine micro-nutrient requirements and describe changes created by deficiency or by pharmacological/toxicological intakes of micro-nutrients across the lifespan.
8. Use the Nutrition Care Process and recognize limitations of the methods of nutritional assessment and the applicability of the DRIs when applied to individuals versus groups.
9. Become familiar with recent research in the area of micro-nutrient metabolism.
10. Be able to use current information technologies to locate and apply evidence-based guidelines and protocols such as the Academy of Nutrition and Dietetics Evidence Analysis Library, Cochrane Database of Systematic Reviews and the US Department of Health and Human Services.
11. Be able to critically review recent research in micronutrient metabolism and demonstrate effective and professional oral and written communication.

ACEND Knowledge Requirements fulfilled by NSD 665:

Objectives/Outcomes	Learning Activities	Assessments
<i>KRDN 1.1 Demonstrate how to locate, interpret, evaluate and use professional literature to make ethical, evidence-based practice decisions</i>		
KRDN 1.1 Learning Outcome: Students are able to demonstrate how to locate, interpret, evaluated and use professional literature to make ethical evidence-based practice decisions	Lecture, Discussion Presentation Assignment	Discussion Exam Presentation Assignment
<i>KRDN 2.1 Demonstrate effective and professional oral and written communication and documentation.</i>		
KRDN 2.1 Learning Outcome: Students are able to demonstrate effective and professional oral and written communication and documentation and use of current information technologies when communicating with individuals, groups and the public	Lecture Discussion Presentation Assignment	Discussion Exam Presentation Assignment
<i>KRDN 1.3 Apply critical thinking skills.</i>		
KRDN 1.3 Learning Outcome: Students are able discuss the complexity of factors that determine micro-nutrient requirements and describe changes created by deficiency or by pharmacological/toxicological intakes of micro-nutrients across the lifespan. Students are able to critically review recent research in micronutrient metabolism and demonstrate effective and professional oral and written communication	Discussion Presentation Assignment	Discussion Exam Presentation Assignment
<i>KRDN 3.1 Use the Nutrition Care Process to make decisions, identify nutrition -related problems and determine and evaluate nutrition interventions.</i>		
KRDN 3.1 Learning Outcome: Students are able to use the Nutrition Care Process to make decisions, to identify nutrition-related problems and determine and evaluate nutrition interventions, including medical nutrition therapy, disease prevention and health promotion	Lecture Discussion Presentation Assignment	Discussion, Exam Presentation Assignment
<i>KRDN 3.5 Describe basic concepts of nutritional genomics.</i>		
KRDN 3.5 Learning Outcome: Students are able discuss the role of micronutrients as transcription factors. Students are able to explain and discuss the interactions between bioactive food components and the regulation of gene expression in the control of inflammation, the maintenance of health and the prevention of disease.	Lecture Discussion Assignment	Discussion, Exam Assignment

Bibliography/Texts/Supplies- Required

Required:

Biochemical and Physiological Aspects of Human Nutrition, by Stipanuk, 3rd ed. WB Saunders Co. 2012.

Recommended:

Nutrition Therapy & Pathophysiology, by Nelms et al. Wadsworth. Belmont, CA 2nd ed. 2011

The Vitamins: Fundamental Aspects in Nutrition and Health 5th. 2017. Edition by G. Coombs, J.P.

McClung ISBN-13: 978-0128029657

The instructor will provide additional materials such as journal articles and chapters from other books. Students are expected to review textbooks and class notes on chemistry, organic chemistry, anatomy and physiology, and biochemistry as necessary in their own time.

Course Requirements and Expectations

This is graduate level science class in nutrition. Students are expected to enter this class with knowledge in general chemistry, basic nutrition, anatomy and physiology, and basic biochemistry. It is the instructor's responsibility to identify, select, and revise the topics, materials, activities, and schedule in this class. The actual learning will be done by individual students through continuous participation and efforts. The instructor will provide help and resources to facilitate this learning process. No one should underestimate the amount of work needed both in and *outside* lecture to succeed in this course.

Students are expected to enter this class with literature search skills (eg. how to use PubMed, how to use the Interlibrary Loan system), proper citation, and writing in scientific language. Students in need of help in any of these areas should make an appointment with a librarian.

Students are strongly encouraged to utilize all course resources available and communicate in a timely matter with the instructor on progress, problems, help needed, and suggestions in this course. The instructor is here to provide any help and support possible.

Exams

It is the policy of the Department of Public Health, Foods Studies and Nutrition not to give make-up exams or quizzes. A signed statement from a health care provider must be presented to show that the absence from class was unavoidable. Notify the instructor in advance if you have to be absent on the day of an exam for any reason. If you miss an exam/quiz for illegitimate reasons, no make-up exam will be given. Students will have opportunity to check exams and answer keys at the department. No one will be allowed to take exam materials away from the department or make photocopies.

Assignments

All assignments are due on the days announced in the calendar. Late submission will not be accepted. No make-up opportunity will be given. All assignments will be product of word processing software such as Microsoft Word. Handwritten homework will not be accepted.

Grading:

Assessments	points	% of Grade
Online Journal Club Discussions (5 pts x 10)	50	12%
Online Group Presentation Assignment in Perusall	50	12%
Online Group Presentation Discussion in Perusall	25	6%
Nutrigenomic/Media Critique Project	50	12%
Midterm exams/Case Studies (100 pts x 2)	200	47%
Final - Group Project Written Assignment (50 pts)	50	12%
	425	100%

Grades*	Grade points/credit*	Percentage range	Total points
A	4.0	93-100	93-100
A-	3.66	89-92.9	89-92.9
B+	3.33	86-88.9	86-88.9
B	3.0	82-85.9	82-85.9
B-	2.66	79-81.9	79-81.9
C+	2.33	76-78.9	76-78.9
C	2.0	71-76.9	71-76.9
C-	1.66	66-70.9	66-70.9
F	0	<66	<66

*Source [Grading FAQ for Students](#)

Grades of D and D- may not be assigned to graduate students

Course-Specific Expectations and Policies

Faculty and Student Responsibilities

University courses are necessary preparation for a professional career. Therefore, you are expected to treat all courses in a professional manner. Professional behavior includes meeting deadlines, taking responsibility for your own learning, and respect for others. Active participation is monitored, expected, and is an indicator of professional behavior.

Perusall

We will use the online shared reading program Perusall (<https://perusall.com>) for journal club discussions and presentations this semester. Perusall is designed to motivate students primarily through the content of the readings and social interactions. I will use Perusall's engagement score to assign grades for participation in our online discussion sessions. The Perusall engagement score is computed from student behavior and designed, based on research, to predict your mastery of the subject. Perusall will help you learn faster by collaboratively annotating the readings and communicating with your classmates. Collaboration gets you help whenever you need it, makes learning more fun, enables you to help others (which research shows is also a great way for you to learn), and helps me make the class better by emphasizing information that you need.

If you have a question or information to share about a passage in the readings, highlight the text and type in a comment as an annotation. You can also respond to a classmate's annotation in threads (Facebook style) in real-time or upvote questions you find helpful. Good annotations contribute to the class by stimulating discussion, explaining your thought processes, helping others, and drawing attention to useful points. If a particular classmate's point is relevant, you can explicitly "mention" them, and they will be immediately notified, even if not presently signed on.

Research shows that the following behaviors on Perusall predict long-term mastery of the subject:

- Contributing thoughtful questions and comments to the class discussion, spread throughout the entire reading (see some examples)
- Starting the reading early
- Breaking the reading into chunks (instead of trying to do it all at once)
- Reading all the way to the end of the assigned reading
- Posing thoughtful questions and comments that elicit responses from classmates
- Answering questions from others
- Upvoting thoughtful questions and helpful answers

To access Perusall, you will need to create an account at <https://perusall.com>. You will enter course code VOSS-EJDX4 upon registration.

University Attendance Policy

Attendance in classes is expected in all courses at Syracuse University. It is a federal requirement that students who do not attend or cease to attend a class to be reported at the time of determination by the faculty that the student never attended or stopped attending the class. Faculty should use Early-Semester Progress Reports and Mid-Semester Progress Reports in Orange SUccess to alert the Registrar and Financial Aid Office. For more information visit [Faculty Non-attendance](#) or [Students Non-attendance](#).

Excuses for class absences for medical reasons will be given only if such absences are advised by a licensed health care provider, based on clinical findings and prescribed treatment recommendations. Excused notes will not be given solely to confirm a visit to the Health Center. For complete details on excuse notes, visit [Health Services Excuse Notes](#).

Syracuse University Policies

Academic Integrity Policy:

Syracuse University's Academic Integrity Policy reflects the high value that we, as a university community, place on honesty in academic work. The policy defines our expectations for academic honesty and holds students accountable for the integrity of all work they submit. Students should understand that it is their responsibility to learn about course-specific expectations, as well as about university-wide academic integrity expectation. The policy governs appropriate citation and use of sources, the integrity of work submitted in exams and assignments, and the veracity of signatures on attendance sheets and other verification of participation in class activities. The policy also prohibits

students from submitting the same work in more than one class without receiving written authorization in advance from both instructors. Under the policy, students found in violation are subject to grade sanctions determined by the course instructor and non-grade sanctions determined by the School or College where the course is offered in described in the Violation and Sanction Classification Rubric. SU students are required to read an online summary of the University's academic integrity expectations and provide an electronic signature agreeing to abide by them twice per year during pre-term check-in on MySlice.

The Violation and Sanction Classification Rubric establishes recommended guidelines for the determination of grade penalties by faculty and instructors, while also giving them discretion to select the grade penalty they believe most suitable, including course failure, regardless of violation level. Any established violation in this course may result in course failure regardless of violation level.

To view the policy in its entirety, please visit [Academic Integrity – Expectations and Policy](#).

Turnitin Usage

This class will use the plagiarism detection and prevention system Turnitin for certain assignments. You will have the option to submit your papers to Turnitin to check that all sources you use have been properly acknowledged and cited before you submit the paper to me. I will also submit all papers you write for this class to Turnitin, which compares submitted documents against documents on the Internet and against student papers submitted to Turnitin at Syracuse University and at other colleges and universities. I will take your knowledge of the subject matter of this course and your writing level and style into account in interpreting the originality report. Keep in mind that all papers you submit for this class will become part of the Turnitin.com reference database solely for the purpose of detecting plagiarism of such papers.

Blackboard Learning System

Syracuse University recognizes the importance of teaching and the use of appropriate teaching materials to successful student learning. The Blackboard Learning Management System is a key instructional technology tool that enables Syracuse University instructors to engage in transformative teaching and learning, both for face-to-face and online courses. All faculty, staff and students at Syracuse University can access Blackboard using their University NetID. Course access is granted through an integrated data feed with the MySlice student information system. This integration automatically generates course sites and enrollments for all officially recognized courses each semester.

Information Technology Services ensures the optimal performance of the Blackboard system by overseeing system access, account creations, system operations, user training and technical support. Additional information about Blackboard is available on [Answers Blackboard](#); alternatively, you can contact Information Technology Services by sending email to help@syr.edu or by calling 315.443.2677.

Syracuse University is using Blackboard Ally, a tool to help enhance the usability and accessibility of course documents in the Blackboard learning management system. Ally provides students with multiple accessible formats of the original document so they can select the best one that fits their

unique needs. Currently, Ally offers accessible versions of Portable Document Format (PDF) files, Microsoft Office files (Word and PowerPoint), images and uploaded HTML files. Students will see a dropdown menu to the right of each document. From this dropdown menu, they can select one or more Accessible versions to download and use.

Additional information on the Blackboard Ally tool is available on [Answers Blackboard Ally](#); alternatively, you can contact Information Technology Services by sending email to help@syr.edu or calling 315.443.2677.

Faith Traditions Observances:

Syracuse University does not set aside days for any religious holiday. **Students must notify instructors by the end of the second week of classes** for regular session classes and by the submission deadline for flexibly formatted classes when they will be observing their religious holiday(s). Please remind students in class of their obligations to do so. Students will have access to an online notification form through MySlice for two weeks beginning on the first day of class.

Syracuse University's religious observances policy, found at [Syracuse University Religious Observances Policy](#), recognizes the diversity of faiths represented in the campus community and protects the rights of students, faculty, and staff to observe religious holy days according to their tradition. Under the policy, students should have an opportunity to make up any examination, study, or work requirements that may be missed due to a religious observance provided they notify their instructors no later than the end of the second week of classes for regular session classes and by the submission deadline for flexibly formatted classes. Student deadlines are posted in MySlice under Student Services/Enrollment/My Religious Observances/Add a Notification.

Disability-Related Accommodations:

If you believe that you need accommodations for a disability, please contact the Office of Disability Services (ODS) located at 804 University Avenue, third floor, or go to the [ODS website](#) and click Students tab to register online. You may also call 315.443.4498 to speak to someone regarding specific access needs. ODS is responsible for coordinating disability-related accommodations and will issue 'Accommodation Letters' to students as appropriate. Since accommodations may require early planning, and are not provided retroactively, please contact ODS as soon as possible.

Email Policy

Syracuse University has established email as a primary vehicle for official communication with students, faculty, and staff. Emergency notifications, educational dialog, research, and general business correspondence are all consistently enhanced in institutions of higher learning where email policies exist and are supported by procedures, practice, and culture.

An official email address is established and assigned by Information Technology Services (ITS) for each registered student, as well as for all active faculty and staff members. All University communications sent via email will be sent to this address. Faculty and staff members must use the officially established University email address to communicate with students registered in their classes. Keep in mind that student records sent to a non-syr.edu email address may create a FERPA violation (See the complete policy at [Syracuse University E-Mail Policy](#))

Policy on Student Academic Work/FERPA

The Family Educational Rights and Privacy Act (FERPA) sets forth requirements regarding the privacy of student records. FERPA governs both the access to and release of those records, known as education records, and the information they contain. Under FERPA, faculty have a legal responsibility to protect the confidentiality of student records. For additional information about FERPA and Syracuse University's FERPA policy, see [Syracuse University Compliance with FERPA](#) or contact the Office of the Registrar (315.443.3535).

In compliance with FERPA, works in all media produced by students as part of their participation in this course at Syracuse University may be used for educational purposes. It is understood that registration for and continued enrollment in a course where such use of student work is announced constitutes permission by the student.

After this course has been completed, any further use of student works will meet one of the following conditions: (1) the work will be rendered anonymous through the removal of all personal identification of the work's creator/originator(s); or (2) the creator/originator(s)' written permission will be secured.

Orange Alert

Orange Alert, Syracuse University's crisis notification system, uses text messages, phone, and email alerts to provide rapid notification and instructions to members of the University community in the event of a critical incident in progress. Critical incidents could include an individual who is considered armed and dangerous, a hazardous materials incident, an explosion, or any other event in which there is an immediate threat of physical harm or death to campus community members.

In the event of an emergency

- Phone emergency line from on-campus: 711
- Phone emergency line from off-campus: 443.2224
- Phone emergency line from cell phone providers ATT/Verizon/Nextel: #78

For complete details on emergency procedures, visit [Syracuse University Emergency Guide](#).

Course Calendar

Week/Lecture	Topic	Required Reading and Assignment
Week 1 2/8	Overview - micronutrient metabolism	Become familiar with Perusall.com Discussion 1 - Huskisson et al 2007
Week 1 2/10	Overview - micronutrient metabolism	
Week 2 2/15	Micronutrients and skeletal health	
Week 2 2/17	Micronutrients and skeletal health	
Week 3 2/22	Micronutrients and skeletal health	Discussion2: Nieves 2007 - Osteoporosis: the role of micronutrients (Perusall)
Week 3 2/24	Micronutrients and Anemia	
Week 4 3/1	Micronutrients and Anemia	Discussion 3: Smuts 2005 - Micronutrients and anemia (Perusall)
Week 4 3/3	Micronutrients and Anemia	Group presentation topics due
Week 5 3/8	Micronutrients and Anemia	Exam 1 assigned
Week 5 3/10	Micronutrients and Energy Metabolism	
Week 6 3/15	Micronutrients and Energy Metabolism	Discussion 4: Lyon 2020- B Vitamins and One-Carbon Metabolism: Implications in Human Health and Disease (Perusall)
Week 6 3/17	Micronutrients and Energy Metabolism	Exam 1 due
Week 7 3/22	Micronutrients and Energy Metabolism	Discussion 5: Stover 2009 - One-Carbon Metabolism–Genome Interactions in Folate-Associated Pathologies (Perusall)
Week 7 3/24	Micronutrients and Energy Metabolism	Media critique topics due
Week 8 3/29	Micronutrients as Antioxidants	Discussion 6: Free Radicals, Antioxidants in Disease and Health (Perusall)
Week 8 3/31	Micronutrients as Antioxidants	
Week 9 4/5	Micronutrients as Antioxidants	Discussion 7: Wang et al 2017 - Supplementation of Micronutrient Selenium in Metabolic Diseases: Its Role as an Antioxidant (Perusall)
Week 9 4/7	Micronutrients as Antioxidants	

Week/Lecture	Topic	Required Reading and Assignment
Week 10 4/12	Vitamins A and K, Blood Clotting Mechanisms	Exam 2 assigned Discussion 8: Cranenburg et al 207. Vitamin K: The coagulation vitamin that became omnipotent (Perusall)
Week 10 4/14	Vitamins A and K, Blood Clotting Mechanisms	
Week 11 4/19	Mineral 1	Discussion 9: Student selected paper
Week 11 4/21	Minerals 2	Exam 2 due
Week 12 4/26	Minerals 3	
Week 12 4/28	Minerals 4	Media critiques posted on Perusall
Week 13 5/3	Fluid, Electrolyte, Acid-Base Balance	Discussion 10: Student selected paper
Week 13 5/5	Fluid, Electrolyte, Acid-Base Balance	
Week 14 5/10	Fluid, Electrolyte, Acid-Base Balance	Media critique peer reviews in Perusall are due
Week 14 5/12	Fluid, Electrolyte, Acid-Base Balance	Final Written Project Due

***** This syllabus including course schedule is subject to update*****